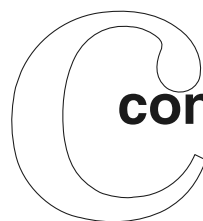




Indian Institute of Technology Bombay

annual report

2012-13



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Director's Report

Introduction

The Indian Institute of Technology Bombay continues to be ranked as one of the top universities of the country and among the best in the world. IIT Bombay attracts the best students from the country for its Bachelor's, Master's and Doctoral programmes, and in the 55 years of its existence, more than 44,000 students have graduated from IIT Bombay. The alumni of the institute have distinguished themselves through their achievements and contributions in diverse fields, and the engagement with the alumni continues to grow. Research is an increasing focus of activity of the institute coupled with strong efforts to see that the fruits of the research are translated into commerce through licensing or through startups. The institute continues to attract outstanding faculty members, and this is at the core of the growth of the institute. Presently, we have 565 faculty members – the largest by far among all the IITs – with many of them internationally reputed for their research contributions. The Institute continues to build links with international and national peer universities to enhance research and educational programmes.

Academic Programme

IIT Bombay has taken several new initiatives in restructuring and strengthening its academic programmes at postgraduate and undergraduate levels over the past years. A new curriculum for undergraduate students was introduced in 2007. The two-year M.Sc. programme was reviewed and a six-year M.Sc.-Ph.D. dual degree programme was introduced in 2008. An M.Tech.-Ph.D. dual degree programme was introduced in 2009. A new M.Sc. and M.Tech. programme at the postgraduate level has also been initiated recently. This programme has a focus on research and development which is a crucial factor that has helped in the recognition of IIT Bombay as a premier institute for higher learning. We recently had a re-look at our undergraduate programme with a specific view of enhancing the science contents. The new curriculum developed is being implemented for the batch entering this year. A new compulsory course on

biology has also been introduced as a result of this endeavour. This new scheme offers the same flexibility for the students to opt for minor and honor courses as before.

The institute has emerged as the leading institution for technology education and research in the country. IIT Bombay continues to be the most sought-after destination for undergraduate and postgraduate studies and attracts the top performers in national examinations such as GATE, CEED, NET, JAM and JEE. Among 15 IITs in the country, 67 of top 100 rankers in JEE 2013 have joined IIT Bombay and eight of the top ten All-India JEE rank holders have chosen to join IIT Bombay. Similar trends are observed for the candidates qualifying in other entrance examinations as well.

The characteristics of the student population at the institute are undergoing a significant change in the recent times. The on-roll strength in 2007-08 was 5285 students of which 2196 (41.5%) were undergraduates (UG) and 3089 (58.5%) were postgraduates (PG). During 2012-13, the on-roll strength has increased to 8327 of which 3656 are UG students and 4641 are PG students. With the existing programmes, the UG population will saturate at 3415 (31%) in the academic year 2013-14, while the PG population will saturate at 7601 (69%) during the year 2018-19, with a total of 11062 students in the institute. The institute has responded pragmatically to the large increase in its intake by substantially reorienting itself academically, technologically and administratively and using it as a great opportunity to retain its leadership in engineering education.

The Ph.D. student strength has been steadily increasing. While we had 771 Ph.D. students on roll in the academic year 2001-02, in the academic year 2011-12 the number rose to 1879, an increase of over 150 per cent in a span of just 10 years. We are on course to achieve our target of 2775 Ph.D. students, i.e., approximately 30 per cent on roll among 11062 students in the academic year 2018-19. On the Ph.D. output front, as compared to 73 Ph.D. degrees awarded in 2001, the numbers were 200, 179, 179 and 173 in the years

2008-2009, 2009-2010, 2010-11 and 2011-12, respectively. An interesting aspect of our Ph.D output, observed in the recent years, is the fact that around 65 per cent of the degrees are in the engineering disciplines. All students involved in research at the Institute are given an opportunity to interact with research community at the national and international levels by providing funds to attend international conferences. While the research scholars are the primary beneficiary of this scheme, some other PG students (including dual degree) and UG students have also benefited. The annual funding utilised by students has increased from Rs. 63,82,855/- last year to Rs. 94,68,288/- lakhs this year. With effect from April 1, 2013, the funding for participation in international conferences has been enhanced to Rs. 1,00,000/- for North and South America; Rs. 90,000/- for Europe and Rs. 60,000/- for neighbouring countries. During the academic year 2012-13, 254 students were granted financial assistance for attending international conferences as against 160 for the previous year.

The Institute Student Mentor Programme has been operating successfully for several years. The programme provides a support structure for the undergraduates, targeted largely to the first and second year students, and is essentially managed by the senior students under the supervision of a faculty coordinator. This programme has been extended to mentor needy senior students at the department level. For undergraduates, whose academic performance does not meet the requirements for continuation in their programmes, a final chance for continuation in the form of the Academic Rehabilitation Programme (ARP) has been in effect since 2008-09. A Senate- appointed committee prescribes a customised academic load for ARP students, provides necessary support with the help of student mentors, and carefully monitors behaviour and performance for a semester. An ARP student is rehabilitated into her/his programme on successful completion. Academic probation, a feature similar to ARP, for the postgraduates gives a PG student a second chance to continue in the programme.

Encouraged by enthusiastic and effective participation of students in various aspects of academic administration, several mechanisms to channelise and structure the energy of the students in creative and constructive activities have been devised and are operational.

UG Teaching Assistantship: In an effort to make the senior UG students more self-sufficient, responsible and oriented towards academics, UG Teaching Assistantship was introduced during the academic year 2009-10. This year, UG Teaching Assistants were appointed to assist the faculty in conducting the various UG courses.

STUDe Club: This is an initiative under the Dean (AP) Office to set up programmes targeting a student's overall development. The club helps students achieve their cherished desires. It has conducted monthly motivational seminars by eminent (invited) speakers and technical workshops each semester, in addition to publishing its newsletter and maintaining its website.

Cell for Human Values: This was started at IIT Bombay around the year 2001 with an objective to bring out the values, ethical and societal dimension of Science & Technology education being imparted at the institute. Three major activities carried out in the Cell include Computer Literacy Programme, Sangeetanand and training in Drawings and Paintings.

The idea behind computer literacy programme is to empower the underprivileged sections of our society, through computer literacy. This environment-friendly project was helpful to the departments of IIT Bombay as well. They were able to donate to the Cell their unused computers and unwanted furniture, which were an eyesore in many a corridor. These computers and furniture have been instrumental in educating more than 1000 students so far. Teaching is done by staff, NSS volunteers and other IIT students. Many IIT students have enthusiastically helped us in starting new courses, designing the evaluations, assignments, etc. Needless to say, the beneficiaries have been flattered and delighted at being taught by the 'IIT students'. The experience for many of the student volunteers has also been profound as the love and respect received can be wonderful. Mrs. Vidya Kulkarni coordinates this activity.

Sangeetanand aims to engage the IIT Bombay students to learn and pursue their interest in Indian classical music. Pandit Nayan Ghosh (Distinguished Guest Professor at IIT Bombay), one of the well-known Hindustani musicians, trains the students and entralls them in learning music. It is growing in size and has about 100 students regularly attending the 'baitak'. It has been a great stress buster for IIT Bombay students. Pandit Yashwant Acharya helps IIT Bombay students in pursuing their interest in fine arts like drawing and painting. These classes also receive very enthusiastic response from students. Sangeetanand and painting activities have been going on in the Institute since last four years.

In this year's Convocation, a total of 2044 degrees were awarded. These include 175 Ph.D., 6 Dual Degree (M.Sc.+Ph.D.), 4 M.Sc. by research, 10 M.Phil., 561 M.Tech., 117 M.Mgmt., 50 M.Des., 228 five year B.Tech.+M.Tech. dual degree, 6 PGDIIT, 14 five-year integrated M.Sc., 200 two-year M.Sc. and 439 B.Tech. degrees.

Research and Development Activities

Research and Development (R&D) activity at IIT Bombay is growing rapidly. During the last three years, R&D receipts grew at a cumulative annual growth rate (CAGR) of about 42 per cent. During 2012-13 R&D receipts (Rs. 293.5 crores) grew by 54 per cent compared to the previous year (Rs. 189.9 crores). Figure 1 shows the growth of research funds in the last few years.

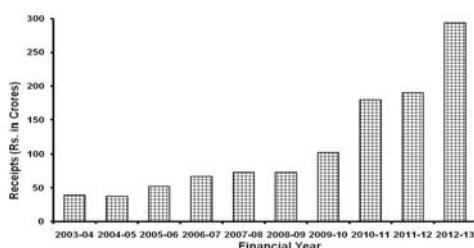


Figure 1: Growth of R&D receipts in the last decade

1. R&D Activities

During the year 2012-13, new R&D projects were initiated in all areas of science, engineering, management and social sciences, typically ranging from two to five years duration. These included short-term consulting projects and long-term sponsored research projects (Table 1).

Table 1: Information on new projects sanctioned during last 3 years

Year	Sponsored projects		Consultancy	
	Number	Sanctioned outlay (Rs. in crores)	Number	Project outlay ('Rs. in crores)
2010-11	229	174.0	460	23.6
2011-12	210	182.0	510	23.0
2012-13	240	343.5	517	29.5

External Grants for R&D

The total money received for R&D activity in 2012-13 was Rs.307.42 crores (Table 2). This includes grants received in the year for the new projects sanctioned and the ongoing projects.

Table 2: Money received for R&D in 2012-13

Project Type	Number	Funds received (Rs. in crores)
Sponsored Projects	466	266.58
Consultancy Projects	567	26.97
Royalty	-	12.54
Equipment usage	-	1.33
Total	1033	307.42

The R&D work continues to be mainly supported by government entities (Figure 2 and Table 3). A sum of Rs. 41.2 crores was received from industry. The figure shows an enhancement of over 52 per cent compared

to the previous year. Table 4 indicates some of the major sponsors from industry.

Figure 2: Distribution of receipts from different agencies

Table 3: Main sponsors

Agencies	Grant received (Rs. in crores)	Number of new / ongoing projects funded
Ministry of Human Resources Development	119.13	10
Department of Science & Technology	53.29	148
Department of Information Technology	25.55	17
Ministry of New And Renewable Energy	12.65	5
Board of Research in Nuclear Sciences	10.54	35
Indian Space Research Organisation	5.50	7
Department of Biotechnology	4.32	34
Defence establishments (DRDO, ADA, NRB, AERB, ARDB, DAA)	3.80	42
The Boeing Company, USA	2.70	1
Ministry of Culture	1.50	1
National Disaster Management Authority	1.11	2
Council of Scientific and Industrial Research	1.08	19

Table 4: Sponsors from Industry and other Govt. 83%

Applied Materials Inc.	Hindustan Petroleum Corporation Ltd.
Aerospace Research and Development, USA	Larsen & Toubro Limited
Boeing	Maxim India Integrated Circuit Design Pvt. Ltd.
Ford Foundation	Netapp India Private Limited
German Development Cooperation	Nokia India Pvt. Ltd.
Holcim Foundation for Sustainable Construction	Oil & Natural Gas Commission
Intel Corporation	Piramal Life Sciences Ltd.
International Business Machines Corporation	Reliance Industries Ltd.
McDonnell Academy	Reserve Bank of India
Nokia Siemens Networks	Samsung Electronics Ltd.
Pratt & Whitney Co.	State Bank of India
Renesas Electronics Corporation	Sumer Infrastructure Pvt. Ltd.
Semiconductor Research Corporation	Tata Consultancy Services Ltd.
Siemens Power Generation Inc.	Tata Steel Ltd.
Wadhvani Foundation	Tata Teleservices Ltd.
Xerox Corporation	Indo-French Centre for the Promotion of Advance Research
Bhilai Steel Plant	Indo-US Science & Technology Forum
Cummins India Ltd.	

Some major sponsored projects initiated

- Teachers Empowerment, Students Empowerment and Integration Tools for Empowerment (Synchronous Delivery), abbreviated as the 'Talk to a Teacher' project

Funding agency: Ministry of Human Resource Development Sanctioned outlay: Rs.133.7 crores over three years

- Hardware and Software Optimization, and Testing of Low Cost Access Devices
Funding agency: Ministry of Human Resource Development Sanctioned outlay: Rs.47.7 crores over two years
- US-India Consortium for Solar Energy Research Institute for India and the United States
Funding agency: Indo-US Science & Technology Forum, New Delhi
Sanctioned outlay: Rs.13.4 crores over five years
- National Mission on Education through ICT
Funding agency: Ministry of Human Resource Development Sanctioned outlay: Rs.11.5 crores over two years
- National Centre for Aerospace Innovation & Research at IIT Bombay
Funding agency: Department of Science & Technology & The Boeing Company, USA
Sanctioned outlay: Rs.11.5 crores & Rs. 4.2 crores over three years
- Indian Language Corpora Initiative – Phase 2
Funding agency: Department of Information Technology
Sanctioned outlay: Rs.9.3 crores over three years
- Dielectrics and their Integration into Nano Scale Logic and Memory Devices
Funding agency: Department of Science & Technology
Sanctioned outlay: Rs.8.5 crores over three years
- Materials for Energy and Sensors
Funding agency: Department of Science & Technology
Sanctioned outlay: Rs.7.4 crores over five years
- Support for the Operation, Maintenance and Upgradation of the National Facility of Texture & OIM
Funding agency: Board of Research in Nuclear Sciences
Sanctioned outlay: Rs.7.0 crores over five years
- New Generation of Molecular Nanomagnet
Funding agency: Department of Science & Technology
Sanctioned outlay: Rs.3.4 crores over three years
- Silicon/Silicon-Germanium/Germanium Vertical Gate all around Transistor Pathfinding
Funding agency: Applied Materials Inc.
Sanctioned outlay: Rs.1.97 crores over three years

Efforts were made to disseminate information and provide support to faculty regarding project funding from sponsors (both national and international). This resulted in enhancing the number of research grant

proposals to funding agencies; the number increased from 320 in 2009 to nearly 370 this year.

Consultancy

Consultancy activities were taken up for government, public sector and industry – both Indian and international. The types of consultancy provided included retainership, expert advice, product / process / software development, analysis, evaluation, product design and limited testing.

Some consultancy projects initiated

- Anti-sea erosion study
- Benchmarking in energy consumption
- Capacity determination of natural gas pipeline networks
- Design of advanced fall arrester
- Design of ethylene oxide sterilizer
- Development and deployment of rail simulator and optimization tool
- Development of multiplexing assay kit technology
- Development of thermo-lab stability chamber
- Ergonomics and aesthetics of packaging machine
- Instrumentation study of Mumbai monorail civil structures
- Launching systems for superstructure girders of road-over-bridge
- Analysis and mitigation of black powder formation in natural gas pipeline
- Slum rehabilitation scheme
- Software for water utility billing systems
- Technology development for impeller design
- Verification of aero thermo models
- Water footprint studies

Internal Grants for R&D

The institute provided internal funding for supporting faculty research and student activities. Grants of around Rs.13.12 crores were sanctioned for these activities which included the following:

- Initiation of research for new faculty
- Augmenting research resources of the (faculty) recipients of research / review paper / young investigator awards
- Research internships
- Research in Healthcare
- Student research/competition: Projects such as Automotive Racing, Intelligent Ground Vehicle, Solar Decathlon and Underwater Vehicle
- Upgradation of central and national research facilities
- Leverage grants and bridge grants

c) R&D Award Grants from External Agencies

IIT Bombay's research was recognised by peers and society in the form of award grants conferred on faculty,

students and groups. Faculty research awards included Innovative Young Biotechnologist Award by DBT in the field of Biosciences and Chemical Engineering and Innovation in Science Pursuit for Inspired Research (INSPIRE) grant by DST in Mathematics and Systems & Control Engineering.

2. Licensing Activities

a) Technology Transfers:

The Institute continues to receive royalties for different IPs licensed in the past. Some of the technologies licensed in this year are:

- An evaluation license was given to the technology on determination of deformations in a transformer
- Technology on drag reduction using water-soluble polymer
- Functionalisation of Su8 based epoxy resist used for lab on chip devices
- Technology on inorganic-organic hybrid coatings
- Portable surface Plasmon resonance-based detector
- Short -term load forecasting

b) Dissemination/Outreach:

- To promote and enhance licensing of technology developed at the institute, the intellectual property available for licensing was disseminated through an advertisement in leading national newspapers, fliers and electronic media.
- IIT Bombay technologies were displayed at a R&D exhibition in the PANIIT Alumni Global Conference 2012 held at Science City Auditorium, Kolkata, during December 1-9, 2012. Alumni, dignitaries and general public visited the exhibition.

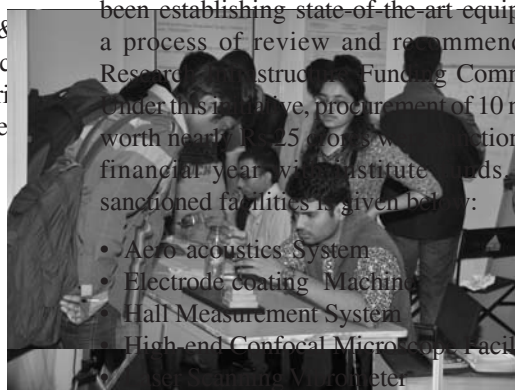
including students, teachers and general public visited the exhibition.



- ‘TechConnect 2013’ was organised during the Techfest, held at IIT Bombay between January 3-5, 2013, to showcase R&D exhibits from different academic units, and included demos and visits to labs and facilities.

3. Augmentation of Research Infrastructure

As part of creating and upgrading infrastructure for enabling research and development, the institute has been establishing state-of-the-art equipment through a process of review and recommendation by the Research Infrastructure Funding Committee (RIFC). Under this initiative, procurement of 10 new equipment worth nearly ₹25 crore was sanctioned during this financial year with institute funds. A list of the sanctioned facilities is given below:



- Aero-acoustics System
- Electro-coating Machine
- Hall Measurement System
- High-end Confocal Microscopy Facility
- Molecular Beam Epitaxy system
- Multi – Frequency Electron Paramagnetic Resonance Spectroscopy
- Protein Crystallography System
- Surface Plasmon Resonance Spectrometer
- Transient Absorption Spectrometer

These are either ‘Central Facilities’ which are made available to all at the institute, or ‘Institute Facilities’ the major users of which are specific academic units. Other units have only limited access to the institute facilities.

In addition, several equipment and facilities were procured through external grants some of which are listed below:

- High Resolution Liquid Chromatography Mass Spectrometry

- IIT Bombay participated in the 6th Science Expo organised by Nehru Science Centre, Mumbai, during February 20-23, 2013, and its exhibits included 35 working models and demonstrations and posters. A Popular Science lecture on ‘Magic and Science: Art of “Active” Learning’ was delivered by Prof. Anil Kumar, Department of Chemistry. About 60 faculty, students and staff of various departments/centres/groups participated in the event. Nearly 8600 people

- DC & RF Device Characterisation system
- Field Emission Scanning Electron Microscope
- Microfocus single crystal X-ray diffractometer system
- Glove Box setup with Coater and Metal Evaporator
- Temperature Dependent Spectral Response Measurement system
- Image based droplet size and velocity measurement system
- TG–DSC DTA with MS
- TEM sample preparation tool set

4. Intellectual Property (IP) Protection Activities

The Annual Report (2010-11) of the Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM), Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, highlighted the outstanding IPR performance of IIT Bombay as:

- One of the top five entities filing Indian patent applications in the field of Information Technology
- Top Indian entity from Institutes and Universities filing patent applications
- Top Indian patentee of the year from Institutes and Universities

The patenting activities continued to grow during the year. The growth of patent filings in the last few years is given in Figure 3.

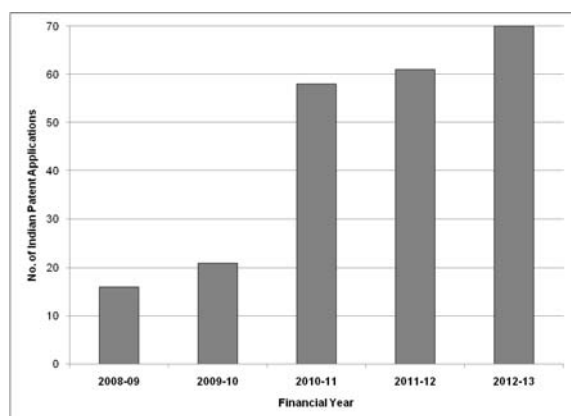


Figure 3: Growth of patent applications from 2008-09 to 2012-13

During current year, 70 Indian patent applications were filed.

Table 5 gives a list of all Indian and international IPR filings.

Table 5: Patents Applications filed during 2012-13

Territory	No. of Applications
Patents	
Indian	70
PCT	13
US	6
EU & Brazil	2
Trademarks and Design	
Indian	2
Copyright	
Indian	1

Two Indian patents and eight US patents were granted during the year. In addition, three Indian Designs, one Trademark and four Copyrights were registered during this period. Proactive efforts continued for licensing of these technologies, products and designs.

Areas of IP filings:

Chemical synthesis, Combustion, Electrical & electronics, Energy and environment, Healthcare, Information and communications technology, Machinery, Network, Refrigeration, Soil engineering, Retail Management System, Aerospace research and others.

As in the previous year, proactive efforts were made to assess the possibility of intellectual property in the work of M.Tech./Dual degree students to file for possible protection. Abstracts numbering 826 were reviewed. Out of this, 53 were shortlisted for a possible filing of patent applications. Eleven invention disclosures were filed.

More than 180 agreements were reviewed or negotiated during the year – including those for research collaboration, licensing, non-disclosure agreements, student sponsorships, consortia formation, endowment, etc. – with industries, organisations, universities and government, both national and international.

5. Focused Initiatives

Initiatives were taken to promote and facilitate research and development work and encourage students to focus on R&D from undergraduate level itself. Some highlights are given below:

a. Enhancing industry partnership

Steps were initiated to enhance interaction with industries. An industry meet on ‘Partner with Us: Strengthening IITB and Industry Interactions’ was organised on April 19, 2012 to brainstorm on specific initiatives and steps that are to be taken to enhance our interactions with industry. The event was well attended by more than 100 participants, including 50 from industry. One of the main suggestions made by industry representatives was that IIT Bombay should

take the lead to create roadmaps for research and development in various areas of interest to academia and industry by aligning the interests of various stakeholders.

Interactions with industry (both Indian and international) to explore opportunities for collaboration in research and consultancy have been growing.

A*STAR, Agusta Westland, Cassidian, Coca-Cola, Eli Lilly Singapore, Michelin, Lianhe Chemical Technology, Mercedes-Benz, Neterwala Group, NTT Date, Reckitt Benckiser and Total.

b. Consortia/Partnership

Healthcare Consortium: The activities included:

- A seminar on Evaluation of Analytical Performance in Laboratory Diagnostics
- Workshops at ACTREC, KEM and NIRRH.
- Inclusion of three new members : InnAccel (a medical technology accelerator company), Hinduja Hospital and Drishti (NGO).

c. Student initiatives

As part of 'Enthuse' activities to motivate young students to do research, post-dinner talks at hostels and R&D orientation in the departments were organised. The talks at hostels included six visits involving around thirty faculty members.

d. Incentives for R&D

This year too, rewards for research excellence, technology development efforts, research/review publications, and industry impact were given (Table 6). Recognition was in the form of cash awards and research grants. Besides, institute-wide dissemination through lectures and electronic media was arranged.

e. Dissemination/Outreach

A workshop on "Central Facilities" was held on August 24, 2012 to disseminate information about the facilities available to the academic community. Conveners of 10 central facilities made presentations on technical specifications and capabilities, the types of experiments carried out and the usage. Internal online registration for using the facilities was demonstrated. About 110 faculty members and students attended the workshop.

Lectures by domain experts (institute faculty and outside experts) on the work of winners of the Nobel Prize 2012 were organised at the institute on November 9, 2012.

f. Safety during R&D activities

The focused emphasis on processes and procedures to address safety during R&D activities was continued. Some of the activities during the year included:

- Safety review and report of 13 academic entities
- Dedicated internal webpage on 'Occupational Health and Safety in Research Laboratory'
- Initiation of Hazardous Waste (Chemical & Bio) Disposal through Authorised Agencies

g. Online processes

Automation of activities related to project management, central facility and IP activity continued along with updation of various existing processes and modules.

h. Manpower

The number of project staff working in various projects as on March 31, 2013 is 950. Of them, 562 joined during the financial year 2012-13.

Table 6: Award recipients in 2012-13

Awards	Names of Recipients
Research Paper Award	Prof. Sumathi Suresh , Centre for Environmental Science and Engineering Prof. Prasenjit Ghosh , Department of Chemistry Prof. Ramaswamy Murugavel , Department of Chemistry Prof. Santanu Bandyopadhyay , Department of Energy Science and Engineering Prof. Arup R. Bhattacharyya , Department of Metallurgical Engineering and Materials Science
Review Paper Award	Prof. Goutam Kumar Lahiri , Department of Chemistry Prof. Rangan Banerjee , Department of Energy Science and Engineering
Young Investigator Award	Prof. Ranjith Padinhateeri , Department of Biosciences & Bioengineering Prof. Debabrata Maiti , Department of Chemistry Prof. Mandar M. Inamdar , Department of Civil Engineering Prof. Saurabh Lodha , Department of Electrical Engineering
Industrial Impact Award	Prof. V. Jothiprakash , Department of Civil Engineering
Dr. P. K. Patwardhan Technology Development Award	Prof. Anil Kumar , Department of Chemistry Prof. V. Jothiprakash , Department of Civil Engineering
S.C. Bhattacharya Award for Excellence in Pure Sciences	Prof. H.B. Singh , Department of Chemistry
Research Internship awards	Given to bright students across the country to undertake research at IIT Bombay for six months, based on national advertisement and selection process: No. of applications received: 653

Outreach Programmes

The Continuing Education Programme (CEP), Quality Improvement Programme (QIP) and the Curriculum Development Programme (CDP) continued to attract wide interest from industry, academia and our own faculty during 2012-13.

The CEP courses of IIT Bombay are aimed primarily at working professionals, though in the last couple of years students have also been considered for specialized training programmes under CEP. The QIP courses are fully funded by the All India Council for Technical Education (AICTE) and are generally meant for teachers working in various degree level engineering institutions to upgrade the expertise and capabilities of the faculty members. IIT Bombay's QIP courses are very popular and draw a large number of deputations from various institutions across the country. In order to provide college teachers an opportunity to interact with the industry professionals, special efforts have been made to permit a few industry participants as part of the QIP courses, in the normal CEP mode. This model has been appreciated by the teachers as well as the industry personnel, and has also helped to improve the overall effectiveness of the various QIP courses.

Many of IIT Bombay's CEP courses are now well established worldwide and continue to attract large participation, both from within as well as from abroad. The certificate course on "Piping Engineering" has reached another milestone and has crossed its 62nd edition in 2012. Similarly, the courses on "Urban Drainage Management", "Casting, Design and Simulation", "Human Computer Interaction", "Energy Management", "Technology Innovation Using Triz", "Elements of Chemical Engineering", etc., have all been well received by the industry. The course on "The Role of Technology in Crime and Crime Prevention", now in its 10th edition, has also established itself as an important training programme of IIT Bombay for the Indian police officers from across the country. This year, 16 senior persons from Indian Police Service (IPS) stayed at our campus for a week and were exposed to various technological issues that are central to crime detection as well as prevention.

On-line version of the course on "Piping Engineering" commenced in July 2009 has continued during the current year. Till now, about 300 participants from over 25 countries, from all over the world, have registered for this course, and the list is expected to grow many folds because of its vast reach and convenience. Currently, efforts are underway to include many other CEP courses in this initiative, in order to significantly increase their reach and effectiveness.

In terms of the overall performance of CE&QIP during 2012-13, a total of 128 CEP courses were conducted with about 3000 participants from across different disciplines as well as industries, organizations and

institutions, with a revenue of around Rs.6.29 crores. Under QIP category, seven M.Tech. and 12 Ph.D. students from AICTE-approved engineering colleges were admitted. In addition, 13 teachers were inducted into Ph.D. programme under the Advance Admission Scheme. Further, 10 short-term courses (STC) were conducted for college teachers under the sponsorship from AICTE and a total of 245 participants from various engineering institutes/colleges attended these courses. Lastly, two books were completed and one new book-writing proposal was sanctioned during 2012-13, under the Curriculum Development Programme (CDP) of QIP.

International Relations

IIT Bombay assigns a significant value to its relationship with various international partners. The reputation built up over the years, both in India and abroad, has helped attract bright and young researchers from all over the world to enroll on the faculty of the institute. A good number of international students continue to do their studies and research at the institute either as full-time or as exchange students. Globalisation efforts at major universities in the world have created a huge potential to engage in collaborative research with various partner universities. During the year, IIT Bombay signed 27 MoUs with various foreign universities and received governmental and ministerial delegations, from countries across the globe, for exploring areas of collaboration and cooperation.

MoUs with Foreign Universities

- Rutgers, The State University of New Jersey, USA
- University of Cologne, Germany
- Ecole Nationale Supérieure Des Arts Decoratifs, France
- University of North Texas, USA
- Extension of MoU with Tohoku University, Japan
- Extension of MoU with Nagoya Institute of Technology, Japan
- The High Energy Accelerator Research Organization, KEK, Japan
- Technische Universität Carolo-Wilhelmina Zu Braunschweig (TU Braunschweig), Germany
- Northwestern University, USA
- Gerog-Simon-Ohm University of Applied Sciences Nurnberg, Germany
- KTH Royal Institute of Technology, Sweden
- University of Toronto, Canada
- University of Waterloo, Canada
- Ryerson University, Canada
- Addendum to the original MoU with Brown University, USA – for faculty exchange
- Université De Montreal, Canada
- University of Alberta, Canada
- University of South Australia
- Erasmus Mundus Partnership- Innovation and Design for Euro Asian Scholars (IDEAS) Consortium Agreement

- Mitacs Inc., Canada
- University of Strathclyde, UK
- University of Edinburgh, UK
- Rhine-Waal University of Applied Sciences, Germany
- University of Dhaka, Bangladesh
- Bangladesh University of Engineering and Technology, Bangladesh
- Augsburg University of Applied Sciences, Germany
- Paris Institute of Science and Technology, France

MoUs with Other Institutions

- French Language Tutors in India Programme 2013-14 with Embassy of France, New Delhi
- Tripartite MoU between IIT Roorkee, IIT Bombay and IIT Delhi
- Bengal Engineering and Science University, India

Visits of Major International Delegations

- University of South Australia
- University of Edinburgh, UK
- University of Southern California, USA
- ETH Zurich, Switzerland
- National University of Singapore
- Rhine-Waal University of Applied Sciences, Germany
- University of Queensland, Australia
- The University of Hong Kong
- University of Moratuwa, Sri Lanka
- Brown University, USA
- Johns Hopkins University, USA
- Delft University of Technology, Netherlands
- Queen's University, UK
- University of Michigan (USA)
- University of Exeter, UK
- CNRS, France
- Estonian delegation led by Dr. Jaak Aaviksoo, Minister of Education and Research of the Republic of Estonia
- Representatives from the European Research Council
- Representatives from the Embassy of France (Mumbai), Embassy of Indonesia (New Delhi), Embassy of Chile (New Delhi), Indo-Korea Science & Technology Centre (Bangalore), Taipei Economic and Cultural Center (New Delhi), and United States-Indian Educational Foundation (New Delhi)

Also, several individuals visited IIT Bombay as representatives of their respective universities.

International Students

A total of 51 international students from Bangladesh, Canada, Ethiopia, France, Germany, Iran, Nepal, Singapore, and USA registered at IIT Bombay and have joined the institute for course work/project work/post graduate studies.

Student Exchange Programme

Under the memoranda of understanding, IIT Bombay students participated in the student exchange programme during the academic year 2012-13, as follows:

Autumn Semester :

National University of Singapore	Two Dual Degree students from Electrical Engineering

Spring Semester :

National University of Singapore	One B.Tech. student each from Chemical Engineering & Mechanical Engineering & one Dual Degree student from Civil Engineering
Nanyang Technological University, Singapore	One B.Tech. student from Electrical Engineering and one Dual Degree student from Mechanical Engineering
Rice University, USA	One B.Tech. student from Civil Engineering and one Dual Degree student from Mechanical Engineering

Foreign Language Courses

IIT Bombay makes efforts to inculcate a global sense of value and culture among its students and staff. French, Japanese, German, and Chinese language courses were organised for them in the autumn semester of the academic year 2012-13. These courses were conducted by the native speakers of these languages.

- French (in association with the Embassy of France, New Delhi)
- Japanese (in association with Koo International Co. Ltd., Japan)
- German (in association with DAAD, New Delhi)
- Chinese (in association with Beijing Jiaotong University, China)

HERITAGE Project under the Erasmus Mundus Programme

IIT Bombay has secured funding for a HERITAGE project under the Erasmus Mundus Programme. HERITAGE is an Erasmus Mundus Partnership (EMA2 strand1) project funded by the European commission. According to the general goals of Erasmus Mundus Partnership, HERITAGE project aims at fostering structured cooperation between European and Indian Higher Education Institutions (HEIs) through the promotion of mobility at all levels of studies for students, doctoral candidates, researchers, and academic & administrative staff. The project is jointly coordinated by Ecole Centrale de Nantes, France, and IIT Madras, India. It gathers 18 diversified and complementary Indian and European HEIs, and is supported by six associated partners from the corporate, organisational and university realms. The HERITAGE project provides mobility scholarships for students and staff from India to the 10 European

partner HEIs. There will be above 140 scholarships to be awarded for 1-34 months depending on mobility type/academic level.

India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Transformation and Sustainability (IC-IMPACTS)

Scientists from the University of British Columbia, University of Alberta, University of Toronto and leading institutions from India have joined forces to tackle urgent issues in both countries with a \$30-million partnership. Supported by the Canadian government and the state and industry partners in India, the India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Community Transformation and Sustainability (IC-IMPACTS) will focus on water safety, disease prevention and treatment, and the development of safe and sustainable civil infrastructure. It will also support new technology spin-offs and the training of more than 700 students and researchers. IIT Bombay is one of the academic partners from India in this initiative. In November 2012, Prime Minister Stephen Harper announced IC-IMPACTS as the winner of the Canada-India Research Centre of Excellence (CIRCE) competition.

Erasmus Mundus meeting of Indian partners

IIT Bombay had hosted a meeting of Indian partners from Erasmus Mundus projects on behalf of the Education, Audiovisual and Culture Executive Agency (EACEA) of the European Commission on November 23, 2012.

Alumni & Corporate Relations

The accomplishments of IIT Bombay are not the result of just one person or just one group, such as the faculty or students. They are the result of the efforts of the entire IIT Bombay family, including the alumni, donors, and other friends working together. The Dean ACR office integrates two strategic thrusts for the institute – one is Alumni Relations, the other Corporate Relations. In order to retain its position of excellence and to improve upon it, the institute requires substantial financial resources for continued modernisation of facilities and setting up new ones. The Government of India, through the Ministry of Human Resource Development, continues to be the primary source of funds for the institute. The Dean ACR office engages with the external members of IIT Bombay family, who are passionate and dedicated and who contribute not only funds but also their time.

This year a sum of Rs. 8.38 crores was received by the institute through donations – Rs.2.83 crores from the alumni and Rs.5.55 crores from corporations. The major

corporate donors, among others, were Applied Materials Inc., Bharat Forge Ltd., and Boeing. The major activities for which these donations were received are as under:

Institute Development Fund: The Institute Development Fund mostly caters to the “greatest need” of the institute, such as modernisation and the establishment of new academic, research and campus infrastructure.

Young Faculty Awards (YFA): All the IITs are facing a severe faculty shortage. IIT Bombay is not an exception. By helping IIT Bombay recruit faculty thus enhancing the quality of the incoming faculty, alumni can have a direct impact on the critical mission of faculty recruitment. The alumni have instituted the Young Faculty Awards programme, which provides a grant of Rs. 1 lakh per year for the first four years to newly recruited young faculty members. This grant is a significant incentive to the prospective faculty.

Chair Professorship: The Chair Professorship is a distinguished academic position of the institute and is conceived as an academic honour to recognise the outstanding teaching/research work and achievements of the permanent faculty of the institute. It is also used to attract outstanding academicians to join the institute as visiting faculty. Each Chair is supported by an endowment created from a donation to the institute. The donors will have the prerogative of naming the Chairs. The broad area of specialisation for instituting the Chair may also be specified by the donor.

Hostel Development: The Hostel Alumni Team Stewardship (HATS) is an important alumni-driven initiative that aims to channel the affinity and affection that many alumni have for their hostels. This activity is run exclusively through the alumni support and contributions. The key goals of HATS are as follows: (a) Improve hostel infrastructure and facilities, (b) Assist the serving and retired mess workers, (c) Increase interaction between the alumni and students, (d) Empower students to improve their living conditions under the aegis of Make Hostel My Home (MHMH), and (e) Organize hostel-level reunions in each hostel on the Alumni Day.

Student Development:

(a) Scholarships: One way to nurture excellence amongst students is by awarding scholarships to deserving candidates. These scholarships may be named after the donor. The scholarships funded by the alumni and corporations supplement the scholarship available from government funds and enable the institute to provide support to a larger number of deserving students. During the year 2012-13, 210 scholarships of varying amounts were granted.

(b) Awards and Prizes: Awards and prizes are given out every year. During the year 2012-13, 45 awards and prizes of varying amounts and forms (certificates, medals, etc.) were given away.

Major Events:

(a) Alumni Day: The Alumni Day was celebrated on Sunday, December 30, 2012. At this function, seven of the alumni were honoured with the Distinguished Service Award. The award was instituted at IIT Bombay in the year 1999 to bestow on alumni who have contributed in a very notable and sustained manner to the progress of the institute. The following are the recipients of the award for the year 2012-13.

Mr. Dipak Himatsingka, B. Tech. (1967), Chemical Engineering.
 Mr. Arun Prabhat Mull, B.Tech. (1967), M.Tech. (1969), Civil Engineering
 Mr. Srikant Rao, B.Tech. (1984), Mechanical Engineering
 Dr. Nitin Padture, B.Tech. (1985), Metallurgical Engineering and Materials Science
 Mr. Sandip Tarkas, B.Tech. (1985), Chemical Engineering
 Mr. Rahul Chaubey, B.Tech. (1999), Chemical Engineering
 Ms. Parul Gupta, B.Tech. (2002), Electrical Engineering

alumni who have reached positions of eminence in the areas of Business, Academics, Research, Government, Public Service and Entrepreneurship. The Young Alumni Achiever Award is presented to those who have shown outstanding achievements in their chosen fields of work and are below 40 years of age.

The recipients of the Distinguished Alumnus Award are as follows:

Dr. Nagesh Palepu, M.Sc. (1972), Chemistry
 Ms. Neera Adarkar, DIIT (1974), Industrial Design Center
 Dr. Jayant Sabnis, B.Tech. (1975), Mechanical Engineering
 Dr. Daniel Dias, B.Tech. (1976), Electrical Engineering
 Mr. Amar Bhide, B.Tech. (1977), Chemical Engineering
 Mr. Ashok Kamath, M.Sc. (1981), Mathematics
 Mr. Shantanu Khosla, B.Tech. (1981), Mechanical Engineering
 Dr. Satyajit Mayor, M.Sc. (1985), Chemistry
 Mr. Satyendra Pakhale, M.Des. (1991), Industrial Design Center

The following were presented with the Young Alumni Achievers Award:

Dr. Manoj Aggarwal, B. Tech. (1995), Electrical Engineering
 Dr. Ashwin Seshia, B.Tech. (1996), Engineering Physics
 Dr. Balabhaskar Prabhakar Pandian, M.Sc. (1997), Biotechnology



(c) Valedictory Function: The Dean ACR Office, in association with the IIT Bombay Alumni Association, organised the Valedictory Function for the graduating students on May 3, 2012. Prof. D.B. Phatak, Subrao M. Nilekani Chair Professor in Department of Computer Science and Engineering, addressed the graduating Class of 2012. During the function, 1413 graduating students signed the “Give One for IITB” pledge to contribute 1 per cent of their earnings to IIT Bombay.

(b) Foundation Day: The Foundation Day of the institute was celebrated on March 11, 2013. During the function, nine alumni were honoured with the Distinguished Alumnus Award and three alumni with the Young Alumni Achievers Award. The Distinguished Alumnus Award is conferred on those



(d) Lecture of Prof. Amartya Sen: Prof. Amartya Sen delivered the GL Mehta Memorial Lecture on January 5, 2013. The lecture titled: “India - a Defense and a Critique” was attended by around 1700 people



(e) Interactions with Mr. Ratan Tata: Mr. Ratan Tata visited the Institute on February 25, 2013. He toured various departments and labs, followed by Student Interactions at the Convocation Hall. Interaction session was attended by around 1700 students and faculty.

(f) Lecture Series: The following lectures were organised with the involvement of Dean ACR Office.

Prof K.C. Khilar Lecture Series: The 1st Prof. K.C. Khilar Memorial Lecture was delivered on April 16, 2012, by Dr. Sirshendu De, Department of Chemical Engineering, IIT Kharagpur. The title of the lecture was: “Polymeric membranes: Tailor-made Casting and Their Applications”.

Professor C.V. Seshadri Lecture Series: A lecture in memory of Prof C.V. Seshadri was delivered on November 6, 2012 by Professor Deepak Kunzru, Department of Chemical Engineering, IIT Kanpur. The title of the lecture was: “Microstructured Reactors for Heterogeneous Reactions”.

Faculty Affairs

During the year, 27 faculty members on regular basis and 16 on contract basis were appointed. The number of full-time faculty members on the roll of the institute has risen to 557 comprising 267 Professors, 121 Associate Professors, and 169 Assistant Professors. In addition, there are 44 adjunct faculty members on the roll. Seventeen faculty members retired – three of whom were re-employed – and two resigned.

The institute provided financial assistance to 272 faculty members for participating in international conferences. In addition, 176 faculty members travelled abroad for attending international conferences using external funding and 20 faculty members went abroad on Fellowship for research work.

Apart from educational and research pursuits, the faculty of the institute meet national and global

obligations in diverse ways. Many of them have accepted membership of various national committees and editorship of journals. They also review manuscripts for publications. The Institute is proud that their efforts have received recognition in the form of many awards and distinctions, some of which are listed below:

Prof A.N Chandorkar, Department of Electrical Engineering, has been conferred Life Time Contribution award in the recently held international conference “VLSI Design 2013” for his contributions to VLSI Field and Education in India.

Prof. Abhay Karandikar, Department of Electrical Engineering, has been selected for NASI-Reliance Industries Platinum Jubilee Award for Application Oriented Innovations in Physical Sciences for the year 2012.

Prof. Ambarish Kunwar, Department of Biosciences and Bioengineering, has been awarded the “Innovative Young Investigator Award (IYBA) 2012”.

Prof. Anand Patwardhan, Shailesh J Mehta School of Management, received two commendations relating to Climate Change during his tenure in TIFAC

Prof. Ashwin Gumaste, Department of Computer Science and Engineering, has been conferred the prestigious Hari Om Ashram Prerit Dr. Vikram Sarabhai Research Award for 2011 in Electronics, Informatics, Telematics & Automation.

Prof. Azizuddin Khan, Department of Humanities and Social Sciences, has been selected by the Indian Council of Social Science Research for the position of “Visiting Scientist” for the year 2012-13, under the Cultural Exchange Programme of “Indo-Russia Cultural Exchange” at Saint Petersburg State University, Russia.

Prof. B. Bandyopadhyay, Systems & Control Engineering, has been awarded the Distinguished Visiting Fellowship by the Royal Academy of Engineering, London, for his contribution in Variable Structures and Finite Time Control.

Prof. B. Ravi, Department of Mechanical Engineering, has won the Gold Medal under the DST-Lockheed Martin India Innovation Growth Programme 2012 (DST-LM IIGP-2012) for his Casting Simulation Software Technology.

Prof. C. P. Narayan, Industrial Design Centre, has won this year’s South Asia Book Award (SABA) the book “Karadi Tales – THE RUMOUR”.

Prof. D. Bahadur, Department of Metallurgical Engineering and Materials Science, has been awarded the 7th National Research Award in Nano Science and Technology–2013 from the Government of India.

Prof. D. Chandrasekharam, Chair Professor, Department of Earth Sciences, has been appointed as an Adjunct Professor in China University of Geosciences, Wuhan, China, from January 2012.

Prof. Debabrata Maiti, Department of Chemistry, has been selected by NASI-Council to receive the NASI-Young Scientist Platinum Jubilee Award (2013).

Prof. Debjani Paul, Department of Biosciences and Bioengineering, has been awarded the “Innovative Young Investigator Award (IYBA) 2012”.

Prof. G. Rajaraman, Department of Chemistry, has been selected as a Young Scientist of INSA.

Prof. H.B. Hablani, Department of Aerospace Engineering, has been awarded the “Excellence in Aerospace Education Award for 2012” by the Aeronautical Society of India.

Prof. I.K. Rana, Department of Mathematics, has been selected for the “Aryabhata Award” by All India Ramanujan Maths Club.

Prof. I.N.N. Namboothiri, Department of Chemistry, has been chosen to receive the CRSI Bronze Medal for his significant contributions to Chemistry, by the Chemical Research Society of India

Prof. K.P. Kaliappan, Department of Chemistry, has been selected for CRSI Bronze Medal 2012.

Prof. Krishnendu Sinha, Department of Aerospace Engineering, has been selected as a member of the National Academy of Sciences, India (NASI).

Prof. Mandar Inamdar, Department of Civil Engineering, has been awarded the “Innovative Young Investigator Award (IYBA) 2012”.

Prof. Nand Kishore, Department of Chemistry, has been selected for the Rev. Fr. L.M. Yaddanapally Memorial Award of the year 2011.

Prof. P.S.V. Nataraj, Systems & Control Engineering, has been awarded by NVINDIA Corporations, USA, for Accelerated Supercomputing of Global Optimization Algorithms – for “Innovative Use of GPUs”.

Prof. Prasenjit Ghosh, Department of Chemistry, has been chosen to receive the CRSI Bronze Medal for his significant contributions to Chemistry, by the Chemical Research Society of India.

Prof. Rajakishore Nath, Department of Humanities and Social Sciences, has been selected for the Young Philosopher’s Award (under 35 category) in 2012 by the Indian Council of Philosophical Research, Ministry of Human Resource Development, Government of India.

Prof. Rinti Banerjee, Department of Biosciences and Bioengineering, has been selected for the National Award for Woman Bio-scientists (under 45 category)

Prof. S.J. Gharpure, Department of Chemistry, has been awarded the BM Birla Science Prize in Chemical Sciences or the year 2012.

Prof. S. Kotha, Department of Chemistry, has been selected to receive the Coastal Chemical Research Society (Visakhapatnam) Award (2013).

Prof. Shireesh Kedare, Department of Energy Science and Engineering, has been awarded the prestigious Intersolar Award 2013 – under the Solar Thermal Technologies category – for the Clique Solar’s patented ARUN® 100 Solar Concentrator System.

Prof. Subimal Ghosh, Department of Civil Engineering, has been selected by NASI-Council to receive the NASI-Young Scientist Platinum Jubilee Award (2013).

Infrastructure Development

The infrastructure projects that were completed during the year include ‘Extension to Hospital’ building, ‘Type-B faculty’ housing (120 flats). Two buildings of ‘Type II-B’ buildings (56 Flats), ‘QIP/DRDO’ housing (80 flats), ‘Nano-Electronics’ building, and ‘Transit Workshop’ building were also completed and have become functional.

Some projects started earlier, namely, ‘Hostels 15 & 16’ (1000-capacity each) and ‘Computer Science & Engineering Department and Computer Centre’ building are nearing completion. MMRDA has completed a connectivity bridge over municipal pipeline dividing the campus thus enabling the institute to speedily develop facilities in other parts of the campus. MMRDA also has completed a sound barrier over the entire compound wall on Adi Shankaracharya Marg, lowering noise levels for the campus community living close to the Jogeshwari-Vikroli link road.

Many other projects such as ‘Hostel 10’ extension (750 rooms), ‘IITB-Monash Research Academy’, ‘Guest House’ expansion with 100 rooms and 50 utility apartments, ‘H-1 Type Staff Housing’ buildings (60 Flats), and building for ‘Department of Energy Science and Engineering’ and ‘Centre for Environmental Science and Engineering’ and ‘National Centre for Mathematics’ are at various stages of planning and pre-execution stage. Most of our new projects are being designed to be built on GRIHA-4 standards.

Apart from these, building projects that would be constructed in the near future include Rahul Bajaj Technology Innovation Centre which will house Society for Innovation and Entrepreneurship and

Industrial Research and Consultancy Centre, Central Animal Facility, Hostels 17 and 18 (1000-capacity each), Married Students Hostel (400-capacity), and Expansion of Students Gymkhana.

Central Library

IIT Bombay's Central Library is user-focused, innovative, and excellence-driven. It manages knowledge, both in print and digital formats, ensures seamless discovery and access to these scholarly resources, and provides faculty, students, and staff with professional support to find, evaluate, manage, and use such resources. It provides high-quality ambiance for both reflective and collaborative work and study.

The library collection of about 4.39 lakh items was used by more than 11,000 members and others who made 3,30,870 visits to the library during the year. In addition, over 10,00,000 downloads were made from the collection of over 12000 e-journals, e-books, and databases. The library homepage - a single window to all its resources and services and a popular interface between users and the library - received over 3,67,000 hits. The institutional repository of IITB publications which now has over 14,000 records also attracted more than 38,000 hits during the year. The library extensively uses social media for improved communication and interaction and has created a blog to post current and interesting information and news items. Users can also follow us on the face-book and twitter. This is the reflection of the continuous engagement of the library with its users as a valuable partner in their learning and research.

Collection building - a core activity of the library - has been undergoing a transformation. From print-only environment where all our acquisitions were in hard copy format, it has shifted to print-and-online and to online-only formats. The library currently subscribes to over 80 per cent of its journals in online-only format which is likely to increase further. It also acquired 1439 e-books during the year, though most of the books are still preferred in print-only format. The library added over 4905 items including books, journals, theses, reports, standards, pamphlets and other reading material during the year. Its collection can be accessed through Online-Public-Access Catalogue.

The library also rendered services like reference and consultation, document delivery, arranging material from other libraries through inter-library loan, helping students belonging to weaker sections of the society borrow textbooks from the book bank, organizing user education programmes to enhance awareness about various resources and services of the library. The upper limit on borrowing of books for students, faculty and staff was increased by more than 50 per cent. The

library allows self check-out of books as well as online renewal of borrowed books. It handled 2,21,327 loan transactions of books and other documents for its members during the year. It also offers services to industry and corporates, IITB alumni and engineering (educational) institutions, and has earned over Rs.32 lakhs for the services rendered.

The Central Library supports electronic submission of theses and dissertations by the postgraduate and doctoral students. It maintains a full-text database of over 5000 items submitted since 1999-2000 on Intranet. During the year, 971 M.Tech. dissertations and 176 Ph.D. theses were submitted online.

The plan to renovate the library building including addition of a new floor is finally taking shape. The renovated library building will reflect the current trends in ICT and the changing needs of library staff, students and faculty in the use of library resources and services. The library organized an exhibition-cum-display of Hindi books during the "HINDI PAKHWADA" and a display of relevant books on "Women's Day".

Computer Centre

The Computer Centre continues to provide computational, network infrastructural facilities and services to the IIT Bombay user community.

Network and Connectivity

The Computer Centre manages the IIT Bombay campus network and is responsible for the availability of intra-campus connectivity of all the departments, all the 14 hostels, all the residential complexes, and the Internet connectivity of IIT Bombay to the outside world. During the year, the following activities have been undertaken to install, expand and upgrade the network infrastructure at IIT Bombay:

The network connectivity to the Lecture Hall Complex in the Academic Area and to the new Type-C, the new Type-B (2 Nos.), and the new QIP Buildings in the residential area were completed,

During the year, the total Internet bandwidth for IIT Bombay campus users has been increased from 910 Mbps to 2580 Mbps. The Computer Centre is satisfied with the quality of service provided by the empanelled Internet Service Providers.

Wireless intrusion detection system procured from Airtight Networks has been deployed at new locations to improve the security of the wireless segment of IITB campus network.

High Performance Computing Facility

The old computing cluster CORONA continues to function as before with 130 user accounts. Given the

space constraint, the cluster continues to be housed in the premise of the Chemistry Department. The cluster “Spacetime Supercomputing” facility consisting of 380 nodes built using the Intel quad core processors has been operational on the ground floor of the old Computer Science and Engineering Department building. The total number of research groups using the spacetime facility is now 67, out of which 33 are faculty members who have been provided new account in 2012-13.

The installation of Building Management System (BMS) for the Spacetime HPCC facility has been undertaken to bring complete automation of the peripheral equipment. It is expected that the DG-Set together with the automation offered by BMS will provide a better and smoother operation of the HPCC facility in terms of reducing the possibility of hardware failures and data being lost due to unexpected power failures. Enhancement of data storage facility is being undertaken to improve the SAN device performance and to address the increasing number of research groups using the Spacetime resources.

National Knowledge Network

IIT Bombay continued to be a member of the National Knowledge Network (NKN) during the year. This multi-gigabit network initiative started by the National Informatics Centre (NIC) is being used by CDEEP to conduct distance education programmes. Staff from the Computer Centre represented IIT Bombay in the the National Level meet of the partnets of the GARUDA-NKN initiative organised by NIC and IIT Bombay. The meet, held on the campus in 2012, enabled the institute to improve and enhance the technologies for fruitful use of the national level infrastructures.

Grid Computing Facility GARUDA

The grid computing facility GARUDA is also supported by the Computer Centre allowing the users of the institute to access the available resources on the National Grid.

Hardware/Software Infrastructure

All service offerings at the Computer Centre are based on OPEN SOURCE Software Systems. The Computer Centre has registered as official mirror for various flavors of Linux Operating Systems on its anonymous FTP server which is available to the user community at large. The institute continues to be a member of Microsoft Developer Network Academic Alliance (MSDNAA) software licensing programme. This allows the user community to use most of the Microsoft software products in a non-production environment. Campus-wide license of AVG anti-virus software has been in operation.

Software packages meant for scientific and technical computation such as ANSYS, MATLAB, MATHEMATICA, MAPLE, Dytran / NasTran / Partan, Tecplot and Libraries from Numerical Algorithm Groups (NAG), AutoCAD, etc., that are available through appropriate license schemes are procured, upgraded and administered by Computer Centre as per the requirements of the students, faculty, scientists and staff.

The Computer Centre encourages and has implemented the use of Open Source Software Systems for office automation in about 800 PCs deployed in the various administrative sections of the institute. The use of Open Source Operating Systems and Softwares has eliminated to a great extent the menace of the spread of computer virus and, thus, has optimised the IT support overheads required for Network Management and PC maintenance.

The Open Source Operating Systems have capabilities for word processing applications (namely OpenOffice.org, LibreOffice). They are also capable of handling various Indian languages, especially Hindi, to produce multilingual (bilingual) documents. The documents prepared in OpenOffice.org / LibreOffice (available for Windows as well as Mac OS) can be saved in files compatible (edit/save) with MS-Office.

At regular intervals the Computer Centre conducts a-2 hour training session on the usefulness of the applications under the Open Source Operating Systems in Office Automation and the IT Infrastructure facilities, provided by the Computer Centre, for the administrative staff of the institute

The Computer Centre continues to play a secondary role by providing technical support to run the IP-based Security Surveillance Systems for the Security Section. The verifocal fixed direction IP (10/100 BaseT ethernet interface) cameras ‘for indoor use only’ (25 Nos.) have been installed and are functioning at the entry points of various departments, sections of the main building, and Convocation Hall to monitor and record the human activities as well as the object movements. Similarly, verifocal fixed direction IP-based Day and Night cameras (10 Nos.) with IP66 certified ‘for outdoor use only’ installed at the Main Gate, Y-Point Gate, and Lakeside Gate continue to monitor and record the inward and outward traffic movements of the campus. PTZ IP Surveillance cameras (5 Nos.) – having automatic Pan, Tilt, Zoom for 24/7 operation, PTZ control over network, minimum 270 degree Pan with auto flip and 180 degree tilt, Day and Night functionality with 0.5 lux in color, minimum 18x optical zoom, 12x digital zoom – have been installed at the Guest House, Hostels 12 & 13, QIP Building and Ananta to keep an eye over the fencing of the campus. Few other features supported on the surveillance cameras are: Minimum Resolution 640x480 at 30 frames per second with Video

Compdcan, password lockout of unauthorized personnel to prevent viewing images or altering the camera configuration, etc. These cameras are integrated with the Video Management Software running on three PCs that enables viewing and recording from up to 24 cameras over the network. The software also allows to control the PTZ and Dome Cameras for event-driven recording, scheduled recording and playback management. The system is attached to 8TB of Storage unit to store about 15-20 days of recorded data. A 42" LCD TV at the security control room enables to watch the images captured.

The computer network set up by the Computer Centre enables the Electric Maintenance Division to monitor the power distribution systems, check the status and operation of various lifts functioning in the buildings, the functioning of UPS Systems, etc., in the institute. The Telephone Exchange runs a few IP telephones (Voice over IP) using the computer network of the institute. The IIT Hospital displays the schedules of the availability of doctors on the web site of the hospital; this information is accessible over the IITB LAN. The Computer Centre runs a Help Desk for all users as a part of its day to day activities.

Projects for the Near Future

The core network of IITB is quite old. The switches are nearly five years old. The underground fibre-optic cable network has been operational for more than 13 years. The cable network, as it exists now, is rather adhoc and has seen patched many times because of damages (mostly during construction/repair of roads and buildings). There is strong case for creating a properly planned fibre-optic cabling infrastructure using single mode fibre with adequate redundancies so as to improve the reliability of network access. The replacement of core network switches is under active consideration. The goal is to have a future-ready network that can be easily migrated to a 10-gigabit infrastructure. The networking of the upcoming institute classroom complex is being undertaken.

Society for Innovation and Entrepreneurship (SINE)

The Society for Innovation and Entrepreneurship (SINE) is an umbrella for promotion of entrepreneurship at IIT Bombay. It administers a business incubator, which provides support for technology-based entrepreneurship, and facilitates the conversion of research activity into entrepreneurial ventures.

SINE has so far incubated 46 companies. This year SINE hosted 14 companies, of which four have graduated. Of the current companies, two have received investments from Venture Capital/Angel investments. Three of the graduate companies have received second round of investment. The existing companies are from various technologies such as education, cleantech,

mechatronics, audio technologies, nanotechnology, engineering software, geometric simulation for foundries, and marketing solutions for retail network. With a view to expanding its incubation activity, SINE is focusing on actively promoting pre-incubation and enabling virtual incubation outside Mumbai. To begin with, virtual incubation in Pune area will be taken up on a pilot basis. SINE has been operationally self-sufficient since inception.

Centre for Distance Engineering Education Programme

During the year, CDEEP recorded 20 IIT Bombay semester-long courses covering 10 disciplines. Many institutions, teachers and students are using these courses available to them even offline. CDEEP provided 107 recorded courses to individuals who paid Rs.300/- per course towards copying charges. It has an archive of 269 IITB coded courses. It has also provided access of its recorded courses, through web, to 115 participants by charging Rs. 1000/- per course.

CDEEP recorded 79 various events on campus including 50th Convocation, 54th Foundation day, institute colloquia, talks by Nobel laureates and other distinguished speakers. CDEEP team worked on specific improvements in the visible quality on the courses available through web. Now the display of courses/events available through web bears a much improved look.

CDEEP has a total 73 institutions connected as Remote Centers (RCs), including the two which joined during the year. Two CEP courses were recorded through CDEEP during this period. CDEEP also supports several MHRD projects through its infrastructure and expertise.

Institute Events

50th Convocation

The Golden Jubilee Convocation of the Indian Institute of Technology Bombay was held on August 18, 2012. Dr. Manmohan Singh, Hon'ble Prime Minister of India, was the Chief Guest and delivered the Golden Jubilee Convocation Address. Shri Kapil Sibal, Hon'ble Minister of Human Resource Development, His Excellency Shri K. Shankaranarayanan, Governor of Maharashtra, and Shri Prithviraj Chavan, Chief Minister of Maharashtra, were also on the dais and graced the occasion.

Foundation Day

IIT Bombay celebrated its 54th Foundation Day on March 11, 2013. Hon'ble Dr. A.P.J. Kalam, former President of India, was the Chief Guest. The institute honoured nine of its alumni with the Distinguished Alumnus Award-2013 and three with the Young Alum

Achiever Award-2013. The “Prof. S.C. Bhattacharya Award for Excellence in Pure Sciences–2012” was conferred on Prof. H.B. Singh, Department of Chemistry, and The “Prof. H.H. Mathur Award for Excellence in Research in Applied Sciences–2012” was presented to Prof. V. Ramgopal Rao, Department of Electrical Engineering. IIT Bombay also presented the “Lifetime Achievement Award–2013” to Prof. Juzer M. Vasi, Department of Electrical Engineering, in recognition of his outstanding contributions as a teacher, researcher and administrator.

Teacher’s Day

The 54th “Teacher’s Day” was celebrated on September 5, 2012. Prof. Gautam R. Desiraju, President, International Union of Crystallography, Solid State and Structural Chemistry Unit, Indian Institute of Science, Bangalore, was the Chief Guest. The “Excellence in Teaching Award–2012”, “IRCC Research & Industrial Consultancy Award– 2010” and the “Dr. P. K. Patwardhan Technology Development Award” were presented on the occasion.

Conferences/Colloquia/Lectures/Seminars

Many conferences and lectures were organised during the past year. Some of these are listed below:

Prof. Perumal Nithiarasu, Personal Chair Professor, College of Engineering, Swansea University, UK, spoke on “What engineering can do to improve healthcare? – Current state-of-the-art of computational modelling” at an institute lecture on April 11, 2012.

Prof. Étienne Ghys, Directeur de recherche au CNRS, École Normale Supérieure, Lyon, spoke on “The Figure of the Earth: From Newton to Poincaré” at an Institute Colloquium on April 12, 2012

Prof. Matthew Jackson, William D. Eberle Professor of Economics, Stanford University, spoke on “Diffusion of Microfinance” at an Institute Colloquium on August 16, 2012.

Prof. Pradeep Sarin, Department of Physics, IIT Bombay, spoke on “The Discovery of the Higgs Boson and it’s Impact on Our Understanding of the Natural World” at an Institute Lecture on August 23, 2012.

Dr. Julio M. Ottino, Dean, Robert R. McCormick School of Engineering and Applied Sciences, Northwestern University, spoke on “Creativity in Art, Technology, and Science” at TechniGraphicS Lecture Series on August 27, 2012.

Prof. Trilochan Sastry, Professor, Indian Institute of Management, Bangalore, spoke on “Reviving Agriculture, Reviving India: The Role of Producer Companies and Cooperatives” at an Institute Colloquium on October 11, 2012.

Dr. Christophe Lavelle, Principal Investigator (CNRS), National Museum of Natural History, France, spoke on “Science and Cooking: From physico-bio-chemistry to culinary art” at an Institute Lecture on October 15, 2012.

Pandit Nayan Ghosh, Distinguished Guest Professor, IIT Bombay, spoke on “The Role of Music in One’s Life and its usefulness in Society” at an Institute Colloquium on October 17, 2012.

Prof. Chandrashekhar B. Khare, Department of Mathematics, University of California, Los Angeles, USA, spoke on “The Art of Counting” at an institute colloquium on October 29, 2012.

Prof. Nayanjot Lahiri, Department of History, University of Delhi, Delhi, spoke on “The Indus Civilisation: Uncovering the Discovery” at an Institute Colloquium on November 2, 2012.

Shri Shripad Dharmadhikari, Manthan Adhyayan Kendra, Pune (Maharashtra) and Badwani (M.P.), spoke on “Rethinking Growth, Redefining Development: Addressing India’s Water and Energy Needs” at First Annual Girish Sant Memorial Lecture on November 7, 2012.

Dr. Stephen F. Altschul, Chairman, Computational Biology Branch, National Center for Biotechnology Information, National Library of Medicine, National Institutes of Health, Bethesda, USA, spoke on “Dirichlet Mixtures and the Probabilistic Structure of Amino Acid Multinomial Space” at an Institute Colloquium on December 3, 2012.

Dr. Raj Chetty, Professor, Economics Department, Harvard University, Cambridge, US, spoke on “Big Data in Economics: Improving Macroeconomic Policy with Microeconomic Evidence” at an Institute Colloquium, jointly organised by IIT Bombay and The Indian Econometric Society (TIES) on December 4, 2012.

Dr. Rakesh Agrawal, Microsoft Technical Fellow, Microsoft Search Labs, Mountain View, CA, spoke on “Whither Big Data?” at an Institute Colloquium on December 13, 2012.

Dr. Subramanian S. Iyer, IBM Fellow and Chief Technologist, Microelectronics Division, IBM, USA, spoke on “Microelectronics for a Smarter Planet” at an Institute Colloquium on December 19, 2012.

Professor Amartya Sen, Thomas W. Lamont University Professor, and Professor of Economics and Philosophy, Harvard University, spoke on “India: A Defence and a Critique” at G.L. Mehta Memorial Lecture on January 5, 2013.

Dr. Hari C. Sharma, Principal Scientist-Entomology, International Crops Research Institute for, Semi-Arid Tropics (ICRISAT), Andhra Pradesh, spoke on “Biosafety of Transgenic Crops to the Nontarget Organisms in the Environment” at an Institute Lecture on January 7, 2013.

Prof. George Sterman, Director, C.N. Yang Center for Theoretical Physics, State University of New York, Stony Brook, USA, spoke on “Quantum Fields at Particle Colliders” at an Institute Colloquium on January 9, 2013.

Prof. John R. Ockendon, FRS, Oxford University, spoke on “The Mutual Benefits of Research at the Mathematics-Industry Interface” at an Institute Colloquium on January 10, 2013.

Professor C.N.R. Rao, National Research Professor, Linus Pauling Research Professor & Honorary President, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, spoke on “Celebrations of Science 2011-2012” at the Distinguished Lecture Series on Nanoscience & Technology, on January 11, 2013.

Prof. Sabyasachi Bhattacharya, Distinguished Professor, Tata Institute of Fundamental Research, Mumbai, spoke on “Persistence of Non-volatile Memory: Remembering and Forgetting Things Seen” at an Institute Colloquium on January 30, 2013.

Prof. Joel S. Miller, University of Utah, USA, spoke on “Organic-based Magnets: New Chemistry and New Materials for this Millennium” at an Institute Lecture on February 6, 2013.

Shri Kiran Nagarkar, Novelist, Dramatist, and Screenwriter, spoke on “Shiva’s Blue Throat” at an Institute Colloquium on February 15, 2013.

Professor Xavier G Viennot, Emeritus Researcher Director, CNRS, University of Bordeaux, France, spoke on “Trees in Various Sciences” at an Institute Colloquium on February 19, 2013.

Professor Raghavendra Gadagkar, INSA S N Bose Research Professor and J C Bose National Fellow, Indian Institute of Science, Bangalore and Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, spoke on “War and Peace: Conflict and Cooperation in an Insect Society” at an Institute Colloquium on February 25, 2013.

Prof. Alan Mycroft, Professor of Computing, Cambridge University, UK, Co-Founder and Trustee, Raspberry Pi Foundation, spoke on “Raspberry Pi — Putting the Fun Back into Computing” at an Institute Lecture on February 27, 2013.

Dr. Vijay K. Saraswat, Director General, Defence Research and Development Organization, Secretary of Defence Research and Development and Chief Scientific Advisor to the Minister of Defence, spoke on “Future Challenges of Aerospace Research in India : A Perspective” at an Institute Colloquium on March 2, 2013.

Prof. Sean P. Meyn, Department of Electrical and Computer Engineering, University of Florida, spoke on “The Dynamics of Power (in Wholesale Electricity Markets)” at an Institute Colloquium on March 6, 2013.

Prof. Tan Chorh Chuan, President, National University of Singapore, spoke on “Ready for the Future? Are universities well-prepared for a much more complex and fast-paced future?” at an Institute Colloquium on March 28, 2013.

The **Department of Electrical Engineering** and IISc Bangalore jointly organised an international conference on “Emerging Electronics” on December 15-17, 2012, IIT Bombay.

The **Department of Computer Science and Engineering** organised COLING 2012, the 24th International Conference on “Computational Linguistics”, December 8-15, 2012.

The **Department of Civil Engineering** organised the TSE Silver Jubilee International Conference on “Transportation Planning and Implementation Methodologies for Developing Countries (10th TPMDC)”, December 12-14, 2012.

The **Department of Mathematics** organised TIME Primary 2012, the first National Conference for Primary (K-5) Level Math Teachers and Educators, December 8-10, 2012.

The **Department of Metallurgical Engineering & Materials Science** organised the International Deep Drawing Research Conference, IDDRG 2012, incorporating SMF 2012, November 25-29, 2012.

The **Department of Humanities and Social Sciences** organised URBIO2012: 3rd International Conference on “Urban Biodiversity and Climate Change: Mitigation and Adaptation”, October 8-12, 2012.

The **Department of Electrical Engineering** organised the 7th INUP Familiarization Workshop on “Nanofabrication Technologies”, June 4-8, 2012.

The **Department Electrical Engineering** organised the 9th International Workshop on “Nanomechanical Sensing 2012 (NMC 2012)”, June 6-8, 2012.

The **Department of Electrical Engineering** organised the 2nd Workshop on “Cell Phone/Tower Radiation Hazards and Solutions”, July 9, 2012.

The **Department of Electrical Engineering** organised the 3rd MRS Trilateral Conference on “Nanotechnology Applications in Energy, Water and Healthcare”, November 19-21, 2012.

The **Department of Metallurgical Engineering and Materials Science** organised the 4th National Symposium for Materials Research Scholars and Workshop on “Advanced Characterization Techniques”, May 3-5, 2012

Staff Development

The Personnel Training and Development Cell organised 16 training programmes on the most preferred areas for the non-teaching (Groups A, B, C and D) staff members of the institute. In all, 414 staff members participated in these training programmes.

Hindi Cell

Hindi Cell is actively engaged in providing support for implementation of Hindi in the institute. The institute circulars, registers, forms, visiting cards, signboards, and degree certificates are prepared in bilingual form. The use of Hindi in the institute email system (GPO) has increased. To facilitate learning Hindi, administrative terms and their Hindi synonyms are posted through the GPO system. An on-line workshop was also conducted through this system, and the winners in the competition held at the end of this workshop were presented with cash prizes.

The publication of Hindi magazine “Khisitiz” was revived this year. The faculty, staff and students of the institute contributed articles to this magazine. Shri Janardan, a staff member at the Hindi Cell, has contributed articles to Hindi magazines like the Media Vimarsh, Sablog, Dalit Asmita, Ispatika, and another staff member (Hindi Cell) Shri Arjun Mahto’s article has been accepted for presentation at an international conference in Hindi that will be organised by DRDO in Delhi.

Hindi workshops were conducted this year too. A special workshop was also conducted for Group ‘A’ officers of the institute. At this workshop, Dr. Rita Kumar, Chief General Manager, Cotton Corporation of India, delivered a lecture on official language policy of the Government of India. Shri Pranav Kumar, Scientific Officer, CDAC, presented, at this workshop, detailed features of open source operating systems and their use in the implementation of Hindi.

“Hindi Pakhawada” was celebrated in the month of September. Competitions in essay writing, story writing based on pictures, noting and drafting, and Hindi translation were organised on this occasion. To add to its vast collection of Hindi books, the Central Library

organised a Hindi Book exhibition within its premises. The students of the institute organised a Hindi competition at their own initiative. A Hindi poetry recitation competition was also organised by them with the support of an alumnus, Dr. Ashok Tewary.

Staff members were encouraged to use Hindi in their routine work, and were honoured for their significant contributions. Support was given to the Central Translation Bureau, Government of India, in its training programme on translation.

Student Activities

Introduction

The students at IIT Bombay do much more than only study. There is ample opportunity to nurture all kinds of talent in students. There are excellent recreational facilities for sports, including gymnasiums, swimming pools, courts for tennis, basket ball, volleyball, hockey, football and cricket, athletics tracks, and many more. Facilities for sports are matched by those for cultural activities, which include film clubs, classical music societies, a debating club and a literary society. IIT Bombay has a number of student festivals. The most well-known and popular events are Mood Indigo, Techfest and Performing Arts Festival.

Sports

National Sports Organisation (NSO): The new batch of 567 undergraduate students was enrolled for the Senate-mandated National Sports Organisation (NSO) activity.

Inter-hostel General Championship (GC): Inter-hostel matches for cricket, football, khokho, cross-country, basketball, tug-of-war, volleyball, hockey, weight-lifting and water polo were held. Hostel-3 won the Men’s General Championship trophy and Hostel-10 and Hostel-11 shared the Girls’ General Championship.

Inter-IIT Sports: The 48th Inter-IIT Sports Meet was held in IIT Roorkee in December 2012. IIT Bombay won the overall Inter-IIT General Championship with medals in diverse sports. IIT Bombay bagged Gold in Lawn Tennis, Table Tennis and Weightlifting; Silver in Athletics, Hockey, Swimming and Water Polo; Bronze in Cricket and Football; and stood at 3rd and 4th positions in Squash, Badminton and Basketball.

DRONA: A Sports Mentorship programme, DRONA encourages the participation of the general body of students by providing accomplished players from senior batches to coach and train the enthusiasts. This scheme became operational this year.

PG Sports: With a substantially increased presence of postgraduate students on campus, activities aimed specifically at these students were conducted. They

enthusiastically participated in events such as Footer, Lawn Tennis, Volleyball and athletics.

Games: During Techfest, Cubemania was conducted. Eleven events on Rubik's cubes with more than 80 participants from all over India were held. IIT Bombay students participated in the Mumbai and Thane Marathon.

Cultural Activities

Paathshaala

This year all cultural activities were brought under a single umbrella branded as "Paathshaala" thus ensuring that these could be publicised and organised in a coherent manner and that people could maximize this opportunity for learning most cultural forms that they might be interested in. The classes on offer were Guitars, Drums and Classical Vocals (with two batches each – beginners and advanced), Tabla, Violin, Keyboards in Music. Bollywood, Hip Hop and Ballroom dance could be learnt in the first semester and Bollywood and Advanced Hip Hop dance in the second. In dramatics, there were workshops held at regular intervals. The first workshop was conducted by Thespo and the subsequent ones by eminent theatre personalities teaching theatre enthusiasts in the campus the art of scripting, direction and acting in one-act plays and street plays. There were film-making classes as well. It was a series of three classes – script and screenplay, cinematography, editing – which had a turnout of more than 100 for each class.

1. Summer School of Cult (SSoC)

Summer vacations provide an ideal opportunity for students who stay back on campus to cultivate their interests in areas beyond just academics. Classes in multiple genres including Music, Dance, Film and Fine Arts were offered, and the response was excellent.

2. Platform Opportunities

Sophie Culturals

This year were given not only sophomores a platform to perform but also to lead and conceptualise everything in a performing art. This gives them a nice platform to learn and handle a performance from scratch and take it forward. A tradition that was being followed in dramatics, Sophie Prod, was taken forward to other genres as well.

Sophie Dance League: More than 100 people participated with mentors allotted to all hostels. The event saw a packed LT with a very good level of involvement and recognition.

Sophie Film Competition: A total of 11 teams participated and the quality of films was very well appreciated by one and all in the institute.

Sophie Music Instrumental: A participation of 18 teams (36 people). Saw a mix of various instruments coming together. It was the first event to be streamed live on-line.

Open Stage

An initiative with a vision to give everybody a stage to perform, showcase their talent and experience something new. A weekly tradition at Campus Hub, it received a positive response in terms of interest and participation. There were many performances which included stand-up comedy, music, and singing, and each participant received a voucher from Campus Hub as a gesture of appreciation for performing on stage. Open Stage gave a platform to one and all to get up on stage and have their two minutes of fame. There were in all five sessions.

3. New Events

Lit Fest: A first-time event on campus, the inaugural IITB LitFest had five speakers, over two days, and it was a great start to what is hoped to be an even larger event from next year onwards. Well-known writers and literary personalities such as Kiran Nagarkar, Rajni Bakshi and Ramu Ramanathan, amongst others, engaged students in a series of talks, workshops and discussions to ensure a fruitful weekend for all.

Hindi Utsav: To give the Hindi speaking and writing people a platform and to reach out to more people, a two-day Hindi Utsav was organised which saw competitions ranging from poetry to stand-up.

Cultural Alumni Day: A platform where students could interact with the alumni who were culturally involved as students (some still are), so that there could be a good dialogue and cultural exchange of views and ideas. Spread over two evenings, the event saw the alumni participating along with the students.

4. Collaborations

National Debate – with Mood Indigo: This year's edition of the National Debate was conducted along with Mood Indigo and it was bigger than ever – more international exposure, more participation than ever before. The British Parliamentary Debate made the event even more unique. A precursor to the World's in India in 2014, the event turned out to be very popular and gave the institute wonderful exposure.

Model United Nations – with Techfest: For the first time, IIT Bombay played host to a Model United Nations and it turned out to be a big success with the first edition itself attracting some of the best speakers of the country and saw international participation as well. A big start to one of the less ventured speaking events in the past, it gives a wonderful avenue for speakers to hone and showcase their skill in something apart from Debating

5. E-Cult

With the Face book Cultural Page up and the newly made website on Gymkhana giving periodic updates, the online scene was active like never before (100% increase in online activity over the previous years). Here's a quick summary of what we call 'E-Cult':

Competitions: Access to competitions was easier than ever before. The Roots Photography competition as part of the Roots Cultural Festival had completely online submissions administered through the Cultural Council forums, as did the 48-hour Film Premier League, both of which were very successful, in terms of numbers of participants and also the quality of the entries received.

6. World Wide Cult

The Institute Cultural Council, under the banner of World Wide Cult, scheduled regular events that highlight the different traditions of foreign countries: Both those that are world famous and also those, which are perhaps not so well-known.

Russian Pantomime: November saw the launch of WWC through Russian Pantomime. The performance was exceptional which showed their skills in a detailed mime, not easy to witness anywhere in the world, let alone the country. The performers enthralled the audience with an amazing performance which led a full LT to be completely enamoured.

Indian Tempest: Footsbarn Theatre, a French Theatre group came over to IIT Bombay in the beginning of February to perform their production – the Indian Tempest. The production, showcased in OAT, saw a wonderful set using drapes, circular slides and raised platforms. An unconventional play in many ways, watching Indian Tempest was a great learning experience for every theatre enthusiast. The use of archaic English, costumes, acting, and the optimum usage of the stage area was phenomenal. A wonderful adaptation of Shakespeare's play, the Indian Tempest was a treat to watch.

7. Professional Plays

In line with our attempts to showcase high quality professional performances, the play 'Copenhagen' was brought to campus.

Epix: Dark Knight Movie Marathon: The Epix banner was created to organize movie screenings of iconic films or film series, all over a single weekend. As a part of this, the Dark Knight Movie Marathon was organized on the 21st of July, which included 2 movie screenings on campus (the first 2 Dark Knight Movies), a Batman-themed quiz, and then finally a trip to PVR to watch 'The Dark Knight Rises' on release date. The response was overwhelming:-over 350 students responded, and the ticket quota was all sold out.

8. Rejuvenation

Indian Arts

ROOTS: An Indian Arts festival, ROOTS was organized in collaboration with SPIC MACAY. A week-long festival – celebrating the glorious art forms of India, be it music, dance, film-making or fine arts – Roots had it all. Over a week, experts in traditional arts and crafts – as diverse as wood carving, Gond painting, Bharatnatyam, classical music and many more – held workshops and gave performances. The event also included a regional convention, for which we played host to over 200 delegates from various schools and colleges around Maharashtra.

Workshops: The week started with a host of workshops of 4-day duration under the banner of 'Virasat', conducted by some of the finest professionals in the country. These workshops saw an overwhelming response from students with over 330 registrations.

9. SPICMACAY

Maharashtra State convention was held at IIT Bombay. Vocal, instrumental music and dance programmes were held on the occasion.

10. The Performing Arts Festival (PAF)

Performing Arts Festival is a cultural event at IIT Bombay, and a number of changes were instituted this year to make the festival even more challenging, competitive and fun than ever.

11. General Championship

The Hostel-2 bagged the general Cultural championship.

12. Infrastructure

Film Room: The biggest improvement in the infrastructure is the establishment of the Film Room, which contains an editing station with high performance iMac desktop computers, Digital SLR camera for quality film-making, Handy Cams for shooting as well as recording events and a setup for small-scale screenings.

Institute Music Album: IIT Bombay's first music album featuring six original tracks was recorded, compiled and launched by the institute musicians. On-line release on BCRadio (<http://www.bcradio.in/channel/iitb/>) was followed by large scale production and sale of the Album inside the institute.

NSS Activities

The NSS conducted the following activities during the year:

Orientation: Orientation was conducted twice in this semester for the 100 first year students who had registered for NSS under the Senate-mandated co-curricular requirement. Most of these students were allotted departments of their preference. The second orientation was for those students who had not opted for NSS as their first preference. The total strength of NSS was approximately 220. All these students were allotted to respective departments in NSS- Educational Outreach, Events, Vikas and Green campus.

RTI workshop: RTI session was organized in F.C. Kohli Auditorium. It was attended by students from all NSS departments. The session was conducted by Mr Shailesh Gandhi, a former Information Commissioner with the Central Information Commission, New Delhi.

Environment-friendly activity: Carry bags were made using old newspapers and notebooks and one-side printed papers during sessions. Notebooks were distributed in Abhyasika Centre in Phulenagar and in NGO ASHA. Newspaper bags were distributed in NGO ASHA and IIT Bombay Hospital Dispensary.

Activities of Green Campus: Around 1200 plants were picked and were transplanted into newer bags using drip irrigation.

Techfest Green Campus Challenge: Students worked on issues like waste management in campus and city, biodiversity in our surroundings, fertilizers, biomedical waste in hospitals, water consumption, e-wastage in institute.

A liter of Light: A workshop was conducted in NCC grounds along with the (departmental) festival of the Department of Metallurgical and Materials Science, 'Padarth' in which setups were prepared which could be put up on the sheds of slum roofs for light in the rooms during daytime. Students from Events and Vikas department of NSS volunteered for this activity.

Activities of Events: In first semester, Annual Cloth Collection campaign was conducted. Approximately 2200 kgs of clothes were collected and handed over to two NGOs. Some clothes were also distributed amongst the construction workers inside IIT Bombay.

NCC

A 10-day annual training camp was held at IIT Bombay in the training year 2012-13 and about 255 cadets participated. The cadets took part in firing (SLR Rifle, 303 Rifle), obstacle activities, daily parades, civil defence activities, etc. The cadets also participated in extracurricular activities such as dance, drama and music. Junior division of NCC IIT Campus School performed/presented a good theme drama in the ATC.

Institute Research Scholars Companion Program

The Institute Research Scholars Competition (IRSCP) was started at the institute with an objective to cater to the needs of research scholars and provide a platform to them, especially the new entrants, to address their academic as well as non-academic issues. Different initiatives such as study groups and help desks, etc., were taken up during orientation.

Institute Student Mentorship Programme

The Institute Student Mentorship Programme (ISMP) consists of a student mentor, a department academic mentor and a preparatory student mentor. New entrants are helped in adjusting to their new surroundings. The department academic mentor programme focuses on academically weak students and assists them in their studies.

TECHFEST

Techfest 2013, IIT Bombay's Annual International Science and Technology festival, celebrated its 16th anniversary this year. As part of "Techfest 2013", competitions, lecture series, exhibitions, etc., were organised, as follows:

Competitions

With the aim of bringing out the best of the world in almost all the fields of Science and Technology, competitions were formulated in Techfest 2013. With two major segments, namely, (1) International Robotics Challenge and (2) TechOlympics, Techfest reached out to over 32,000 students across the world.

International Robotics Challenge: This year, International Robotics Challenge (IRC) witnessed huge international participation from Sri Lanka, France, Bangladesh, Nepal, Egypt and Indonesia. Qualifying rounds for IRC were held in all participating countries, and winners from each country were given a direct entry into IRC-grand finale. The grand finale saw 16 teams (four from Egypt, four from India, three from Sri Lanka, two from Bangladesh and one each from Indonesia, Nepal and France). The teams from Sri Lanka stood first and third, with a team from Bangladesh being second. One of the Indian teams secured the fourth place. To increase participation from IIT Bombay, workshops and practice sessions were conducted in association with STAB.

Other competitions covered various genres like Image processing, coding, civil engineering, aerospace engineering, mechanical engineering. In all, "Techfest 2013" had 15 major competitions this year with over 24,000 students registering from all over India.

Techolympics: With a motive to promoting holistic development among the students of India, “Techfest 2013” initiated a totally new type of format called Techolympics with four competitions covering respective genres – Line Following, Aqua robotics, Aeromodelling and Coding. Techolympics aimed at reaching Tech-enthusiasts from the furthest corners of the country and gather winners in different spheres of technology.

Robowars:

“Robowars” has now become the flagship event of Techfest. This year, Fatal Combat had a record breaking participation with more than 300 entries from all across the countries. Even participants from UK had shown interest in participating in “Robowars” this year. Participation IIT Bombay was also remarkable. One of the two of our institute teams grabbed the second position.

Ideate: Ideate comprised five events (each having a prize money of Rs.80,000), namely, “Earth”, bringing ideas for better usage of energy; “Inspire India”, aiming to provide a platform for the visionaries to lead movements for social upliftment and progress; “Ummeed”, inviting ideas for children upliftment; “Utkarsh”, aiming at improving rural people’s livelihoods in an equitable and sustainable manner, both socially and environmentally; “Vidyaarth”, bringing novel and extremely potential ideas to revolutionize the system as we know it. Around 15 final teams in each event, filtered through two levels of shortlisting and throughout guidance by mentors, presented their ideas in Techfest and were judged by 4-5 renowned personalities. Ideate was a grand success bringing many innovative ideas like Ceramic Water Filter, solar power-driven water carrying system, etc., into limelight.

Lecture Series: Techfest had the presence of three Nobel laureates for the first time, including one of the most influential and inspiring persons in the world Dr. Amartya Sen. The other two were Ei-ichi Negishi and Jean Marie Lehn. For the first time in Techfest and in India, a live demonstration of wireless electricity was displayed by the CEO of WiTricity, Eric Giler. Lectures by Rakesh Sharma, Ashoke Sen (Physics), Charles Lineweaver (Astronomy), Stephen Cook (Computer Science), Jocelyn Goldfein, Dr. Amitabha Ghosh, and P. Sainath, a Ramon Magsaysay Award winner for Journalism, were held on topics like socio-economic problems, mathematics, physics, etc.

“Tech-a-Tete” is an event where some of the top technological innovators and researchers of the world came together and presented their revolutionary game-changing ideas. Speakers from different fields of expertise mesmerized with their interactive talks and a panel discussion.

Apart from two pre-festival lectures by Ramesh Raskar, MIT Media Labs, and Trip Hawkins, the founder of Electronic Arts, a post-festival lecture by Jean Marie Lehn, Nobel laureate, was also held by Techfest. Overall, the “Lecture Series” has received overwhelming reviews which not only made it successful but also unique and the best ever.

Exhibitions

In the International Technology and Arts Exhibition, a total of 75 exhibits under various categories were exhibited. MIT (USA), EPFL (Switzerland), ETH (Zurich), London Arts School, Tokyo Institute of Technology, CNRS (France), University of Ljubljana (Slovenia), Quinnipac University (USA), and many other institutions and companies enthusiastically displayed their exhibits at IIT Bombay. There was also a good participation from many foreign and Indian companies which displayed their latest R&D. DRDO and Numismatic Society of India (Coin Exhibition) too participated in the event.

Techfest in collaboration with IRCC, IIT Bombay, organized TechConnect, an annual event, for the fourth time. In all, 23 departments showcased their research in the fields of health care, energy, wireless communication, information technology and materials science. Catchy simulations, working prototypes, and design models were presented. Some of the prominent projects include Aakash tablets, Spoken Tutorials and E- Yantra all supported by MHRD. Apart from the main exhibition hangar at the KV grounds, lab visits, movie screening and quizzes were also organised for the school children and the academic institutions.

Technoholix

The performances included one of the most technically advanced entertainment acts of augmented reality by Moulla from France. It was followed by the very energetic “Lords of Gravity”, who at present are arguably the finest dunking team in the world.

Ozone

‘Ozone’ – an on-the-spot zone – had the following events evenly spread over three days:

Ozone Competitions: Its main purpose was to cater to the rolling crowd, targeting genres such as literature, Rubik cube, board games, scavenger hunt, etc. The highlights of the segment were Indian Sudoku Championship, a very close attempt to break the Guinness World Record in Cube Mania, and the country-famous competition Junkyard Wars.

Ozone Workshops : With the sole purpose of teaching informal yet interesting stuff, this year festival conducted workshops – Judo, Mentalism, Character Animation, Rubik’s Cube.

Light Painting World Alliance: An exhibition of modern light paintings from more than 70 artists across the world was held during the three days of the festival.

Karate Night: The event was seen as an after-night activity, held after Technoholix. With a blend of Halloween theme, the whole ambiance was decorated with all the Halloween elements. The event witnessed a large gathering of people and was thoroughly enjoyed.

Techfest Green Campus Challenge

Techfest Green Campus Challenge (TGCC) is an initiative to involve people in sustainable development and make them aware about the effects of neglecting the situation. The registered teams are free to choose any number of activities from various domains and conduct them in their campus. They will be awarded points on the basis of the efforts they have put in for making their campus more sustainable. The activities range from conducting a quiz, recycling waste to setting up a rain harvesting system, auditing greenhouse gas emissions in their city, and to organizing a green march in their city. The activities will be such as to create awareness and provide practical solutions to the existing problems on these issues.

Social Cause

“Give a Coin” (GAC) was one of the initiatives by Techfest 2013. With a noble concept of promoting “Financial Child Adoption” among college students and garnering future donors for the helpless children, GAC campaign was conducted in 34 colleges.

Mood Indigo

The annual cultural festival “Mood Indigo” was held during December 20-23, 2012. The winners of previous year Mood Indigo events, viz., dramatics, music, dance and fine arts, performed at NCPA Mumbai under the caption “Aaveg”. It was rated as one of the best events held at the NCPA. The event was graced by theatre personalities.

Nihilanth: Mood Indigo organised “Nihilanth” – an inter IIT-IIM Quizzing festival. It turned out to be an immense success, with teams from the new IITs and IIMs participating for the first time.

Tribal Tryst: The Theme “Tribal Tryst” was unanimously chosen for Mood Indigo 2012. The Indian tribal art forms through ambience was showcased during the festival. In order to promote tribal handicrafts, tribal exhibition was installed in the Student Activity Centre, where artists from Orissa, Calcutta, etc., had arrived to sell their exhibits.

Horizons: The ideology of “Horizons” was “Festivity on the streets, interaction and promotion of cultural

exchange pro-shows”. Five collaborative performances involving Indian instruments like jal tarang, mandolin, etc. were held. Four street artists performed at multiple times on different venues during the festival. Two international puppet street theatres and a comic play “Some Times” by AKS production were held. The World’s Most Amazing Acts – Unusual Musical Comedy show by Michel Lauziere, Reggae band from Morocco, and Kite festival – were also held.

Worldfest: Contingents from five countries, viz., Italy, Japan, Romania, Serbia, Sri Lanka, participated in the “Worldfest”, the first ever international carnival organised at a college festival featuring more than 100 international performers. The event was a success.

Global Mela: For cultural exchange and to represent culture of each of the participating countries, individual country pavilions were set up. Activities at the pavilions include name writing, photo booth, workshops, performances, festival celebration, food festival and sports festival, arts and ideas.

PRONITES

“Pronites” at this year’s Mood Indigo saw Contemporary Nite, Livewire Nite, Fusion Nite and Popular Nite. Pt. Vishwa Mohan Bhatt performed for the Contemporary Nite and Talavva; a 5-piece tabla set from Gujarat and Mumbai also performed. For the Livewire Nite “Simple Plan”, a pop punk band and a “Thermal and a Quarter” performed. For Fusion Nite Karsh Kale Collectiv’s and Paradigm Shift, a classical rock band, and for Popular Nite, Salim-Sulaiman Merchant performed.

Social Cause - Thalassemia

Being a part of the Social Cause team, the students helped in both signing campaign and testing camp. A total of 1464 students got screened for thalassemia minor in a two-day camp and about 5000 signatures were obtained during the campaign.

E-Cell

The E-Cell at IITB was founded with a vision for creating an entrepreneurial ecosystem by enabling easy and efficient interaction between its major components spanning students, faculty, working professionals, aspiring and existing entrepreneurs, mentors, angel investors and venture capitalists. Founded 15 years ago, E-Cell works as an independent body striving towards this vision. Through its activities, ECell has brought in a new era of entrepreneurship in the institute and, in recent times, there is an increasing number of ‘start-ups’ by students and alumni of the institute. The major initiatives of E-Cell were:

Eureka: It is an international Business Plan competition, organised every year, which aims at encouraging people from across the globe to flesh out

their ideas and form global enterprises that combine technology, vision and business acumen. Eureka 2012 started off with ILLUMINATE – pre-Eureka workshops which are aimed at spreading awareness about entrepreneurship among students and young professionals and equipping them with the skills, tools and advice to help realise their entrepreneurial ambitions and improve their performance in Eureka! Eureka received over 5000 registrations and around 150 teams from the institute participated. Mentoring sessions by experts were held over a period of two months and the final pitching was held during the Entrepreneurship Summit 2013. The winners in every track received huge cash prize and opportunity to go to Stanford University for entrepreneurship camp. Eureka through the years has produced several successful startups.

Entrepreneurship and Business Club

The vision of the Entrepreneurship and Business Club is to create a platform of entrepreneurship enthusiasts where students, faculty and professionals can interact on a regular basis for discussions, brainstorming sessions, informal sessions and networking. The team is dedicated to enhancing the learning experience of those students who are curious about entrepreneurship and to providing an action-oriented road map for those looking to launch a startup. Thus the events were divided into two tracks to cater to the needs of both these groups:

Basic track events like ‘Am I an Entrepreneur?’, ‘What an Idea, Sirji!’, ‘Stock Exchange Extravaganza!’, ‘Course on Basics of Entrepreneurship’, ‘Tech-Ventures’, Idea Blaze’, ‘Idea Validation Platform’, ‘The First Pitch’, ‘A Day with an Entrepreneur’ were organized. Advanced track sessions like ‘Common Mistakes that Early-stage Start-ups Make’, ‘E-Commerce’ were also held.

Harvard US-India Initiative: E-Cell at IIT-Bombay and Harvard US-India Initiative (HUII) jointly conducted an international conference on “Entrepreneurship and Innovation: Bridging the Gap Between Tradition and Modernity”. HUII is a student-run organization that aims to create dialogue between Indian and American youth to address the most pressing social, economic and environmental issues that India is facing today.

In January, IIT Bombay’s PCSA played host to TEDx Masala – a conference independently organised by UnLtd India in partnership with E-Cell under the patronage of TED. The theme of the conference was “What if...?”, with every speaker attempting to present to the audience thoughtful, new questions with the intent of achieving solutions to difficult problems.

Entrepreneurship Summit: The Entrepreneurship Summit is an initiative by E-Cell, IIT Bombay, to serve as a platform for bringing together budding

entrepreneurs, venture capitalists, investors, startups and other major contributors to the entrepreneurial ecosystem. This networking event gives a chance for people to interact and help build successful ventures. The summit also showcases the latest global trends in entrepreneurship. E-Summit 2013 witnessed world-class speakers from various domains of the entrepreneurial ecosystem who shared their own life experiences and views about the most relevant topics one must know about as an entrepreneur. Adil Zainulbhai, Avijit Dutt, Devdutt Pattanaik, Jim Beach, Joe Abraham are some of the many prominent personalities present during the summit.

The competitions and workshops included Ideablaze, Business Simulation Games, Freshbiz, Bizquiz, Incept, and Investor’s Hat. Panel discussions were also conducted on various topics related to trends in recent times. “Startup expo 2013” witnessed some of the most innovative startups from across the country.

Enspace: An entrepreneurship magazine of IIT Bombay, Enspace was initiated as a newsletter in the year 2008 with the vision of promoting the entrepreneurial spirit through print medium. Enspace reaches out to the students of IIT Bombay as well as various colleges and corporates all across the nation.

Placement

Despite the general atmosphere of uncertainty due to global economic slowdown and recession, IIT Bombay entered its placement season with confidence due to its high quality of students and strong corporate relationship. In 2012-2013, the recruiters have continued to show very positive interest in our students. The first phase of IIT Bombay’s campus placement in December 2012 saw participation from around 250 companies, and offering 881 jobs. Up to June 10, 2013, close to 300 organisations took part in campus placement and have offered over 1040 jobs. The final year students – doing Bachelor of Technology (B.Tech.), Master of Science (M.Sc.), Dual Degree (D.D.), Master of Technology (M.Tech.), Master of Design (M.Des.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.) programmes in various fields of engineering, science and technology, design and humanities – are participating in the placement process. A small number of the eligible students are not actively participating in the placement process due to their other career choices.

The process began in July 2012 with sending an invitation to companies to visit the institute for pre-placement talks and provide their job announcements. The talks provided avenue for interaction and familiarisation of students with the recruiting organisations and their work profile. The company interview process began on December 1, 2012, and continued till mid-July 2013.

‘Day 1’

The hectic ‘Day 1’ of IITB placement on December 1, 2012, witnessed 35 firms representing some of the most well known organisations in the global industry vying for our students. A total of 173 jobs were offered on ‘Day 1’, all belonging to the high-end job market reconfirming the commitment of top recruiters to the IIT Bombay graduates. The figure is unprecedented, and shows a 22 per cent increase over last year.

Continuing Commitment towards Engineering and Technology-oriented Jobs

The students of IIT Bombay continue to demonstrate strong commitment to their core educational background in the choice of employment. This can be primarily attributed to the highly challenging work profile and the compensation package offered by the recruiters. More than two-thirds of the students opted for science, engineering and technology-oriented jobs with the recruiting companies operating in various sectors of the economy.

Strengthening Presence in the Management Consulting Sphere

Over 20 leading management consulting firms, including several global leaders, visited IIT Bombay for campus placement this year. These organizations work with large corporations across the world and help them resolve complex business problems. They carry a reputation of being very selective in their choice of campuses and of having extremely high standards in their recruitment process. With the high quality of recruits that these companies had taken last year, they came back with a renewed vigour as even some new firms came on board. There were over 120 offers in the management consulting sector.

Increased Prominence in the Financial Services and Analytics Sectors

Continuing the trend of last few years, the financial services and analytics sectors were major recruiters this year too. With many of the top global companies in these sectors preferring IIT Bombay students, there was a rush among the top-level as well as mid-level companies to recruit the brightest and the best from the campus. A variety of profiles were opened up as these companies had begun to appreciate the analytical abilities of our students. Over 70 offers were made by the financial services sector. The analytics sector offered 90 jobs.

Research & Development to the Forefront

With the economy increasingly striving for high-end products and services, a larger number of companies now develop products on the forefront of technology. There was an increase in the number of organisations

hiring fresh graduates in the R&D sector. This sector which has been steadily growing for the past few years, has made some premier job offers this year. A total of 18 R&D organisations offered 59 positions this year.

Educating the Future Generations

IIT Bombay continues to provide faculty to several educational institutions through campus placement. Forty students, including some with doctoral degree, have been offered jobs with educational institutions through campus placement.

Good Response to Government/Public Sector Opportunities

Several students have shown their inclination towards career in governmental organisations or public sector units. Sector leaders from government organisations and public sector companies, including several ‘Maharatna’ and ‘Navaratna’ companies, have recruited from the institute. This year, a total of 42 students have been recruited by seven such organisations.

Diverse Recruiters

While the placement season has seen recruiters from the entire spectrum of the industry, the initial part of the season was dominated by a variety of firms from sectors like engineering and manufacturing, computer software and hardware, management consulting, finance/banking, data analytics and FMCG. Most of these firms are world leaders in their respective domains.

Preparing well-rounded students

This year a key focus of the Placement Office was to prepare the students for placement. IIT Bombay students are expected to excel not just in technical knowledge but in leadership, teamwork and other attributes. A large number of preparatory activities were conducted this year for the graduating students, including refresher lectures on various technical subjects. In addition, preparatory programmes to enhance communication skills, interview skills and group dynamics were also organised. Talks with the alumni working in diverse sectors were also organised to orient the students to different job requirements. Around 600 preparatory sessions were organised by the Placement Office.

Conclusion

The highly successful student placement in 2012-2013 clearly demonstrates the demand of IIT Bombay graduates among the top recruiters in various segments of the economy. The recruiters appreciated the knowledge and training of these students. A majority of the past recruiters held their faith in the abilities of IIT Bombay students and came to recruit in large numbers. This year several new organisations visited the institute.

Program-wise placement data 2012-2013:

* Some eligible students did not actively participate in the placement process.

Many companies for M.Des. students are expected to visit during and after the Design Show in June 2013.

Placement detail by range of salary offered:

Range of Gross Salary (in Lakh Rupees per annum)	Number of Organisations	Number of Offers Received
Above 10	76	322
Between 8.5 to 10	34	145
Between 7 to 8.5	52	219
Between 5.5 to 7	53	176
Less than 5.5	52	181
Total	267	1043

Placement details by type of organisation

Sr. No.	Sector	Number of Organisations	Number of Offers Received
1	Analytics	27	94
2	Consulting	26	124
3	Education	10	40
4	Engineering and Technology	64	268
5	Finance	19	78
6	FMCG	6	27
7	Public Sector / Government	7	42
8	Research & Development	18	59
9	Sales & Marketing	2	14
10	Services	6	16
11	Software, IT	82	281
Total		267	1043

Internship Report 2012-13

For the academic year 2012- 2013, Placement Office handled internships as well. The well defined format followed by Placement Office for the internship process resulted in a 45 per cent increase in numbers with over 900 internship offers from around 650 organisations.

The internship season started around mid August 2012 and continued till 15th May 2013. The students in the 3rd and 2nd years of Bachelor of Technology (B.Tech.), 5 -year Master of Science (M.Sc.) and Dual Degree (D.D.) programmes in various departments participated in the internship process.

Department-wise Internship Data (2011-2012 data in brackets):

Department	Number of Internships
Aerospace	53(19)
Chemical	151(113)
Civil	102(82)
Computer Science	169(118)
Engineering Physics	15(9)
Electrical	140(88)
Energy Science	40(15)
Mechanical	137(95)
Academic Programme Registered	Placed* % Placed
B.Tech. Chemistry	419 321 76.6
Dual Degree (B.Tech.+M.Tech.)	239 200 83.68
M.Tech.	533 388 72.79
5-yr M.Sc.	64 54 84.38
2-yr M.Sc.	152 54 35.52
M.Des.	34 21# 61.76
M.Phil	7 5 71.42
Total Number of Internships	909
Summer Internships	801
Winter Internships	108

Summer vs. Winter Internships :

Companies vs. Universities

Total Number of Internships	Company Internships	University Internships
909	801	108

Country-wise offers from Universities :

Country	No. Of Universities	No of Interns
Germany	6	19
Canada	6	12
United States	5	13
Switzerland	2	9
Hong Kong	1	7
France	2	5
United Kingdom	1	4
Malaysia	1	3
Austria	1	3
Taiwan	1	3
Portugal	1	1
Australia	1	1
New Zealand	1	1
India	5	27
Total	34	108

Comparison of Internship Offers 2012-13 vs. 2011-12





Introduction

The academic programmes of the department focus mainly on science and engineering/ technology behind flight vehicles and their sub-systems. The courses cover fundamentals of fluid dynamics, propulsion, structural mechanics, vehicle dynamics, control and guidance, etc., as well as applications of these fundamentals to the analysis of aerospace vehicles and other jobs.

The department runs strong undergraduate and graduate programmes in Aerospace Engineering and carries out basic and applied research as well as continuing education activities in various sub-disciplines of Aerospace Engineering such as Aerodynamics, Propulsion, Structures, Dynamics and Control, Design and Systems Engineering. The academic programmes include 4-year B.Tech. degree programme, 5-year Dual Degree programme, 2- year M.Tech. Programme, and Ph.D. programme.

The department is an excellent fusion of academics, research and technology development, coupled with education beyond the classroom and co-curricular activities. Two landmark projects initiated by the students of the department are: Mars Rover Project and Autonomous Underwater Vehicle Project. These projects involve complete design, development and launch of the vehicles, under the design-build-fly initiative nurtured during the past few years by the department. This indicates the new trends and new opportunities for learning and absorbing the satellite, space and underwater technologies in the department. The projects, which involve students from other departments of IIT Bombay, are entirely managed by the students of the department and mentored by faculty from several departments.

The department faculty strength includes 21 full time faculty members, one Adjunct Professor and one Emeritus Fellow. The distinguished faculty of the department includes two faculty members holding the prestigious Alexander Von Humboldt Fellowship and one faculty member holding the Institute Chair Professor Award. The department has 355 students,

of whom 117 are graduate and 238 are undergraduate students.

Vision & Mission

The Aerospace Engineering Department seeks to establish traditions which will foster creativity and growth of excellence. It has the following broad objectives:

- To provide the best possible educational facilities for training bright students for careers in Aerospace Engineering.
- To provide a creative atmosphere in which higher studies and academic research of high quality thrive both amongst the students and the faculty.
- To organize short intensive courses, conferences and seminars on current technological developments which will be of benefit to the surrounding community.
- To undertake sponsored research of practical relevance and provide developmental consultancy which will promote contact with, and be of service to industries and to government aerospace programmes
- To provide leadership in curriculum design and development.

The department grooms its students to be the leaders of tomorrow in the aerospace engineering and technology arena.

Infrastructural Facilities

The department has extensive experimental and computational facilities that support its research and teaching activities. Among these are: Aerodynamics Lab., which houses the subsonic and supersonic wind tunnels, open jets, water tunnel, 6W Ar-Ion laser from Spectra Physics, computer controlled 3D traverse system and the Laser Doppler Velocity-meter (LDV) facility; Instrumentation Lab., which has experimental set-ups for control education, e.g., temperature control, speed servo, torsion disk, level and flow

control, etc., in addition to sensors, actuators and other accessories as a part of mechatronics related facilities; Structures Lab., which has facilities for composite fabrication, material testing, components testing, strain and vibration measurements, drop weight and ballistic impact testing, modal testing, bench type modular polariscope system and reflective polariscope system for photo-elasticity studies, high strain rate research facilities based on the split-Hopkinsons bar; Propulsion Lab., which houses axial flow compressor research test rig for rotor tip aerodynamics studies, low speed low turbulence wind tunnel, diffuser test rig for turbine exhaust diffuser system for aerodynamic analysis, centrifugal blower and motor control unit for air delivery to the cascade tunnel; MAV Lab., which has facilities for building & flying aircraft models, hardware in loop simulation for MAVs, facilities for design, development and implementation of autonomous control in MAVs; and ARDB Associate Center for CFD, which provides computational assistance with its computer servers, and work stations. The department also houses the ARDB Center for Aerospace Systems Design and Engineering (CASDE), which conducts R&D activities and continuing education related to Multidisciplinary Design Optimization, MAV system design and integration and systems engineering. Major computational facilities include a 23-node Intel Xeon Cluster, SGI Altix 8 CPU, & SGI Altix 14 CPU machines. Aircraft Design and Computing Lab (ADCL) houses nine PCs loaded with the latest versions of softwares for teaching aircraft conceptual design and analysis, such as (RDS-Pro) Advanced Aircraft Analysis (AAA), and Aircraft Control Toolbox (ACT) which consists of a suite of MATLAB routines for modeling of control systems of aircraft, helicopters and airships. A Shock Tunnel used for the simulation of hypersonic flow, capable of producing flows of air up to specific reservoir enthalpy of 1.35 MJ/kg, reservoir pressure of 0.74 MPa, and reservoir temperature 1343 K which is then expanded into the test section using a Mach 8 nozzle has been recently designed, developed and built in the department. Models such as re-entry bodies, scramjet engine and missile-shaped bodies can be tested to study its aerodynamics.

A laboratory is being developed for experimental study of Cardio-vascular Flow Dynamics. Development of an anechoic chamber for high speed jet acoustics measurements has been planned.

Academic Programmes

The department offers a 4-year undergraduate B.Tech. programme, a 2-year graduate M.Tech. programme, a 5-year integrated Dual Degree (B. Tech. and M.Tech.) programme, and a Doctor of Philosophy (Ph.D.) programme. The specialisations offered this year for Dual Degree and M. Tech. programmes are:

- Aerodynamics
- Aerospace Propulsion
- Aerospace Structures
- Control and Guidance

The curriculum is designed with the aim of catering to the country's growing need for talented, well trained manpower in aerospace engineering, especially in the scenario where India is poised to become a global economic superpower. As part of the Institute-wide revamping of the UG curricula, the departments new curriculum providing a student-centric flexible framework which covers basic inputs in the core areas as well as electives and specially designed supervised self-learning opportunities called Supervised Learning entered its third year of implementation. At the end of the year, the earlier UG curriculum stands phased out. The department has also redesigned the Minor in Aerospace Engineering for UG students of other departments which is a basket of five selected courses dealing with the basics of flight mechanics, performance and design. Three new PG electives in the area of dynamics and control, specifically related to spacecraft navigation, guidance and control, were also introduced.

The department aims to provide students with a cordial atmosphere and an opportunity to acquire a multi-disciplinary perspective to engineering problems.

Student Intake

B.Tech.	: 62
Dual Degree	
M.Tech.	: 62
Ph.D.	: 15

Degrees Awarded

B.Tech.	: 24
M.Tech.	: 42
Dual Degree	: 20
Ph.D.	: 4

Student activities

Zephyr

The 11th edition of Aerospace Engineering Annual Aviation Festival Zephyr was organised on March 2, 2013. This year Zephyr launched four extra competitions Express symposium, Shape your ideas, Aero-Tale, and Laws of motion to get participation from every sub-branch of Aerospace. To encourage students towards core career, it organized panel discussion by experts in aviation industry. The day was full of workshops, competitions and exhibitions. It was covered by Hindustan Times as well as Marathi media.

Mars Rover Project

A group of undergraduate students from the Department, under the guidance from Prof. P.J. Guruprasad and others, have embarked upon a project to develop a student Mars Rover, which is aimed at increasing the awareness and indulgence of students in space sciences and technologies across the country.

The first stage of the project is a rover for the 2014 edition of University Rover Challenge, an international competition held in Mars Desert Research Station (MDRS) in Utah, USA. In the next stage of the project, artificial intelligence, inertial navigation, etc., will be incorporated to move towards developing a space grade version of a Mars Rover.

Autonomous Underwater Vehicle Project

AUV-IITB is a group of students spanning different streams of engineering, namely, aerospace, electronics, computer science, material sciences and mechanical engineering, dedicated towards designing and developing a state-of-the-art autonomous underwater vehicle. The project is currently under the guidance of Prof. Hemendra Arya and Prof. Leena Vachhani from IIT Bombay.

This is a year-long activity taken up by the dedicated interdisciplinary team of 26 students. The first prototype of the project has been completed and the team is currently working on its second version.

R&D Activities

The department has maintained and nurtured a close association with the Aeronautical, Space, Defense and the other industries of the country through invited lectures and faculty participation in continuing education. In addition to providing high technology support and inputs to the national projects like LCA, IGMDP and GSLV through sponsored and consultation projects, the research had spin-off benefits to other fields such as bio-medical engineering. Many of the research programmes pursued in the department are funded by the government agencies and organisations such as ARDB and DST, ISRO,

DRDO, HAL, BARC, NAL, ADE, GTRE, ADA and private industries like SIEMENS, Pratt and Whitney Co., USA, etc.

The departmental faculty actively pursue research programmes that address basic engineering problems as well as applications in various fields of aerospace science and technology such as: Experimental Aerodynamics, Aero-acoustics, Computational Fluid Dynamics, Grid Generation, Computational Electromagnetism, Hypersonic Flows, Heat Transfer, Aero-thermodynamics, Infrared Signature Suppression, Turbo-machinery and Air-breathing Propulsion, Combustion Studies, Dynamics and Control of Aerospace Systems, Multi-disciplinary Design Optimization of Aerospace Systems, Plate Theories, Smart Structures, Aero-elasticity & Aero-servo-elasticity, Composite Materials and Impact/Ballistic Impact Studies, Spacecraft Attitude Dynamics, Control, Orbit Estimation; Satellite-based Navigation of Land or Flight Vehicles, MAV Research & Development.

While the research and development activities of the department continue to contribute to national aerospace programmes, some of the faculty are also engaged in basic research collaborations with research groups world over, e.g., the Technical University of Hamburg, Germany; China Jiliang University, China; Illinois Institute of Technology, USA; Tohoku University, Japan; Cambridge University, U.K.; Indian Institute of Science, India.

Research activities were related with GPS satellite-based navigation of airplanes, low-earth orbit satellites in formation; point positioning, relative navigation, and orbital control of geostationary satellites in formation; satellite altitude determination; navigation of lunar spacecraft; satellite payload attitude control; and altitude determination and control system for Pratham Nanosatellite of IIT Bombay.

Sponsored Research Projects	: 47
New	: 7
Ongoing	: 30
Completed	: 10
Faculty Involved	: 19

List of sponsored research projects

Project Title	Name of Agency
Sponsored projects initiated in 2012-13	
Analysis and modeling of turbulence amplification across a shock wave	ARDB
Design Fabrication and Flight Testing of an autonomous airship	ARDB
Multi-disciplinary Design Optimization (MDO) for MAV	ARDB

Project Title	Name of Agency
High Altitude Airship Research Initiative	ARDB
Modeling of Periodic Structure with Application to Dynamic Analysis of Carbon Nano-tubes.	DST
Development of a six-component accelerometer balance for use in shock tunnels	ISRO
Sponsored projects initiated in 2011-12	
Flow Characteristics and Active Separation Control in the AURA Intake Duct with Cowl-lip and Fore-body	ADA
Computing Environment for RCS Analysis of Flying Wing Configurations	ADA
Thermo-Mechanical Failure in CT Tubes under Severe Accident Conditions	Atomic Energy
Hardware In-loop Simulation for collaborative missions	ARDB
Unsteady Incompressible Turbulent Flow Computations on Static/ Moving Grids	ARDB
Parametric study of contra-rotating axial flow fans under different inflow conditions and design modifications based on the parametric study	ARDB
Development of non-linear Lamb wave based techniques for prediction of damage modes and their propagation in composite laminates	ARDB
Engineered Surfaces on Pyrolytic Carbon for Bio-Medical Applications	CSIR
Development of principles of eco-friendly technologies of gas combustion on the base of micro channels technologies	DST
Hardware in loop simulation (HILS) for collaborative missions	DST
Manufacturing of MAVs	DST
R&D in collaborative missions-Phase 1	DST
Compact Linear Fresnel Reflector (CLFR) for Solar Thermal Power and Process Heat	Indo-German STC
FOSSEE: Free/Open Source Software in Science and Engineering Education (Assimilation of Open source Software in Science and Engineering)	HRD ministry
Sponsored projects initiated in 2010-11	
Estimation of angle of attack in Mini Aerial Vehicles	ARDB
Centre for Aerospace Systems Design and Engineering (CASDE) - Phase-III.	ARDB
R & D in Collaborative Missions - Phase 1	ARDB
Manufacturing of MAVs	ARDB
Study of Flow Characteristics of the Fontan's Circulation with Energy Booster	ARDB
Numerical modeling of deflagration to detonation transition (DDT) in a detonation tube with commercial CFD software.	DRDO

Project Title	Name of Agency
IIT(B) STC/ viscous drag on a scramjet engine in a shock tunnel through wall heating rate measurements.	ISRO
Sponsored projects initiated in 2009-10	
Coordinatorship Allowances.	ARDB
Upgradation of Associate CFD Centre at IIT, Bombay	ARDB
DST - FIST to the Aerospace Engineering Department	DST
IIT(B) STC/ Development of High Resolution schemes for flow computations on space vehicle configurations using unstructured grids	ISRO
Assimilation of open source software in science and engineering education	HRD ministry
Virtual laboratory experiments	HRD ministry
De-sensitised Tip Design for Axial Flow Compressors.	Pratt & Whitney, Canada
Sponsored projects initiated in 2008-09	
Development of Baseline Free Damage Detection Technique for Laminated Composite Structures.	ARDB
Sponsored projects initiated in 2007-08	
Capability development to meet MAV08 mission requirements.	DRDO
Siemens Power Generation Inc./ Annular Diffuser Aerodynamics For Turbine Delivery System.	Int. Collaboration
Garuda Grid Computing Workshop at IIT Bombay	Private Org.
Sponsored projects initiated in 1991-92	
Multi block grid generation in three dimensional domains	ARDB

Consultancy Projects

Number of Jobs	: 10
Number of Faculty Involved	: 2

Patents

Menezes, V.

Fluid Injection Device. Japan Patent 2009"039384. European (EPO) Patent EP2022419. **Inventors:** Seto Takeshi, Takayama Kazuyoshi, Nakagawa Atsuhiko and Menezes Viren Ivor. **Assignee:** Seiko Epson Corporation, Tokyo, Japan.

Pradeep, A.M.

“High Diffusion Airfoils”, Patent application no. 2451/ MUM/2012,
Co-inventor: Prof. Bhaskar Roy

Sudarshan Kumar

Design of a Probe for Measuring Radiative Heat Flux of Combustion Systems

Extension Activities

A five-day CEP course on “Integrated Navigation of Flight Vehicles” (with Matlab/Simulink codes and illustrations) was conducted by Prof. H.B. Hablani during July 9-13, 2012, and an Industry-Academia workshop on “Shock Boundary Layer Interaction” was

coordinated by Prof. K. Sinha on May 15, 2012. There was also a Lecture Series on “Aircraft Conceptual Design and LTA Systems”, during January 28-30, 2012, coordinated by Prof. R.S. Pant.

Visitors to the Department

Prof. Nithiarasu, College of Engineering, Swansea University, Singleton Park, Swansea, United Kingdom, visited the department on April 11, 2012.

Prof. Sergi Minaev, Khristianovich Institute of Theoretical and Applied Mechanics, SB RAS, Novosibirsk, Russia, delivered a lecture on Dynamics of Micro-flames on April 13, 2012.

Prof. Arvind G. Rao, TU Delf, Netherlands, gave a lecture on Advanced Hybrid Engines for Aircraft Development on August 13, 2012.

Prof. S.K. Oza, (Rtd.) Professor, Aerospace Engineering Department, IITB, delivered a lecture on What Should be the Basis and Type of Best Education? on September 10, 2012

Mr. Naganand Murthy, Co-Founder and President, Embrace Innovations, delivered a lecture on Innovative Low Cost Infant Warmer on September 25, 2012.

Prof. S.C. Pradhan, IIT Kanpur, delivered a lecture on Non-Local Elasticity in Aerospace Engineering on October 31, 2012.

Prof. Chandra Veer Singh, University of Toronto, delivered a lecture on Multiscale Fracture Mechanics: from Atoms to Airplane” on January 9, 2013.

Conferences/Symposia/Workshops/Seminars (participated/Papers Presented)

Dubey, A.K. and Sudarshan Kumar

“Large eddy simulations of vortical instabilities in segmented solid rocket motors”, *26th National Convention of Aerospace Engineers*, November 24-25, 2012, Hyderabad, India.

Das, S. and Sudarshan Kumar

“Numerical simulation of an optimized strut-based fuel-injection system for a scramjet combustor”, *26th National Convention of Aerospace Engineers*, November 24-25, 2012, Hyderabad, India.

Jasmine Kaur, Akram, M., Minaev, S., Fursenko, R., and Sudarshan Kumar

“On the formation of FREI inside preheated mesoscale tube”, *National Propulsion Conference*, February 21-23, 2013, IIT Madras, India.

Sawant, D., Reddy, V.M., and Sudarshan Kumar

“Development of combustor for achieving flameless combustion of liquid fuels”, *National Propulsion Conference*, February 21-23, 2013, IIT Madras, India.

Akram, M., Saxena, P., and Sudarshan Kumar

“Laminar burning velocity of LPG-air mixtures at elevated temperatures”, *ASME 2012 Gas Turbine India Conference*, December 1, 2012, Mumbai, Maharashtra, India.

Reddy, V.M., Sawant, D., and Sudarshan Kumar

“Study on optimization of a liquid fuel based low emission combustor”, *ASME 2012 Gas Turbine India Conference*, December 1, 2012, Mumbai, Maharashtra, India

Hablani, H.B.

Keynote lecture “Relative Navigation and Formation Control of Geostationary Satellites”, *Advances in Control and Optimization of Dynamical Systems, (ACODS)*, IISC, Bangalore, February 2012.

Keynote lecture “Flight Vehicles Guidance, Navigation, and Control Technology”, *National Seminar on Advancement in Material Processing and Production Technology*, Department of Mechanical Engineering, Gyan Ganga, Institute of Technology and Sciences, Jabalpur, February 24-25, 2012.

Mandal, J.C.

“Numerical Shock Instabilities in High Speed Flows”, *5th Symposium On Novel Ideas In CFD (SONIC 2012)*, January 25, 2012, International Institute of Information Technology, Pune.

“Development of CFD Algorithm - An Overview”, *One Day Workshop on Overview of Aerodynamics Research and the Current Status in India*, on May 16, 2012, Indian Institute of Technology Bombay, Mumbai.

“High Resolution Finite Volume Method for Unstructured Grids Based on Solution Dependent Weighted Least-Squares Gradient”, *14th Annual CFD Symposium*, IISc, Bangalore, August 10-11, 2012.

“Issues with high speed flow computations”, *57th Congress of The Indian Society of Theoretical and Applied Mechanics*, December 17-20, 2012, Defence Institute of Advanced Technology, Girinagar, Pune, India.

“Implicit Formulation for Genuinely Multi-dimensional HLLC Riemann Solver”, *Ninth Asian Computational Fluid Dynamics Conference (ACFD9)*, October 10-14, 2012, Nanjing, China.

“High Resolution Finite Volume Method for Unstructured Grids Based on Solution Dependent Weighted Least-Squares Gradient”, *Keynote Address*

delivered at International Conference on Applications of Fluid Engineering (CAFE 2012) September 20-22, 2012 G.L. Bajaj Institute of Technology and Management, Greater Noida-201306, India.

“Numerical Shock Instability — An Issue with High Speed Flow Computations”, *Keynote Address delivered at International Conference on Applications of Fluid Engineering (CAFE 2012) September 20-22, 2012 G.L. Bajaj Institute of Technology and Management, Greater Noida-201306, India.*

Mandal, J.C., and Sonawane, C.R.

“High resolution incompressible flow computations over unstructured grids using sdwls gradients”, *The Ninth Asian Computational Fluid Dynamics Conference (ACFD9)*, October 10-14, 2012, Nanjing, China.

Murugan, K.N., Sharma, S.D., and Chatterjee, A.

“Far Field Acoustic Characteristics of Compressible Subsonic Elliptical Jets”, *Proceedings of the Thirty Ninth National Conference on Fluid Mechanics and Fluid Power*, December 13-15, 2012, SVNIT Surat, Gujarat.

Reddy, D.S.K. and Sinha, K.

“Analysis of High-Enthalpy Air-chemistry and its Effect on Stagnation Point Heat Flux”, *43rd AIAA Thermophysics Conference*, New Orleans, Jun 2012.

Reddy, V.M., and Sudarshan Kumar

“Development of high intensity ultra-low emission combustor with biodiesel”, *4th International Symposium on Energy and Environment: ACCESS*, December 9-12, 2012, IIT Bombay, India.

Sarkar, S., Jaura, A., and Sudarshan Kumar

“Evolution of Aircraft Gas Turbine Power Management System”, *2013 IEEE Aerospace Conference*, March 2-9, 2013, Montana, USA.

Akram, M., Sudarshan Kumar, and Ratna Kishore, V.

“Measurement of Laminar burning velocity for Propane/CO₂/N₂/ air mixtures at elevated temperatures”, WiPP Progress Poster W2P047, *34th International Symposium on Combustion*, July 29 - August 3, 2012, Warsaw, Poland.

Akram M., Sudarshan Kumar, and Saxena, P.

“Laminar burning velocity of methane-air mixtures at elevated temperatures”, WiPP Progress poster W5P004, *34th International Symposium on Combustion*, July 29 - August 3, 2012, Warsaw, Poland

Roy, R.N., Sudarshan Kumar, and Sreedhara, S.

“CMC modeling of turbulent lifted methane air flame in vitiated coflow”, *International Congress on*

Computational Mechanics and Simulation (ICCMS), IIT Hyderabad, December 10-12, 2012.

Nandan Kulkarni, N., and Sudarshan Kumar

“A Novel Concept of Active Combustion Instability Control in Solid Rocket Motors through H₂O₂ Capillary Injection”, *18th AIAA/CEAS Aeroacoustics Conference*, June 4-6, 2012, Colorado Springs, Colorado, USA

Menezes, V.

“A shock-wave-driven therapeutic device”, *in Proceedings of the Third Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS-2012)*, December 5-8, 2012, New Delhi, India.

Soni G., Singh R., Mitra M., and Falzon B.

“A Multi-fiber Multi-layer Representative Volume Element (M²RVE) for Prediction of Matrix and Interfacial Damage in Composite Laminate”, *15th European Conference on Composite Materials*, June 2012, Venice, Italy.

Sudarshan Kumar

National Propulsion Conference, February 21-23, 2013. IIT Madras, India.

Mistry, C. and Pradeep, A.M.

“Understanding the Flow Behaviour in a Low Hub-Tip Ratio, High Aspect Ratio Contra-Rotating Axial Fan Stage”, GTIndia2012-9531, *Proceedings of the 2012 ASME GT India conference*, 2012, Mumbai.

“Effect of Speed Ratio and Axial Spacing Variations on the Performance of a High Aspect Ratio, Low Speed Contra-Rotating Fan”, GT2012-68383, *Proceedings of 2012 ASME TURBO EXPO*, 2012, Copenhagen, Denmark.

Babu, M., Shukla, R.K., Maru, A., Pradeep, A.M., and Roy, B.

“Boundary Layer Control in Turbine Exhaust Diffusers Using Casing Injection and Design Modifications”, GT2012-68387, *Proceedings of 2012 ASME TURBO EXPO*, Copenhagen, Denmark.

Mitra M.

Presented a paper (co-authored by Janarthan, B. and Mujumdar, P.M.) “Damage Detection in Stiffened Composite Panels Using Lamb Wave”, *6th European Workshop on Structural Health Monitoring* Dresden, Germany, 2012.

Guruprasad, P.J., Singh, C.V., and Harursampath, D.

“Nonlinear analysis of pretwisted anisotropic strips in presence of interlaminar and intralaminar cracks”, *49th Society of Engineering Science Annual Meeting*, Atlanta, USA, 2012.

Thejasvi, M. and Guruprasad, P.J.

“Dynamic analysis of a thin pre-twisted and delaminated anisotropic strip”, *Asian Conference on Mechanics of Functional Materials and Structures*, New Delhi, India, 2012

Guruprasad, P.J.

“Role of dimensional and microstructural length scales in crystal plasticity”, *Workshop on Mechanical Behavior of Materials at Small Length Scales*, Coorg, India, 2013.

Sharma, S.D. and Deshpande P.J.

“Control of Benard-Karman instability by means of streamwise vortices generated by obliquely segmented blunt trailing edge”, *IUTAM Symposium on Vortex Dynamics: Formation, Structure and Function*, March 10-14, 2013, Kyushu University, Fukuoka, Japan.

Invited Lectures

Hablani, H.B.

“Precise Navigation for Proximity Operations and Formation Control of Low-Earth-Orbit Satellites using GPS”, *Structured Training Program* at ISRO Inertial Systems Unit, Thiruvananthapuram, June 2012.

“Autonomous Guidance and Inertial Relative Navigation for Spacecraft Rendezvous using Imaging Sensors Misaligned with Inertial Sensors”, *Structured Training Program*, ISRO Satellite Center, August 2011.

“GPS Navigation for Inertial motion, Formation Control, Rendezvous and Proximity Operations A brief review of recent literature”, *Panel Review on Space Situational Awareness, Space Weather and Space Debris Research*, Panel Meeting, COSPAR-12 Associated Event, AFOSR-USA, July 19, 2012, Mysore, India.

Mitra, M.

“Damage Detection Using Time Reversibility of Lamb Wave”, *Asia-Pacific Network of Centers for Research in Smart Structure and Technology*, Bangalore, India, July 2012.

Pant, R.S.

“Why airplanes look like they do?” *Punjab Engineering College*, Chandigarh, March 16, 2013.

“Principles of Flight through Chuck Gliders”, *Lecture-cum-Demonstration*, Regional Science Center, Lucknow, February 21, 2013.

“Design and development of outdoor remotely controlled airships”, *JS Academy of Technical Education*, Noida, UP, February 14, 2013.

“Design Fabrication and Flight testing of Remotely Controlled Airships”, *MVJ College of Engineering*, Bangalore, February 5, 2013.

“High Altitude Airships Critical Technology Review and Design Challenges”, *National Aerospace Laboratories*, Bangalore, February 4, 2013.

“Design and development of outdoor remotely controlled airships”, *Amity University*, Noida, UP, January 7, 2013

“From Concept to Reality in less than a month: Design-build-fly project of R C airship in Manali”, *AME School*, Bombay Flying Club, Juhu, Mumbai, October 12, 2012.

“Modeling of an airline MRO to determine trade-off between facility utilization and service level” at *MRO India 2012*, Mumbai, September 27, 2012.

“Airships for Navigation”, *Lecture Series* at 5th SERC School on GPS Applications and Atmospheric Constraints, *Osmania University*, Hyderabad, June 23, 2012.

“Design, Build and Flight Demonstration of a Remotely Controlled Airship”, *DST-INSPIRE Science Camp*, IIT Delhi, May 21, 2012.

“Design and Development of Lighter-Than-Air Systems”, one-day workshop at *Indian Institute of Aeronautical Engineering and Information Technology*, Pune, April 21, 2012.

Sharma, S.D.

“Engineering Aspects of the Fontan Circulation”, *59th Annual Meeting of Indian Association of Cardiovascular & Thoracic Surgeons*, February 14-17, 2013 held at *Renaissance Mumbai Convention Centre*, Mumbai.

Sinha K

“Turbulence modeling for shock-boundary layer interaction” as part of the Air-breathing propulsion seminar series at *Vikram Sarabhai Space Centre*, ISRO, Trivandrum, November 2012.

“Shock-turbulence Interaction - Theory, Modeling and Application”, *International Symposium of Hypersonic Aerothermodynamic Recent Advances (ISHARA)*, Bangalore, December 9-13, 2012.

“Shock-turbulence Interaction - Theory, Modeling and Application”, *Texas A&M University*, College Station, TX, June 2012.

“Shock-turbulence Interaction - Theory, Modeling and Application”, *University of Texas*, Austin, TX, June 2012.

Significant Awards/ Distinctions

Hablani, H.B.

Excellence in Aerospace Education Award (2012) was bestowed by the Aeronautical Society of India.

Mahulikar, S.P.

Appointed to the DFG-Mercator Chair Professorship in Institute for Thermo-fluid-dynamics, T.U. Hamburg, Germany, from December 2011-2012."

Shimpi, R.P.

Served on Management Council of North Maharashtra University, Jalgaon

Sinha, K

Elected as a Member of the National Academy of Science India (NASI), Allahabad.

Pant, R.S.

Chairman of the Mumbai Branch of the Aeronautical Society of India, 2012-13.

Visiting Researcher at the Department of Aerospace and Mechanical Engineering, Instituto Tecnológico de Aeronáutica ITA, Sao Jose dos Campos, Brazil, May 25 - June 6, 2012.

Honorary Work

Pradeep, A.M.

Reviewed papers for: AIAA Journal, Transactions ASME, Journal of Fluids Engineering.

Session Chair, ASME Turbo Expo 2012; Technical Program Chair, ASME GT India 2012.

Hablani, H.B.

Reviewer for: Defense Science Journal, DRDO, Government of India; Acta Astronautica.

Mandal, J.C.

Expert Member, Selection Committee for scientists/engineers (Grade SG) in the Department of Space/ Indian Space Research Organization, Bangalore.

Member, National Core Technical Committee, International Conference on Applications of Fluid Engineering (CAFE 2012), September 20-22, 2012, Noida, India.

Session Chair, ACFD9.

Expert Member of NBA, AICTE, for visit to IARE Hyderabad, December 29-30, 2012.

Expert Member, Selection Committee for faculty in the Aerospace Engineering Department, Indian Institute

of Space Science and Technology, Trivandrum, February 23, 2013.

Expert Member, Selection Committee for faculty in the Mechanical Engineering Department, Indian Institute of Technology Guwahati, March 9, 2013.

Expert Member, Selection Committee for faculty in the Aerospace Engineering Department, Indian Institute of Technology Kharagpur, March 23, 2013.

Member, IRCC Award Committee, IIT Bombay.

Expert Member, Nuclear Reactor & Fuel Cycle (NRFC), Process Engg. and CFD Subcommittee, Board of Research in Nuclear Sciences (BRNS).

Expert Member, Homi Bhabha National Institute (HBNI), Bhabha Atomic Research Centre, Mumbai.

Member, National Scientific Organizing Committee; Member, Local Executive Committee, National Programme on Differential Equations: Theory, Computation & Application (NPDE-TCA-2012), sponsored by the Department of Science and Technology, Government of India.

Reviewed manuscripts for: Computers and Fluids, International Journal for Numerical Methods in Fluids, International Journal of Computational Fluid Dynamics.

Mitra M.

Reviewed papers for: Smart Materials and Structures, Structural Health Monitoring, AIAA Journal, Structural Control & Health Monitoring, Journal of Vibration & Acoustics, Composites Science & Technology, Journal of the Institution of Engineers (India): Series C, Sadhana, Journal of Sound & Vibration, Wave Motion, Philosophical Magazine.

Guruprasad, P.J.

Reviewed papers for International Journal of Solids and Structures, 2012.

Shimpi, R.P.

Reviewed papers for: ASME Journal of Applied Mechanics, Journal of Sound and Vibration, Composites Part B, Meccanica, AIAA Journal, Thin-Walled Structures.

Menezes, V.

Reviewed papers for: Defense Science Journal, May 2012; Measurement Science and Technology, September 2012; and Shock Waves, August - November 2012.

Reviewed Ph.D. thesis for the Department of Mechanical Engg., IIT Guwahati, March 2013.

Sinha, K

Reviewed paper for Physics of Fluids, September 2012

Sudarshan Kumar

Reviewed papers for: Combustion and Flame, Proceedings of the Combustion Institute, International Journal of Hydrogen Energy, Fuel, Aerospace Science and Technology, Energy and Fuels, International Journal of Emerging Multidisciplinary Fluid Sciences, Recent Patents in Engineering, International Journal of Hypersonics, Defence Science Journal, Combustion Science and Technology, International Journal of Heat and Mass Transfer, International Journal of Aerospace Engineering, Journal of Combustion, Power Propulsion Research, Turbo Expo 2012.

Faculty Members and their Specializations**1. Pradeep A.M.**

Active and passive flow control, Flow characteristics of internal flows and turbo-machinery, Design and performance enhancement strategies in turbo-machinery

2. Hemendra Arya

Mini/Micro Aerial Vehicle system Design, Autonomous aerial Vehicles, Hardware-In-Loop-simulation, Systems Engineering, Co-operative missions

3. Kowsik V.R. Bodi

Areas of Interest: Propulsion, High Enthalpy Flows, Heat Transfer, Plasma physics, Turbulence, transport and structure formation”

4. Avijit Chatterjee

Computational Fluid Dynamics, Aerodynamics, Computational Electromagnetics

5. Guruprasad P.J.

Mechanics of Materials

6. Hari Hablani

Guidance, Navigation and Control of Flight Vehicles

7. Ashok Joshi

Dynamics & Control of Flight Vehicle Structure, Aero-elasticity

8. Subhash Chandra Lakkad

Composite Materials, Structural Design, Biomechanics

9. Shripad Mahulikar

Aerothermodynamics, Heat Transfer in Hypersonics, Jet Propulsion, Micro-channel Cooling, Stealth Technology

10. Jadav Chandra Mandal

Computational Fluid Dynamics

11. Viren Menezes

Hypersonic aerothermodynamics, Hypersonic ground testing facilities and related experimental techniques,

Shock waves, Medical and industrial applications of shock waves

12. Mira Mitra

Wave propagation and structural dynamics, structural health monitoring, smart structures, wavelet, carbon nano-tubes and nano-composites, computational mechanics

13. Prasanna Mujumdar

Structural Dynamics & Stability, Aero-elasticity, Aero-servo-elasticity, Multi-disciplinary Design Optimization, Smart Structures

14. Niranjan Naik

Polymer Matrix Composites, Textile Composites

15. R.S. Pant

Lighter-Than-Air systems, Aircraft Design, Air Transportation, Optimization

16. Prabhu Ramchandran

Vortex methods, Particle methods, Scientific computing, Computational fluid dynamics

17. Bhaskar Roy

Aircraft Propulsion, Axial Flow Compressor, Gas Turbine Aerodynamics

18. Shailendra Sharma

Experimental Techniques in Fluid Mechanics & Aerodynamics, Control of Coherent Structures in Free Shear Flow, Turbulent Mixing of coaxial ducted jets, Vortex Flow, Pulsatile Flow

19. Gopal Shevare

Grid Generation, Computational Fluid Dynamics

20. Rameshchandra Shimpi

Theory of Plates, Finite Element Method, Optimization Techniques (Genetic Algorithms, Simulated Annealing, Particle Swarm Optimization), Material Testing, Experimental Stress Analysis”

21. Krishnendu Sinha

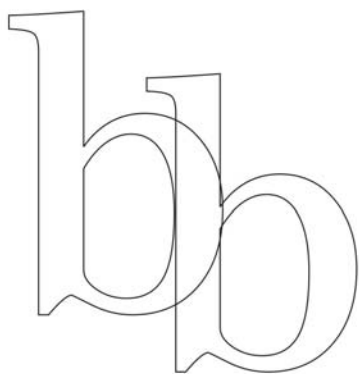
Computational fluid dynamics, High-speed flow analysis, Turbulence modeling, High-performance computing

22. Sudarshan Kumar

Combustion and Propulsion, Flameless and mild combustion, Micro combustion, Pattern formation of flames and propulsion

23. Krishnarao Sudhakar

Systems Design, Complex Systems, Systems Engineering



Biosciences & Bioengineering

Introduction

The Department of Biosciences and Bioengineering comprises two broad areas representing Biotechnology and Biomedical Engineering. The department aims to create an ambience for the smooth pursuit of scholarly activity in research and education, and endeavours to produce the leaders of tomorrow in this field. With the formation of the Department of Biosciences and Bioengineering, there has been a great impetus to research in biosciences at IIT Bombay. The department has 24 core faculty members. The names of newly joined faculty members are: Prof. Debjani Paul, Prof. Ambarish Kunwar, and Prof. Anirban Banerjee.

The new building of the Biosciences and Bioengineering Department was inaugurated by Dr. A.P.J. Abdul Kalam on Monday, March 11, 2013. The department has the following infrastructural facilities: Protein purification system; Real time PCR; Sonoprotator with accessories; Minus 80 deg deep freezer; Shaker and electrophoresis apparatus; Fraction collector; Centrifuge; Ultracentrifuge; Microplate reader; Microarrayer set up; Liquid scintillation counter; ITRAQ kit; Protein purification system; and High speed centrifuge.

Academic Programmes

The academic programmes currently consist of the DBT-supported M.Sc. Biotechnology programme, the M.Sc.-Ph.D. dual degree programme in Biotechnology, M.Tech. in Biomedical Engineering programme, and the Ph.D programme. The M.Tech. programme is unique in a way, that it provides an entry point for a medical doctor (MBBS) to work together with engineering students and get an engineering (M.Tech) degree. This programme is extremely popular with doctors and draws a large number of applicants. The institute has boosted the academic activity of the department by funding four new scholarships and a few more are being added.

The academic programme of the department have been running successfully and a review of achievements over the years has shown positive trends both in terms of student career profiles and the quality of instruction as evident from student feedback. Extensive interactions with various groups in Electrical Engineering, Chemical Engineering, Aerospace Engineering, Computer Science, Chemistry and Mathematics make the departmental research activities truly interdisciplinary.

Degrees Awarded

M.Sc.	: 27
M.Tech.	: 21
Ph.D.	: 13

The recruitment of faculty with diverse backgrounds has led to introduction of new courses in the department, which can be taken by students from various other departments. These include: Programming for bioinformatics, Physics and applications of microfluidics, and Theoretical and computational modelling in biology.

The department has introduced a new Introductory Biology course for all first year UG students.

R&D Activities

Research in the department encompasses both basic biology and applied bioengineering topics. As part of the Wadhwani foundation, cancer and cell motility has been identified as a thematic focus area of research. Several of our faculties have participated in organizing international conferences in India and abroad. Following are the main thrust areas of R&D activity: Biotechnology, Biochemistry and Molecular enzymology, Bioelectricity; Bioinformatics, Biointerfaces, Biomaterials, Biomechanics, Biomedical Optics (Tissue Spectroscopy and Imaging), Bionanotechnology, Biosensors, Biostatistics, Computational Biology, Drug delivery, Glycobiology, Instrumentation, Medical Signal Processing, Natural Products, Nerve-muscle Transmission, Non-invasive

diagnostic tools, Prokaryotic biology, Rehabilitation, Synthesis of Bioactive molecules, Synthetic Polymer Chemistry, Tissue engineering, Yeast molecular biology.

Sponsored Research Projects :

New	:	17
Ongoing	:	69
Completed	:	07
Faculty involved	:	27

List of Sponsored Research Projects

Name of the Project	Sponsored by	Status
“Integration Platform for III-V Semiconductors with Polymer Waveguides and Micro-Fluidic Channels”	ARDC of DST	New Project
“Transdermal drug delivery using microneedles”	Aeronautical Development Agency	New Project
“Mechanism of DNA packaging in Nucleo-cytoplasmic large DNA viruses”	BRNS	New Project
“Studies on type II Phosphatidylinositol 4-kinase beta role in T cell activation signaling mechanisms”	BRNS	New Project
“Stiffness Modulated Gellan Hydrogels for Tissue Engineering Applications”	CSIR	New Project
“Novel Microalgal isolates as cell factory for biodiesel production: Identification of multiple targets and designing of optimal process via system biology and biochemical engineering approach	DBT	New Project
“Embedded Polymer Optical Biosensors”	DBT	New Project
“Development of antimalarial inhibitors targeting Plasmodium parasite plasmepsins”	DBT	New Project
“DBT Task Force Meeting on ‘Environmental Biotechnology & Biodiversity Conservation’”	DBT	New Project
“Prolonged stimuli responsive delivery of macromolecules for subcutaneously implanted matrices”	DBT Innovative Young Biotechnologist Award	New Project
“Understanding protein - protein interactions of JAK-STAT pathway proteins on protein arrays”	DST	New Project
“Preferential utilisation of aromatic compounds over glucose by Pseudomonas putida CSV86: Studies on inner membrane component involved in glucose transport”	DST	New Project
“Probing the recognition dynamics of proteins involved in cell cycle regulation by NMR”	DST	New Project
“Biosensor systems based on nanosized materials for the detection of food or waterborne toxins”	DST	New Project

Name of the Project	Sponsored by	Status
“Examining The Role of Actin Crosslinking Protein Alpha-Actinin In Breast Cancer Metastasis”	DST	New Project
“Designing peptide inhibitors against synuclein aggregation : Therapeutic approach for Parkinson”	ICMR	New Project
“Validation of a computational model of urinary bladder electrical activity in health and during overactivity”	UK India Education and Research Initiative	New Project
“CSIR -UGC Junior Research Fellowship”	CSIR	New Project
“Development of Near InfraRed stimuli responsive nanoparticles for targeted cancer therapy”	Autonomous Research & Development Centre of DST	Ongoing Project
“Probing the relationship between extracellular matrix (ECM) ligand and invadopodia formation in breast cancer”	BRNS	Ongoing Project
“Comparative genomics analyses of glycosylation pathways in completely sequenced bacterial genomes”	BRNS	Ongoing Project
“Studying Mechanism of Copy Number Control of Naturally Harboring Plasmid of budding yeast, a widely used Multicopy Eukaryotic Vector”	CSIR	Ongoing Project
“In-house Production of Human Proteome Arrays to Study Pathways and Protein Interaction Networks in Brain Tumor”	CSIR	Ongoing Project
CSIR Fellowship	R/O Asmita Dasgupta	Ongoing Project
“The assembly dynamics of Mycobacterium smegmatis FtsZ and its role in cytokinesis”	CSIR	Ongoing Project
“Dissection of structure function correlation of an allosteric signal transducer of the Gal Genetic Switch of Saccharomyces Cerevisiae using experiment and computational approach”	CSIR	Ongoing Project
“Studies on DNA and protein translocation machinery of bacteriophage ϕ 4”	CSIR	Ongoing Project
“Understanding the membrane interactions of oligomeric states of amyloidogenic proteins” by solid-state NMR”	CSIR	Ongoing Project
“Effects of tau glycation and phosphorylation on stability and dynamics of microtubules and on differentiation of neuronal cells: Therapeutic implications for neuropathies”	DBT	Ongoing Project
“Mechanobiological regulation of embryonic stem cell self-renewal and differentiation”	DBT	Ongoing Project
“Computational studies on bladder biophysics with special reference to possible mechanisms in over activity”	DBT	Ongoing Project

Name of the Project	Sponsored by	Status
“Assessment of thrombolytic potential and anticancer activity of fibrinolytic enzymes purified from Russell’s viper venom and bacteria isolated from NE-India”	DBT	Ongoing Project
“Understanding the formation of neurotoxic - synuclein oligomers associated with Parkinson’s disease”	DBT	Ongoing Project
“Studying the heterogeneity of gliomas for the tumor antigen identification using proteomics and histology & generation of metabolic map using radiology”	DBT	Ongoing Project
“Elucidating the factors responsible for spatio-temporal regulation of association between cohesin and chromatin in executing faithful chromosome segregation during meiotic cell cycle using budding yeast as a model system”	DBT	Ongoing Project
“A dynamic insight into bio-molecular assemblies using solution and solid – state NMR”	DBT	Ongoing Project
“Mycobacterial genes that are orthologs of prokaryotic N-linked glycosylation pathway enzymes: Cloning and expression, and characterization of the protein products”	DBT	Ongoing Project
“Role of Polo-like kinases in regulating microtubule dynamics, cell cycle and cell migration”	DBT	Ongoing Project
“Understanding Genome Organization and Gene Expression in Hexachlorocyclohexane (HCH) Degrading Bacteria and the HCH Dumpsite”	DBT	Ongoing Project
“DBT-Research Assistanship of Dr. Radhika J. Poojari”	DBT	Ongoing Project
“Centre of Excellence in nanoelectronics – Phase – II a joint project between IISc Bangalore and IIT Bombay”	DST	Ongoing Project
“Role of FtsZ assembly dynamics in Z-ring formation and bacterial cell division”	DST	Ongoing Project
“Nanoparticulate cosmetics for nutrient delivery in pregnancy” (Global innovation award scheme) by	Bill and Melinda Gates Foundation	Ongoing Project
“Clinical Proteomics RT Virtual Lab”	MHRD	Ongoing Project
“Localized Surface Plasmon Resonance (LSPR) Based Optoelectronic Biosensors”	NMRL	Ongoing Project
“Systematic studies on Localized Surface Plasmon Resonance (LSPR) based biosensor using ATR technique and its potential for DNA/ antibody detection”	NMRL	Ongoing Project

Name of the Project	Sponsored by	Status
“Novel Multifunctional Ultrasound Triggered and Targeted Nanoparticles for Cancer Therapy”	Samsung Electronic Ltd.	Ongoing Project
“BRNS/ Nanoengineered Alginate Carrier Glucose Sensors Using Competitive Binding Resonance Energy Transfer Assays Based on Apoenzymes”	BRNS	Ongoing Project
“Functional promiscuity of arginase in <i>Aspergillus niger</i> metabolism”	BRNS	Ongoing Project
“Role of microtubules dynamics in cell cycle and cell motility: Implication in cancer chemotherapy”	BRNS	Ongoing Project
“Sequence Dependent Oligomerization of α -synuclein : Relevance to Parkinson’s Disease”	CSIR	Ongoing Project
“Gold Nanostructures and polymeric nanoparticles for breast cancer therapy”	DBT	Ongoing Project
“Drug loaded surfactant nanoparticles for therapy in acute respiratory distress syndrome”	DBT	Ongoing Project
“Proteomic analysis of human gliomas for biomarker discovery”	DBT	Ongoing Project
“Nanoengineered Calcium-Sensing Tattoo Materials for Early Diagnosis of Milk Fever”	DBT	Ongoing Project
“Oligomerization of α Synuclein in Parkinson’s Disease (PD)”	DBT	Ongoing Project
“Nanoengineered Lab-on-a-Particle System”	DBT Innovative Young Biotechnologist Award	Ongoing Project
“Force generation by Actin and Microtubules”	DBT Innovative Young Biotechnologist Award	Ongoing Project
“DBT- Project Assistantship of Mrs. Meghna Singh”	DBT	Ongoing Project
“DBT- Project Assistantship of Mrs. Dipty Singh”	DBT	Ongoing Project
“Development of Multifunctional Magnetic Nanoparticles for Cancer”	DIT	Ongoing Project
“Understanding and modulating the α -synuclein aggregation in Parkinson’s disease”	DST	Ongoing Project
“Study of regulatory factors involved in chromosome dynamics during meiotic cell division using budding yeast, <i>Saccharomyces cerevisiae</i> as a model system”	DST	Ongoing Project
“Deciphering the role of KRR1 and KRR2 in glucose and ammonium mediated signaling of filamentation response”	DST	Ongoing Project

Name of the Project	Sponsored by	Status
“Nanoparticles for Delivery of Anticancer Drugs in Resistant Tumors”	Indo-US Science & Technology Forum, New Delhi	Ongoing Project
“OSCAR Proteomics Lab Course-I”	Internally funded by MHRD project	Ongoing Project
“Proteomics Laboratory”	MHRD	Ongoing Project
“Wadhwani Center of Excellence”	Wadhwani Foundation	Ongoing Project
“Characterization of the fermentative pathway in Pichia pastoris and study of its role in central carbon metabolism”	BRNS	Ongoing Project
“Oscar for Proteomics and Cell & Molecular Biology”	Internally funded by MHRD project	Ongoing Project
“A lab on chip of Cardiac Diagnostics”	Aeronautical Development Agency	Ongoing Project
“Development of Nanoparticles and Nanovesicles for Delivery of Anticancer Drugs Through Inhalation Route”	Private Organisations	Ongoing Project
“DST/Development and evaluation of injectable biopolymer based scaffolds for cartilage tissue engineering”	DST	Completed Project
“Serum profiling of malaria patients by using proteomic techniques”	BRNS	Completed Project
“Structure and Functional Characterization of Bacterial Cell Division Protein SepF and UgtP and their roles in Z-Ring and Septum formation”	BRNS	Completed Project
“Genomic analysis of microbial resistance mechanisms using ‘Streptomyces coelicolor as a model system”	DBT	Completed Project
Prediction of the kinetics of competitive metabolic networks in hydrocarbon degrading organisms : Development of a structured model and experimental validation”	DBT	Completed Project
“Conversion of Cellulose and hemi-cellulose into sugars and ethanol”	CSIR	Completed Project
“Population heterogeneity in Saccaromyces Cerevisia: Causes and Consequences of Phenotypic Variation”	BRNS	Completed Project
“In Search of the novel pathways, enzymes or operons involved in the degradation of aromatic compounds using metagenomic approach”	DBT	Completed Project
“Nanoengineered ‘Smart Tatoo’ Lactate Sensors”	CSIR	Completed Project
“Integration Platform for III-V Semiconductors with Polymer Waveguides and Micro-Fluidic Channels”	Autonomous Research & Development Centre of DST	Completed Project

Consultancy Projects

No of jobs	: 05
Faculty involved	: 03

Visitors to the Department

Dr. Alpeshkumar K. Malde, Senior Postdoctoral Fellow, MD Group, School of Chemistry and Molecular Biosciences (SCMB), The University of Queensland, St. Lucia Campus, Australia, delivered a lecture on “Refinement and validation of ligands in X-ray crystal structures.”

Dr. Nikhil S. Malvankar, Post-doctoral Research Associate, Departments of Physics and Microbiology, University of Massachusetts, USA, delivered a lecture on “Metal-like transport in proteins: A new paradigm for biological electron transfer and bioelectronics.”

Dr. Leslie Wilson, Professor of Biochemistry and Pharmacology, Department of Molecular, Cellular and Developmental, Biology and the Neuroscience Research Institute, University of California, Santa Barbara, delivered a lecture on “Microtubule Dynamics and its Modulation by Microtubule-Targeted Anticancer Drugs and Plus-Tip Tracking Complexes.”

Ritwick Sawarkar, Epigenomic Group, Department of Biosystems Science and Engineering, ETH Zürich, Switzerland, delivered a lecture on “Hsp90@chromatin. nucleus: An emerging hub of a networker.”

Dr. Venuka Durani Goyal, Institute Post-doctoral Fellow, Structural Biochemistry Lab, Chemistry Department, IIT Bombay delivered a lecture on “Making Sense of Protein Sequences: Experimental Verification of Bioinformatic and Computational Predictions.”

Dr. Erroll Rueckert, Nanostring Technologies, Inc., delivered a lecture on “Multiplex gene expression analysis with Nanostring Counter technology; Applications in cancer biology, psychiatric disease and beyond.”

Dr. Sarath Chandra Janga, Assistant Professor, School of Informatics, Indiana University & Purdue University, Indianapolis, delivered a lecture on “Uncovering the design principles and regulatory architecture at transcriptional and post-transcriptional levels using systems and network-based approaches.”

Dr. Akhilesh K. Chaurasia, Post-doctoral Fellow, Department of Microbiology, University of Massachusetts, Amherst, MA, delivered a lecture on “Genomics and Bioengineering of Bugs: From Strictly

Anaerobes to Oxygenic Aerobes for Sustainable Energy and Cleaner Environment.”

Dr. Pradyumna S. Singh, Post-doctoral Researcher, MESA+ Institute for Nanotechnology, University of Twente, The Netherlands, delivered a lecture on “Electrochemistry meets nanofluidics: A new single molecule technique.”

Dr Ravi Gooneratne, BVSc, Dip.Tox., PhD, FRCPath, FAAVCT, Associate Professor in Toxicology, Faculty of Agriculture and Life Sciences, Lincoln University, New Zealand delivered a lecture on “Use of novel electrophysiology, genotoxic, enzyme proteins, and metabolomic biomarkers to monitor environmental health.”

Prof. Jonathan Bacon, Adjunct Professor of Neuroscience, Department of Neuroscience, University of Arizona, Tucson, delivered a lecture on “Synaptogenesis in the fly’s brain – a case study in molecular cell biology.”

Prof. Mibel Aguilar, Monash University, delivered a lecture on “Defining the Mechanism of Peptide-Membrane Interactions Through Membrane Structure Change And Recovery” & “Peptidomimetic Strategies to Turn Bioactive Peptides into Drugs.”

Dr. Sourav Datta, Postdoctoral, Research Fellow, Department of Plant Sciences, Oxford University, UK, delivered a lecture on “Regulation of plant growth and food security: Opportunities ahead.”

Dr. Umakanta Tripathy, Department of Physics, McGill University, Montreal, Canada, delivered a lecture on “Detecting malaria and imaging extra cellular matrix in tissues by multi-modal nonlinear laser scanning microscopy (NLSM).”

Stuart A. Ralph, Department of Biochemistry & Molecular Biology, Bio21 Molecular Science and Biotechnology Institute, The University of Melbourne, Australia, delivered a lecture on “Dual-targeted tRNAsynthetases as antimalarial drug targets.”

Dr. Ratnesh Jain, Ramanujan Fellow (DST, GoI), Institute of Chemical Technology, delivered a lecture on “Polymeric Nanomedicines: Translation to the clinics?”

Dr. Sukrat Sinha, Young Investigator, Centre for Biotechnology, University of Allahabad, delivered a lecture on “Role of protein kinase C alpha in T cell proliferation during Visceral Leishmaniasis.”

Dr. Raman Maiti, Research Fellow at University of Leeds, delivered a lecture on “50 active years after 50”.

Dr. Nikhil J. Joshi, Post-doctoral Fellow, Division of Biology/Computation and Neural Systems, California Institute of Technology, delivered a lecture on “The minimal complexity of an adapting agent increases with fitness.”

Prof. M. Cynthia Goh, Professor, Department of Chemistry, Institute of Medical Science and Munk School of Global Affairs, delivered a lecture on “Diffraction-based sensing: From measurement of biomolecular interactions to applications in medical diagnostics.”

Dr. Sandip Kar, Senior Post-doctoral Fellow, Division of Theoretical Systems Biology, German Cancer Research Center, Heidelberg, Germany, delivered a lecture on “An insight to Mathematical and computational Modeling in Biology.”

Dr. Aparup Das, Scientist D, EGB Laboratory, National Institute of Malaria Research, Delhi, delivered a lecture on “Molecular Evolutionary Signature of Host-parasite Interaction: Understanding from Plasmodium vivax Malaria in India.”

Dr. Eeshita Ghosh Dastidar, delivered a lecture on “Towards Understanding Histone Phosphorylation as an Epigenetic Factor in P. Falciparum.”

Dr. Anita Singh, Faculty, Biomedical Engineering, University of Delaware, delivered a lecture on “Spinal cord injury: Mechanism and Treatment.”

Dr. Janaki Iyer, delivered a lecture on “How is peptidoglycan recognized by primary innate immune cells?”

Dr. Chinmoy Patra, Post-doctoral fellow, Max-Planck-Institute for Heart and Lung Research, Germany, delivered a lecture on “Cardiovascular development and cardiac regeneration.”

Dr. Debabrata Mandal, Research Scientist, Massachusetts Institute of Technology (MIT), Department of Biology, Cambridge, Massachusetts, USA, delivered a lecture on “Transfer RNA modifications and their role in translational fidelity.”

Dr. Gautam Agarwal, Post-doctoral Fellow, Redwood Center for Theoretical Neuroscience, UC Berkeley, delivered a lecture on “The Spatial Structure of Hippocampal Oscillations Signifies Behavioral State.”

Dr. Mayura Desai, Department of Microbiology & Immunology, University of Texas Medical Branch, Galveston, USA, delivered a lecture on “Differential anti-viral effects of type I interferons.”

Dr. Sanjay V. Malhotra (PhD, FRSC), Laboratory of Synthetic Chemistry–SAIC, National Cancer Institute,

Frederick, MD 21702, USA, delivered a lecture on “Himalayan mayapple to anti-cancer therapeutics.”

Conferences/Symposia/Workshops/ Seminars (participated/Papers Presented)

Banerjee, R.

“Post 2015 Millenium Development Goals in Global Health” at the *Global Colloquium* of University Presidents, New York, 2013.

Banerjee, R. and Sarkar, S.G.

Oral presentation on “Site-specific Drug Delivery using Biodegradable, Nanoparticle-in-Membrane Systems,” *International Conference on Nanotechnology in Medicine (NanoMED) 2012* at University College London (UCL), London, United Kingdom, November 7-9, 2012.

Bhaumik, P.

Poster presentation on “Proline rich fusion domain of the mouse hepatitis virus spike protein is involved in the neuronal cell fusion and induction of concurrent demyelination with axonal loss”, at the *11th International Symposium on NeuroVirology*, New York, USA, May 29 – June 2, 2012.

Ghosh, S.K.

Poster presentation on “The biology of fungal pathogens as a path to drug discovery” at *The Candida Paradigm, Badajoz*, Spain, 2012.

Poster presentation on “EMBO Centromere”, *Workshop on Structure, Function and Regulation of Centromeres and Kinetochores* at Barcelona, Spain, 2012.

Kunwar, A.

Poster presentation on “Model of Cargo Transport by Multiple Kinesin Motors with Single Motor Mechano-chemistry” at the *57th Annual Meeting of Biophysical Society*, Philadelphia, PA, USA, February 2-6, 2013.

Poster presentation: “Model of Multiple Motor based Transport with Single motor Mechano-chemistry” at the *Young Investigator’s Meeting 2013 (YIM 2013)*, February 10-13, 2013, Taj Gateway, Jodhpur, India.

Maji, S.K.

Poster presentation on “Cytotoxic helix-rich Intermediate is the Immediate Precursor of Alpha-Synuclein Fibrils”, *New Frontiers in Neurodegenerative Disease Research, Keystone Symposium* held during February 2-8, 2013, at Santa Fe, New Mexico, USA.

Mukherji, S.

Paper presentation on “Comparison of Micro Fabricated C and S Bend Shape SU-8 Polymer

Waveguide of Different Bending Diameters for Maximum Sensitivity”, *1st International Symposium on Physics and Technology of Sensors (ISPTS)*, 2012.

Paper presentation on “U-Bend Fiber Optic Sensor using 6-Mercaptonicotinic Acid (6-MNA) Functionalized Gold Nanoparticles for Detection of Explosives RDX and TNT” at the *International Conference on Fiber Optics and Photonics*, 2012.

Paper presentation on “A novel and facile method for synthesis of uniform and monodispersed hollow gold-silver nanostructures for incorporation in label-free optical biosensors” in the *Third International Conference on Multifunctional, Hybrid and Nanomaterials (Hybrid Materials 2013)*, at Sorrento, Italy, March 3-7, 2013.

Padinhateeri, R.

Poster presentation on “History-dependent depolymerization of cytoskeletal filaments,” *International Conference PhysCell* at Hyres, France, September 2012.

Invited Talk on “Understanding nucleosome kinetics,” *Mechanobiology of Chromatin and Transcription Workshop* at NUS, Singapore, November 2012.

Oral presentation on “Dynamics of cytoskeletal filaments and force generation,” *ICTS International Conference on Mechanical Manipulations and Responses at the Scale of the Cell and Beyond*, April 2013.

Panda, D.

Poster presentation on “Reconstructing the essential bacterial cell cycle machinery” in Spain during September 16-19, 2012.

Post presentation at the *Annual Meeting of ASCB* at San Francisco during December 15-19, 2012.

Patankar, S., Narayan, A., and Chaudhari, R.

“Population heterogeneity in the localization of the antioxidant protein Glutathione peroxidase in *Plasmodium falciparum*,” *XXXVI All India Cell Biology Conference and International Symposium*, Mumbai, 2012.

Paul, D.

Poster presentation: “Phagocytosis dynamics depends on target shape”, *Young Investigators’ Meet*, February 10-14, 2013, Jodhpur, India.

Phale, P.S.

Paper presentation on “Membrane Transport Proteins,” *Gordon Research Conference* at Les Diableretes, Switzerland, July 1-6, 2012.

Sen, S.

Poster presentation on “History-Dependent Depolymerization of Cytoskeletal Filaments”, *International Conference on PhysCell* at Hyres, France, September, 2012.

Srivastava, R.

Paper presentation: “Thermosensitive Gold-Liposome Hybrid Nanostructures for Photothermal Therapy of Cancer”, *IEEE NANO*, August 20-23, 2012, Birmingham, UK.

Paper presentation on “Core/Surface Modified Nanomedicines for Controlled Release of Drug”, *IEEE NANO*, August 20-23, 2012, Birmingham, UK.

Paper presentation on “Approaches to drug delivery and biosensors”, *Young Researchers Conference*, held during August 20-23, 2012, at MUCT - Mumbai, India.

Srivastava, S.

Oral presentation on “Search for biomarkers in blood serum: A proteomic investigation in different infectious diseases and gliomas”, *3rd International Conference on Biomarkers & Clinical Research*, July 2-4, 2012, Las Vegas, USA. (Published - Sanjeeva Srivastava et al., *J Mol Biomark Diagn*, 3:4 <http://dx.doi.org/10.4172/2155-9929.S1.013>).

Oral presentation on “Serum proteome analysis of falciparum and vivax malaria: Search for surrogate protein markers” *2nd International Conference on Proteomics & Bioinformatics*, July 2-4, 2012, Las Vegas, USA. (Published - Sanjeeva Srivastava et al., *J Proteomics Bioinform*, 5:6 <http://dx.doi.org/10.4172/0974-276X.S1.062>).

Oral presentation on “Identification of potential early diagnostic biomarkers for *Plasmodium falciparum* and *P. vivax* infections through serum proteomics,” *9th Annual Conference Translational Proteomics (US-HUPO)*, March 10-13, 2013, Baltimore, USA.

Oral presentation on “Quantitative and functional proteomics to understand glioma pathogenesis and identification of biomarkers,” *10th Meeting of Asian Society for Neuro-Oncology*, March 21-24, 2013, Mumbai, India.

Poster presentation on “New e-Learning Resources in Proteomics: India’s Virtual Proteomics Initiatives,” *9th Annual Conference Translational Proteomics (US-HUPO)*, March 10-13, 2013, Baltimore, USA.

Oral presentation on “Water borne pathogen detection using proteogenomics”, *Canada-India Workshop on Water & Energy*, IIT Bombay, June 1, 2012.

Participated in *Workshop on Paths of Convergence for Agriculture, Health and Wealth*, June 22-24, 2012.

Organized by McGill World Platform & Inclen Trust International, New Delhi.

Participated in *National Cancer Grid Meeting*, February 4-5, 2013, Tata Memorial Hospital, Mumbai.

Srivastava, S. and Ray, S.

Poster presentation on “Comparative analysis of serum proteome alterations in malaria, dengue and leptospirosis: Understanding host responses and diagnostic indicators,” *11th Annual World Congress Human Proteome Organization (HUPO-2012)*, September 9-14, 2012, Boston, USA.

Srivastava, S. and Malhotra, D.

Poster presentation on “A proteomic analysis of low grade vs high grade gliomas using cerebrospinal fluid,” *10th Meeting of Asian Society for Neuro-Oncology*, March 21-24, 2013, Mumbai, India.

Srivastava, S. and Kumar, S.

Poster presentation on “Proteomic analysis of Glioblastoma multiforme and correlation with radiology for SVZ involvement and survival prediction,” *10th Meeting of Asian Society for Neuro-Oncology*, March 21 - 24, 2013, Mumbai, India.

Srivastava, S. and Jain, R.

Poster presentation on “Studying role of JAK/STAT interactome and therapeutic potential of STAT3 inhibitors in gliomas using proteomics approach,” *10th Meeting of Asian Society for Neuro-Oncology*, March 21 - 24, 2013, Mumbai, India.

Srivastava, S. and Gollapalli, K.

Poster presentation on “Investigation of serum proteomic alterations in glioblastoma multiforme patients,” *10th Meeting of Asian Society for Neuro-Oncology*, March 21 - 24, 2013, Mumbai, India.

Poster presentation on “Investigation of grade specific tumor proteins in gliomas using differential proteomic analysis,” *10th Meeting of Asian Society for Neuro-Oncology*, March 21-24, 2013, Mumbai, India.

Srivastava, S. and Sharma, S.

Poster presentation on “Proteomic profiling of meningiomas and comparison with gliomas for the identification of potential biomarkers,” *10th Meeting of Asian Society for Neuro-Oncology*, March 21-24, 2013, Mumbai, India

Manchanda, R., Mithun, P., and Bhuvaneshwari, K.

Paper presentation on “Classification and Analysis of Electrical Signals in Urinary Bladder Smooth Muscle Using a Modified Vector Quantization Technique,” *SPCOM 2012*, July 12-16, 2012, Bangalore

Invited Lectures

Banerjee, R.

“Nanoparticulate cosmetics for nutrient delivery in pregnant women,” *Grand Challenges Canada*, Ottawa, 2012.

“Single or combination nanoparticle drug delivery in cancers,” *Cancer Nanotechnology Brainstorming Workshop*, New Delhi, 2013

Mukherji, S.

“Optical Biosensors for Waterborne Pathogens,” *First International Conference on Emerging Technologies for Clean Water*, IIT Madras, September 2012.

“Nanotechnology Research in IIT Bombay: From Nanoparticles and Structures to Sensing devices,” Simon Fraser University, Canada, February 2013.

“Nanotechnology: Is it old wine in new bottle?” Inaugural address as the Chief Guest at the *International Conference on Nanoscience and Nanotechnology (ICONN-2013)*, March 2013.

Srivastava, S.

“Personalized medicine and need for proteomics and systems level tools”, Central South University, China, May 29, 2012.

Punekar, N.S.

“Fungal Biotechnology: Genetic engineering in Filamentous Fungi,” *National Workshop on Taxonomy, ex situ Conservation & Bio-prospecting of Fungi* (May 25 – June 8, 2012), National Fungal Culture Collection of India – at Agharkar Research Institute, Pune, June 4, 2012.

“Unidirectional inhibition of *A. niger* NADP-Glutamate dehydrogenase: Whither Haldane Relationship? Frontiers in Biological Chemistry,” Society of Biological Chemists (1930), Mumbai Chapter, VMCC, IIT-Bombay, August 11, 2012.

“Manipulating Aspergillus genome: A personal journey,” *International Conference on Industrial Biotechnology; IX Convention of the Biotech Research Society, India* (November 21-23, 2012, ICIB-2012), Department of Biotechnology, Punjabi University, Patiala - 147 002, Punjab, India, November 21, 2012.

Balaji, P.V.

“C-H...pi interactions in carbohydrate-binding sites,” Silver Jubilee Celebrations, Bioinformatics Centre, University of Pune, Pune, December 6-8, 2012.

“Probing the early stages of amyloid aggregation by MD simulations,” *National Symposium on Frontiers of Biophysics, Biotechnology and Bioinformatics* and

37th Annual Meeting of Indian Biophysical Society, University of Mumbai, January 13-16, 2013.

Banerjee, A.

“Bioinformatics at a crossroad between Industry and Academia,” Padmashree Dr. D. Y. Patil University, September 2012.

Bhaumik, P.

“X-ray crystallographic studies of enzymes to understand their structure-function relationship,” *Biophysics Paschim 4 (BPP4)*, Pune, March 2013.

Kunwar, A.

“Computational Techniques to Understand Single Motors,” Advanced School, January 13-19, 2013, at IIT Bombay, Mumbai, India.

“Axonal Transport and Neurodegenerative disorders,” *Workshop*, January 20-26, 2013, at The Club Mahabaleshwar, Satara, India.

“Model of Multiple Motor based Transport with Single Motor Mechano-chemistry,” *Conference on Condensed Matter and Biological Systems (CCMB13)*, January 11-14, 2013 at Banaras Hindu University, Varanasi, India.

Manchanda, R.

“Classification and Analysis of Electrical Signals in Urinary Bladder Smooth Muscle Using a Modified Vector Quantization Technique,” *SPCOM 2012*, July 12-16, 2012, at IISc Bangalore.

“Recent advances in Neuroprosthetics,” *SCRAC Monsoon Session*, August 4, 2012, Mumbai. [set of seven talks]

Mukherji, S.

“Nanotechnology and Biotechnology Research and Commercialization,” Panel Discussion at Kerala, September 2012.

“Optical Biosensors using Nanomaterials and Nanoscale Phenomena,” in the *2012 Winter Workshop* at IIT Indore, December 2012.

“Development of Optical Fiber and Embedded Waveguide Biosensors,” in the *National Conference on Smart Materials & Technologies for Emerging Electronics*, March 2013.

“From Nanomaterials and Nanostructures to Optical Biosensors,” in the *First National Conference on Mapping the Material Genome*, March 2013.

Padinhateeri, R.

“Physics and Biology,” Zamorin’s Guruvayoorappan College, Calicut, July 2012.

“Monte Carlo simulations to study kinetics of cytoskeletal filaments,” M2T2 Advanced school at IIT Bombay, January 2013.

“Non-equilibrium self-assembly in living systems,” Raman Research Institute Bangalore, January 2013.

“The Problem of life: Physics and Biology,” *New Frontiers in Physics*, Sir Syed College, Kannur, March 2013.

Panda, D.

“Protein in Disease and Disorder,” *BioWorld 2012*, IIT Delhi, New Delhi, December 10-12, 2012

Foundation Day lecture, National Institute of Science Education and Research, Bhubaneswar, December 27, 2012.

“Protein Folding and Diseases,” *IISC 2012*, Jamia Millia Islamia. New Delhi, December 10-12, 2012

Patankar, S.

“Mechanism Based Approach,” *National Conference-cum-Workshop on Search for Antimalarials*, Jawaharlal Nehru University, New Delhi, April 2012.

“Frontiers in Biological Chemistry”, Society of Biological Chemists (India), Mumbai Chapter, IIT Bombay, August 2012.

“Application of Genomic Technologies in Malaria Research,” *DBT-ICMR-sponsored Laboratory Training Course*, National Institute of Malaria Research, New Delhi, November 2012.

Sen, S.

“Probing cell mechanics using trypsin de-adhesion assay,” Raman Research Institute Bangalore, January 2013.

Srivastava, R., and Joshi Abhijeet

Abhijeet Joshi was Keynote Speaker for “Approaches to Drug Delivery and Biosensors,” *Young Researchers Conference*, at MUICT - Mumbai, India, August 20-23, 2012.

Awards and Distinctions

Balaji, P.V.

Member, Board of Studies, Bioinformatics Center, University of Pune.

One of two leaders for the Indian Delegation at the 23rd International Biology Olympiad, Singapore, July 8-15, 2012.

Banerjee, R.

National Women Bioscientist Award, 2012.

Kumar, A.

Elected as a Member of the National academy of sciences, India (Allahabad).

Kunwar, A.

Innovative Young Biotechnologist Award for the year 2012 (IYBA 2012), Department of Biotechnology, India.

Padinhateeri, R.

IIT Bombay Young Investigator Award.

Panda, D.

G. N. Ramachandran Gold Medal for Excellence in Biological Sciences and Technology from Council of Scientific & Industrial Research, Government of India (2012).

Paul, D.

Innovative Young Biotechnologist Award from the Department of Biotechnology, Govt. of India. (2012).

Srivastava, R.

Gandhiyan Young Technological Innovation Award given by Sristi and Techpedia in IIM-Ahmedabad, 2013.

INAE-ISP award 2012: Innovative Student Project awarded by Indian National Academy of Engineering.

“India TR35: Young Innovators award” by Technology Review (MIT’s Magazine on Innovation), 2012.

Samsung Innovation Award, 2012.

Srivastava, S.

Deputy Editor-in-Chief, Current Pharmacogenomics and Personalized Medicine, 2012.

Guest professorship in Central South University, China 28-30 May, 2012.

Honorary Work

The faculty of the department served in various capacities as follows:

Banerjee, R.

Expert Panel Member, Indo-US Joint Commission on Science & Technology (Health), Washington DC, 2012.

Expert Panel Member, Indo-Australian Grand Challenges 2012-13.

Expert Panel Member, Composite Evaluation Committee, International Bilateral Cooperation, DST, 2012-13.

Expert Panel Member, BIG DBT, BIRAC, 2012-13.

Expert Panel Member, Orthopedic Instruments, Implants and Accessories, Sectional Committee, Bureau of Indian Standards, 2012-13.

Associate Editor, Journal of Biomaterials & Tissue Engg.

Member, Editorial Board, Drug Delivery & Translational Research.

Manchanda, R.

Member, Board of Studies, National Brain Research Centre.

Member, DBT Task Force in Neurosciences.

Member, NBRC Scientific Assessment Committee.

Member, Advisory Committee, Biomedical Engineering Programme, IIT-H.

Member, DBT Initiative on Neuroinformatics and Computational Neuroscience Education (INCNE).

Member, Indian National Node for Neuroinformatics (INNNI).

Member, Project Review & Steering Group (PRSG) for the project “Internet of Things (IOT) for Smarter Health Care” by IIT Hyderabad.

Mukherji, S.

Member of Selection Committees in NIT Raipur and Calcutta University.

Panda, D.

Member, Editorial Advisory Board, Biochemical Journal and Associate Editor, BMC Cell Biology.

Phale, P.S.

Task Force Member for “Environmental Biotechnology and Biodiversity Conservation,” DBT, Govt. of India.

Expert Committee Member for ‘Bioremediation Technology’, DBT, Govt. of India.

Editor, Indian Journal of Microbiology.

Punekar, N.S.

DBT Representative in IBSC for Embio Research Centre Member; DBT Expert Committee for Energy Bioscience Chair and Energy Bioscience Overseas Fellowship.

Member, Finance Committee, IIT Indore; Member, Selection Committee for Scientist ‘E’ at NCL Pune.

Faculty Members and their Specializations

Core Faculty

1. N.S. Punekar

Microbial biochemistry; enzymology; metabolic regulation; secondary metabolism; metabolic engineering; nitrogen metabolism of fungi.

2. K.K. Rao

Cell biology; protein biochemistry; molecular biology; genetic engineering, prokaryotic gene regulation.

3. P.J. Bhat

Eucaryotic gene expression; yeast molecular genetics; eucaryotic transcriptional regulation.

4. R. Manchanda

Neuromuscular Physiology & Biophysics.

5. G. Subrahmanyam

Protein phosphorylation gene regulation, molecular mechanism of signal transduction.

6. P.V. Balaji

Protein-carbohydrate interactions, molecular biology of glycosyltransferases; molecular modeling; docking and MD simulations.

7. Dulal Panda

Cell biology, biophysics, protein structure-function, molecular medicine and mechanism(s) of action of antifungal, anticancer and antibacterial drugs

8. Soumyo Mukherji

Bioinstrumentation, Cardiovascular Physiology, Transducers and Biomedical Sensors, Biosensors

9. P.S. Phale

Aromatic hydrocarbon degradation, elucidation of metabolic pathways, molecular enzymology and kinetics, genetics engineering, bacterial physiology, Bio-surfactant production and its significance.

10. Rinti Banerjee

Biomaterials & Artificial Organs, Haemorheology & Biomedical Fluid Dynamics.

11. Swati Patankar

Molecular parasitology and genomics applied to the malarial parasite *Plasmodium falciparum*.

12. Rohit Srivastava

Fluorescent Biosensors, Nanoengineered Sensors, Controlled Release, Layer-by-Layer Assembly, BioMEMS.

13. Samir Maji

To study the amyloid formation by protein/peptides in the diseases and functional amyloid perspective.

14. Sanjeeva Srivastava

Proteomics, Systems Biology, Stress physiology and cellular responses.

15. Santanu K. Ghosh

Understanding mechanism of faithful chromosome segregation during meiotic cell division.

16. Padinhateeri Ranjith

Nucleosome dynamics and Chromatin assembly, Dynamics of Actin and Microtubules, Mechanics of DNA.

17. Shamik Sen

Cell Mechanics & Mechanobiology, Tissue Engineering, Computational Modeling.

18. Ashutosh Kumar

Structural Biology, Biomolecular NMR Spectroscopy.

19. Kiran Kondabagil

Mechanisms of assembly of large DNA viruses, virus engineering: viral nano-containers for targeted delivery.

20. Prasenjit Bhaumik

Understanding the structure function relationship of enzymes and biological macromolecules. Protein crystallography, Structure based antimalarial drug development, Structural enzymology.

21. Prakriti Tayalia

Cellular programming, Tissue engineering, Immunotherapy, Biomaterials, Microfabrication.

22. Debjani Paul

Microfabrication technology, thin-film transistors, biosensors, microfluidic devices, biophysical aspects of bacterial invasion, interaction of cells with micro and nano-structured surfaces, integration of microfluidics and electronics.

23. Ambarish Kunwar

Biophysics, Non-equilibrium Statistical Physics, Computational Modeling

24. Anirban Banerjee

Bacterial Pathogenesis, Host-Pathogen Interactions, Cellular Immunity

Associate Faculty

1. Jayesh Bellare

Nanotechnology and micro-engineering; biomedical devices surfactants; Cryo-electron and optical microscopy.

2. Santosh Noronha

Biochemical engineering, recombinant biotechnology, computational biology.

3. H.S. Shankar

Biochemical Engg., vermiculture.

4. A.K. Suresh

Biochemical Engg., multiphase reactions.

5. K.V. Venkatesh

Biochemical and food engineering.

6. P. Wangikar

Biothermodynamics; Biophysical Chemistry.

7. S. Chaudhari

Medical Image & Signal Analysis.

8. U.B. Desai

Medical Image & Signal Analysis.

9. V.M. Gadre

Communication Engineering Control & Instrumentation.

10. P.C. Pandey

Bioinstrumentation, Medical Image & Signal Analysis.

11. A.Q. Contractor

Electrochemistry, Conducting polymers, Biosensors.

12. S. Durani

Drug design; de nova Protein design; Enzyme catalytic principles; Active site characterization.

13. Nand Kishore

Biothermodynamics; Biophysical Chemistry.

14. Sambasivarao Kotha

Organic Synthesis; non-coded amino acids.

15. Anil Kumar

Bio Polymers.

16. C.P. Rao

Electrochemistry, Conducting polymers, Biosensors.

17. Y.U. Sasidhar

Molecular Biophysics; Protein folding.

18. A.K. Singh

Bioorganic chemistry; Photoreceptor membrane proteins; Photochemistry and photobiology.

19. Sumathi Suresh

Remediation of pesticides using biological & chemical methods. Biological treatment for removal of textile dyes, biodegradation of hydroxybenzoate and phthalates.

20. Rajani R. Joshi

Computational Biology, Bioinformatics, Biostatistics.

21. G.G. Ray

Ergonomics.

Distinguished Guest Professor

1. G. Padmanaban

Malaria research.

2. Dr. Hartmut Michel, Noble Laureate

Photosynthesis research.

Adjunct Faculty

1. Dr. Vivek Soni

Biomaterials & Artificial Organs.

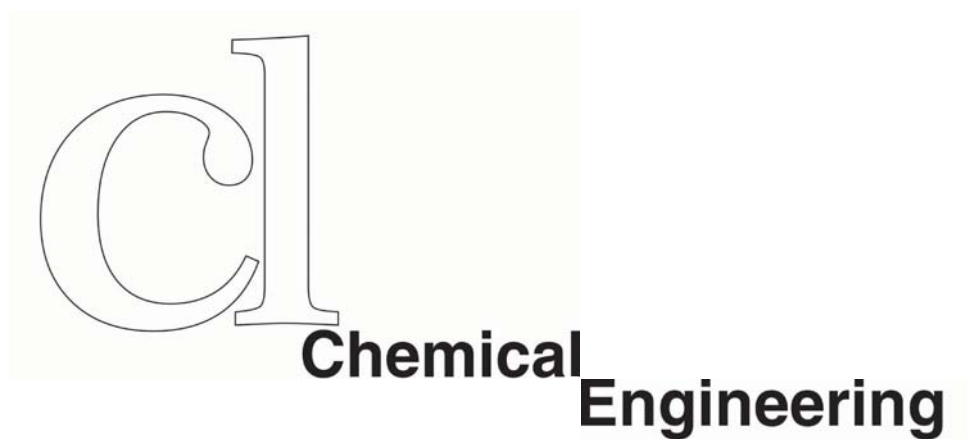
2. S. Arunkumar

Computers in Biology and Medicine, Telemedicine, Intelligent systems and pattern recognition approaches to the analysis of medical and biological data.

Alumni Visiting Professor

1. Nitish V. Thakor

Medical Instrumentation, Neuroengineering, Neural Signal Processing, Devices, Microsystems and Prostheses



Introduction

The Department of Chemical Engineering has a strong focus on excellence in education and research. The department has a dynamic faculty with a wide range of research specializations. Research activities in the department are supported by excellent research students (Ph.D., M.Tech. and Dual Degree), very competent technical staff, and good experimental and computational facilities.

The recruitment of students into the Ph.D. programme continues to show an uptrend and has contributed to the increase in research activity in the department. The department also received good funding for sponsored projects during the year. The total number of International journal publication this year is around 130.

The Department-Industry interactions were multifold this year including continuing education courses (both open and in-house programmes), consultancy, and technology transfer.

Academic Programmes

Degrees Awarded

B.Tech.	:	53
Dual Degree (B.Tech., M.Tech.)	:	21
M.Tech.	:	14
Ph.D.	:	10
PGDIIT (Exit)	:	02

R&D Activities

The department is involved in a variety of frontier and traditional areas in chemical engineering research, under the broad areas of:

- Biological Systems Engineering
- Energy & Environment
- Materials Engineering
- Process Systems Engineering
- Reactor Engineering
- Transport Phenomena and Complex Fluids

The department received grants from various sources towards many new projects during the year apart from various ongoing projects. The summary of which is as follows:

Sponsored Research Projects

Ongoing	:	87
New	:	21
Completed	:	10
Faculty Involved	:	34
Sanctioned Amount	:	Rs. 21,34,23,543/-

The details of these projects is given in the following table

Project Title	Agency Name	Project Status
Development of non-hazardous process for the synthesis of Dimethyl carbonate (DMC) from methanol and urea	Council of Scientific and Industrial Research	Ongoing
Development of platform technology for Nitrilase catalyzed biotransformation processes	Department of Biotechnology	Ongoing
Task force meeting	Department of Biotechnology	Ongoing
Nanocomposite hollow fiber membranes and biomaterials for hemodialysis and reconstructive medicine	Department of Biotechnology	Ongoing
Development of bacterial expression systems suited for large scale production of industrial enzymes.	Department of Biotechnology	Ongoing
DBT Screening Committee meeting on Development of Next Generation Imaging Technologies for Biomedical Applications	Department of Biotechnology	Ongoing
Reprogramming cellular networks in Salmonella enterica to develop novel vaccines.	Department of Biotechnology Innovative Young Biotechnologist Award	Ongoing
Ramanujan Fellowship - Electrochemical oxygen reduction on platinum sub-monolayer electrocatalysts	Department of Science & Technology	Ongoing
“Self-assembly in Colloidal systems: From photonics crystals to mud-cracking”	Department of Science & Technology	Ongoing
Pocess and Product Improvements in Kolhapur Type Jaggery Making Unit	Department of Science & Technology	Ongoing
IRHPA Projects Workshop 2013	Department of Science & Technology	Ongoing
SERC School on Introduction to Systems and Synthetic Biology for Scientists or Engineers	Department of Science & Technology	Ongoing
Engineering Escherichia coli strains optimized for large scale lignocelluloses fermentation for biofuel production	Department of Science & Technology	Ongoing
Thermodynamically Stable Pickering Emulsions	Department of Science & Technology	Ongoing
Design and Synthesis of Porous Materials for Carbon Capture and Seuestration: Molecular modeling study	Department of Science & Technology	Ongoing
Genomic scale systemic modeling of gene regulatory networks, metabolic and signaling pathways to predict phenotypic response and experimental validation	Department of Science & Technology	Ongoing

Project Title	Agency Name	Project Status
Development of electrocatalysts for electrochemical reduction of carbon dioxide to formic acid and syn-gas	Department of Science & Technology	Ongoing
Development and setting up of propylene drying unit at Visakh Refinery	Hindustan Petroleum Corporation Ltd.	Ongoing
Coupled Geochemical and Transport processes in Geologic Carbon Sequestration: Evolution of Geochemical Gradients and Flow properties in Diffusion-Limited Zones	McDonnell Academy St. Louis, USA.	Ongoing
FOSS on Aakash	Internally funded by MHRD	Ongoing
Hardware and Software optimization, and testing of Low Cost Access Devices (LCAD)	Ministry of Human Resource Development	Ongoing
Teachers Empowerment, Students Empowerment, and Integration Tools for Empowerment (Synchronous Delivery), abbreviated as the Talk to a Teacher project (Phase 2)	Ministry of Human Resource Development	Ongoing
National Mission on Education through ICT	Ministry of Human Resource Development	Ongoing
Metabolic engineering of a model cyanobacterium <i>Synechococcus</i> sp. PCC 7002 for enhanced bio-fuel production.	Reliance Industries LTD., MUI	Ongoing

Consultancy projects

The department undertook 21 jobs generating Rs. 5148934/- The total number of faculty members involved are nine.

Extension activities

Symposium

Research Scholars' Symposium 2013
Azeotropy 2013
Mumbai-Pune Soft Matter Meet: January 2012, and
Indo US Workshop on "Cyanobacteria: Molecular networks to biofuels, December 2012

Visitors to the Department

Dr. Prankul Middha, Senior Engineer, GexCon, Bergen, Norway, delivered a talk on "The use of CFD for explosion safety studies on process facilities" on April 11, 2012.

Dr. Sirshendu De, Professor, Department of Chemical Engineering, I.I.T. Kharagpur, delivered talks on

"Polymeric membranes: Tailor-made casting and their applications", "Modeling approaches of pressure driven membrane separation processes" and "Development of low cost arsenic filter" during April 16-17, 2012.

Dr. Jean-Francois Leon, Leon Laboratoire d'Aérodynamique & Observatoire Midi-Pyrénées, France, delivered a talk on "Monitoring of particulate air pollution for health impact assessment: Active and passive remote sensing" on July 18, 2012.

Mr. Sajith K.V., Safety Officer, IIT Bombay, delivered a talk on "Safety Talk for Research Scholars and Faculty" on August 9, 2012.

Prof. Anand Yethiraj, Associate Professor, Memorial University, St. John's, Canada, delivered talk on "Physics and Materials Science of Colloid Spincoating", on August 23, 2012.

Dr. Bhaswar Ghosh, Computational Systems Biology Lab Ecole Polytechnique Fédérale de Lausanne Lausanne, Switzerland, delivered a talk on "Divergent promoter architectures employed by the co-regulated budding yeast ribosomal protein genes", on October 11, 2012.

Dr. Ananya Debnath, Max Planck Institute for Polymer Research, Germany, delivered a talk on “Modelling of processes involving biological chain and macro molecules”, on October 11, 2012

Dr. Deepak Kunzru, Professor, Department of Chemical Engineering, I.I.T. Kanpur delivered a talk on “Microstructured Reactors for Heterogeneous Reactions”, on November 6, 2012.

Dr. Abhijit Majumder, delivered a talk on “Field-Theoretic Modeling of Supramolecular Polymer Networks and Gels”, on November 22, 2012.

Prof. Ravi Prakash Jagadeeshan, Department of Chemical Engineering, Monash University, delivered a talk on “Concentration Dependent Dynamics Of Semi-Dilute DNA Solutions”, on December 6, 2012.

Dr. Sujata Sohoni, Research Scientist, Novozymes, delivered a talk on “Promoter engineering and energy perturbation to improve antibiotic production in/ *Streptomyces coelicolor*” on January 12, 2012.

Dr. Barry C. Buckland, Professor, University College London, delivered a talk on “Bioprocess Engineering Challenges for Therapeutic Protein and Vaccines”, on December 18, 2012.

Prof. Rohan Hule, Division of Chemistry and Chemical Engineering, California Institute of Technology, delivered a talk on “Exploring Structure-Property Relations: Side-Group Liquid Crystalline Polymers and Self-Assembled Peptide Hydrogels” on December 20, 2012.

Dr. P. A. Ramachandran, Department of Chemical Engineering, Washington University, St. Louis, delivered a talk on “Polysilicon production - Modelling and Scaleup” on January 8, 2013.

Dr. Suvajyoti Guha, Food and Drug Administration, Silver Spring, Maryland, U. S. A., delivered a talk on “Understanding Bio-nanoparticle Behavior through Physical Characterization”, on January 10, 2013.

Dr. Y S Mayya, Ex-Head, Radiological Physics and Advisory Division, BARC, delivered a talk on “Coagulation modelling of dispersing nanoparticle aerosols released from continuous sources”, on January 24, 2013.

Dr. Vivek Trivedi, Lecturer in Formulation Science, School of Science, University of Greenwich, delivered a talk on “Supercritical fluid processing: Chemical engineering and novel drug delivery systems”, February 14, 2013.

Prof. Matthew Tirrell, Director, Institute of Molecular Engineering University of Chicago, Chicago, USA, delivered a talk on “IProtein Analogous Micelles: Versatile, Modular Nanoparticles”, February 20, 2013.

Mr. Samruddhi Kamble, PhD Student, IIT Bombay and NCL, Pune, delivered a talk on “Yielding in Soft Colloidal Glasses using Rheology and Light Scattering”, March 21, 2013.

Mr. Apratim Chatterji, IISER-Pune, delivered a talk on “Self-assembly of ordered cylindrical nano-structures: A theoretical investigation of experimental results”, March 28, 2013.

Conferences /Symposia/Workshops and Seminars (participated/ Papers presented)

Bhartiya Sharad

SERC School on Introduction to systems and synthetic biology for scientists and engineers, delivered one lecture on Optimization and control of Biological Networks, April 30 - May 03, 2012

Gundabala Venkat

Presented a talk titled “Microfluidic Route to Generation of Celloidosomes” at the *APS March meeting 2013* held at Baltimore, USA from March 18-22, 2013.

Soni Purushottam, Juvekar, V.A. and Naik, M. Vijay

Presented a paper titled ‘Investigation on dynamics of double emulsion droplet in a uniform electric field’, at *Electrostatics 2013*, Budapest, Hungary, April 17-19, 2013.

Das Diptendu, Rahi, Vikas Kumar, Juvekar, V.A., and Bhattacharya, R.

Presented a paper titled Study of Equilibrium & mass transfer of co-extraction of mineral acid and Fe(III) from aqueous solution by Tri-n-Butyl Phosphate using Bulk Liquid Membrane, *ICCET 2013*, at the *International Conference on Chemical Engineering and Technology*, New York, June 5-6, 2013

Patil, S. Rajkumar and Juvekar, V.A.

Presented a poster on ‘Open Bipolar Electrolysis in Multi-Electrode Systems’ at *MaCKiE 2013-Mathematics in Chemical Kinetics and Engineering*, Chennai, February 4- 6, 2013

Khakhar Devang, V.

Presented a paper “Rheology and Segregation of Granular Mixtures in Dense Flows” in the *21st International Conference on Discrete Simulation of Fluid Dynamics*, July 23-27, 2012, Bangalore.

Malani Ateeque

Attended *AIChE Annual Meeting* at Pittsburg, USA in November 2012. Chaired two session on Molecular Modeling and Simulations of Complex System at *AIChE Annual Meeting*. Gave a departmental seminar at Chemical Engineering Department of University of Illinois at Chicago, USA on molecular level modeling of wetting behaviour and self-assembly processes.

Narayanan Janaky

Lecture on Small angle x-ray scattering technique to study protein crystallization, protein- surfactant complexation and protein polymerization in the *National Workshop on Soft Condensed Matter*, organized at Institute of Chemical Technology, Matunga, Mumbai during June 6-8, 2012.

Saini Supreet

“Network Architecture and cellular behaviour in bacteria at the *International Conference on Networks in Biology, Social Science, and Engineering*, IISc, Bangalore, India, 2012.

“Impact of network map and architecture on gene expression dynamics. *Foundations of Systems Biology and Engineering (FOSBE)*, Tsuruoka, Japan 2012.

“Dynamics and Control of the Clostridium acetobutylicum metabolic network Clostridium XII, Nottingham, United Kingdom, 2012.

Thaokar Rochish

Presented Poster on “Mechanism of Electroformation” at *Bio-Membrane Days*, Berlin, Germany.

Presented a talk on “Drop deformation and dielectrophoresis in quadrupole electric fields” in *International Symposium on Electrohydrodynamics*, Gdansk, Poland.

Tripathy Mukta

SERC School-cum-Symposium on Molecular Simulations, IIT Kanpur, November 27-30, 2012.

Vishwanathan Ganesh A.

Presented a poster “Noise propagation in series MAPK cascades” in *Gordon Conference on Stochastic Physics in Biology*, Ventura, USA, 2013.

Presented a paper “Transversal pattern formation in non-adiabatic catalytic packed-bed reactors” in *MaCKiE 2013: International workshop on Mathematics in Chemical Kinetics and Engineering*, IIT Madras, Chennai, 2013.

Served as Member of Organizing Committee, *MaCKiE 2013: International workshop on Mathematics in Chemical Kinetics and Engineering*, IIT Madras, Chennai, 2013.

Invited Lectures**Bhartiya Sharad**

“Stabilizing MPC for linear switched systems”, *ABB Corporate Research*, January 25, 2013

“Mathematics in Biological Sciences”, Popular talk at *MatheMite 07*, V.E.S. College of Arts, Science & Commerce, Chembur, Mumbai, January 20, 2013.

Khakhar, D.V.

Presented a plenary lecture on “Rheology and Segregation of Granular Mixtures in Dense Flows” at the *Asian Particle Technology Conference* during July 3-5, 2012 at Singapore.

Patwardhan, S.C.

Delivered keynote address titled “Advanced Process Monitoring and Control: An Overview” in *Aditya Birla Group Simulation Conference 2012*, Mumbai, December 5, 2012.

Delivered series of two lectures titled “Bayesian Nonlinear State Estimation: A Tutorial Review”, in the Department of Chemical and Materials Engineering, University of Alberta on May 29-30, 2012.

Tripathy Mukta

Delivered a lecture on “Particle Guided Self-Assembly of Polymer Melts”, on November 30, 2013 at Indian Institute of Technology Kanpur

Delivered a lecture on “Equilibrium Phase Behaviour of Chemically Anisotropic Rods” on May 23, 2013 at Indian Institute of Science Bangalore.

Delivered a lecture on “Introduction to Integral Equation Theory of Spheres”, on June 28, 2013 at Indian Institute of Science Bangalore.

Venkatesh, K. V.

Invited plenary speaker at *International Symposium on Frontiers in Computational Systems Biology and Bioengineering*, February 28 - March 1, 2013, Iizuka, Fukuoka, Japan.

Viswanathan, G. A.

“Library: A center stage?” in “Workshop on Meeting User Expectations”, IIT Bombay, India, in May 2013.

“Noise propagation in MAPK Cascades” at Indian Institute of Technology Gandhinagar, Gandhinagar, in October 2012.

Significant Awards and Distinctions

Bhartiya Sharad

Reviewed papers for BMC Systems Biology, *Journal of Process Control*, Nonlinear Analysis - Hybrid Systems; *Indian Journal of Chemical Technology*.

Member of IPC, Control Systems 2012, April 22-25, 2012, New Orleans, Louisiana

Khakhar, D.V.

J. C. Bose Fellowship

Honorary Work

Khakhar, D.V.,

Executive Editor, Advanced Powder Technology

Juvekar, V.A.,

Paper Reviewed: ACS Applied Materials & Interfaces (1 No), Industrial & Engineering Chemistry Research (3 No), The Journal of Physical Chemistry (1 No), Applied Surface Science (2 No), Chemical Engineering Journal (1No), AIChE Journal (1No), Colloids and Surfaces A (1No), Fluid Phase Equilibria (1No), The Canadian Journal of Chemical Engineering (1No), Separation and Purification Technology (1No), Bulletin of Materials Science (1No), Ultrasonics Sonochemistry (1No)

Reviewed papers: Chem. Eng. JI (1No), ACS App. Mat. & Int. (1 No), J.Phys.Chem.(1No), AIChE Journal (1No), IECR (4No), Bull. Mat. Sci. (1No), Sep. Pur. Tech. (1No), Ult. Son.(1No) , Can. JI. Chem. Eng (1No),. App. Sur. Sci. (2No) . Coll. Surf. A (1No), Flu.Ph.Eq. (1No)

Goswami, P.S.

Reviewed a paper in Computers and fluids (Elsevier)

Gundabala Venkat

Reviewed article for “Applied Nanoscience”.

Mehra Sarika

Member of Advisory Editorial Board for Journal of Chemical Technology and Biotechnology.

Reviewer for journals including Mathematical Biosciences, BMC Research Notes

Patwardhan, S.C.

Review of journal articles for 1. Computers and Chemical Engineering 2. Chemical Engineering Science 3. Journal of Process Control 4. Industrial and Engineering Chemistry Research.

Evaluation of PhD thesis for Department of Chemical Engineering, IIT Madras.

Served as IPC member and associate editor for conference proceedings for IEEE Conference on

Control Applications (CCA-2013), Hyredabad, India, August 28-30, 2013.

Viswanathan Ganesh

Reviewed papers for BMC Systems Biology

Faculty Members and their specializations

1. Jhumpa Adhikari

Statistical Thermodynamics, Molecular Simulations

2. Rajdip Bandyopadhyaya

Porous Media, Colloids, Aerosols, Thin films, Surface Science, Nanoparticles, Nano-composites, Molecular Simulations

3. Jayesh Bellare

Separations, Surface Science, Nanoparticles, Microscopy, Drug Delivery

4. Sharad Bhartiya

Process Control, Modelling, Identification

5. Mani Bhushan

Process Safety Analysis, Process Control, Optimisation, Identification

6. Abhijit Chatterjee

Computational Material Science, Multiscale modeling, Energy application

7. Partha Sarthi Goswami

Turbulent suspensions, Multiphas flow

8. S Ganeshan

Heat and Mass Transfer

9. Ravindra D. Gudi

Process Safety Analysis, Process Control, Optimisation, Identification, Biochemical Engineering

10. Venkat Gundabala

Microfluidics, Colloids and nano-composite materials

11. Sameer Jadhav

Surface Science, Computational Flow Modelling (CFD), Drug Delivery, Biomolecular Engineering

12. Vinay A. Juvekar

Surfactants, Separations, Rheology, Electrohydrodynamics, Multiphase Reaction, Surface Science, Polymer Physics

13. Devang V. Khakhar

Surfactants, Rheology, Granular Flow, Reactor Modelling, Polymer Processing, Nano-composites, Drug Delivery

14. Sanjay. M. Mahajani

Separations, Computational Flow Modelling (CFD), Multiphase Reaction, Catalysis, Renewable Resources, Coal Gasification

15. Ateeque Malani

Computational Material science, Modeling and Interfacial science, Simulations.

16. Ranjan Kumar Malik

Separations, Modelling, Energy Integration

17. Anurag Mehra

Surfactants, Multiphase Reaction, Nanoparticles, Molecular Simulations, Food Engineering

18. Sarika Mehra

Systems Biology, Computational Biology, Biomolecular Engineering

19. Arun Sadashio Moharir

Separations, Reactor Modelling, Optimisation, Modelling, Pollution

20. Kannan M. Moudgalya

Process Control, Modelling

21. Mamata Mukhopadhyay

Separations, Food Engineering

22. V. M. Naik

Surfactants, Separations, Electrohydrodynamics, Colloids, Surface Science, Polymer Processing, Nanoparticles, Food Engineering

23. Hemant Nanavati

Statistical Thermodynamics, Polymer Processing, Polymer Physics, Nano-composites, Molecular Simulations, Renewable Resources

24. Janaky Narayanan

Surfactants, Rheology, Surface Science, Microscopy

25. Santosh Noronha

Renewable Resources, Green Engineering, Systems Biology, Computational Biology, Biomolecular Engineering, Biochemical Engineering

26. Sachin C. Patwardhan

Process Control, Modelling, Identification

27. V Govardhana Rao

Separations, Rheology, Heat and Mass Transfer

28. Sandip Roy

Surfactants, Separations, Process Safety Analysis, Surface Science, Statistical Thermodynamics, Renewable Resources

29. Supreet Saini

Systems Biology, Synthetic Biology, Theoretical Biology

30. Arindam Sarkar

Electrochemistry, Material Science

31. Jyoti Seth

Complex Fluids, Renewable Energy

32. Hariharan S. Shankar

Pollution, Biochemical Engineering

33. Yogendra Shastri

Process systems engineering, Optimization, Biofuels sustainability

34. P. Sunthar

Surfactants, Granular Flow, Fluid Mechanics and Stability, Computational Flow Modelling (CFD), Polymer Physics, Drug Delivery

35. A. K. Suresh

Heat and Mass Transfer, Multiphase Reaction, Catalysis, Nanoparticles, Biochemical Engineering

36. Rochish M Thaokar

Surfactants, Electrohydrodynamics, Computational Flow Modelling (CFD), Colloids, Statistical Thermodynamics, Nanoparticles, Drug Delivery

37. Mahesh S Tirumkudulu

Surfactants, Rheology, Computational Flow Modelling (CFD), Colloids, Coatings, Thin films, Surface Science, Drug Delivery

38. Mukta Tripathy

Colloid Science, Statistical Mechanics, Self-assembly, Polymer Science

39. Chandra Venkataraman

Aerosols, Surface Science, Nanoparticles, Nano-composites, Drug Delivery, Renewable Resources, Pollution, Climate Change

40. K. V. Venkatesh

Food Engineering, Systems Biology, Biomolecular Engineering, Biochemical Engineering

41. Madhu Vinjamur

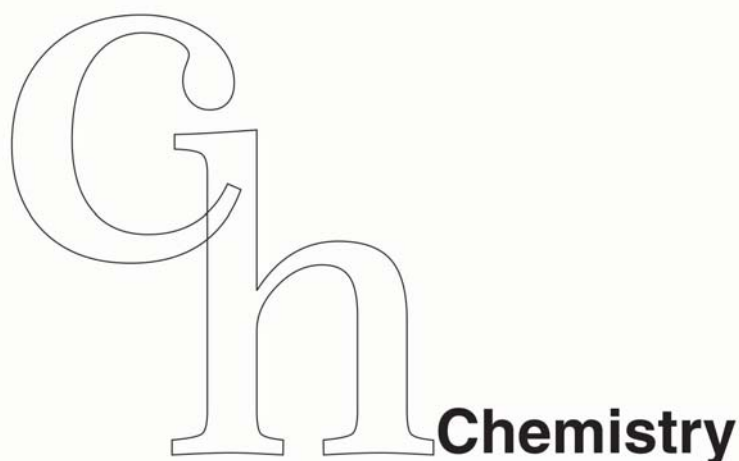
Porous Media, Heat and Mass Transfer, Coatings, Food Engineering, Renewable Resources

42. Ganesh A Viswanathan

Reactor Modelling, Multiphase Reaction, Systems Biology, Computational Biology, Biomolecular Engineering

43. Pramod Wangikar

Process Control, Modelling, Computational Biology, Biomolecular Engineering, Biochemical Engineering



Introduction

The Department of Chemistry comprises 35 faculty members with expertise in various areas of chemistry and allied subjects and a large number of motivated young students assisting the faculty in their research. There is an ongoing effort to maintain quality teaching and research standards and to generate adequate financial support. The department has emerged as one of the leading centers for education and research in India.

The contribution of the faculty members in the department has been recognized in various forms. Many of them serve as members of the Project Advisory Committees of the DST, CSIR and DAE, besides serving on the Editorial Boards of several reputed journals. Some of the publications by the Faculty members have been placed among top 10-25 downloaded articles.

Interaction with scientists through seminars and other formal programmes is an integral part of the academic activity. Further, the faculty keeps abreast with the developments in the scientific world through visits and interactions with various research groups within country and abroad.

Academic Programme

The General Chemistry programme of the department consists of two theory and two laboratory courses in the core curriculum of the first year B.Tech./Dual Degree M.Tech. programmes and has received much praise for the molecular level understanding it provides to all areas of technology. The department also offers an additional course to third year B.Tech./Dual Degree M.Tech. (Chemical Engineering) students. Furthermore, the department has three well established academic programmes leading to M.Sc. and Ph.D. degrees: 2-year M.Sc. for post B.Sc. students, with entrance through JAM, 5-year integrated M.Sc. Chemistry with entrance through JEE, and Ph.D. in Chemistry. The syllabi of all these are reviewed and updated periodically in order to meet the new challenges of the field.

Degrees Awarded:

M.Sc.:	
5-yr. Int. programme	: 17
2-yr. M.Sc. programme	: 40
Ph.D.	: 30

The department is involved in research problems of both basic and applied nature in frontier areas through sponsored research projects, and as part of the M.Sc. and Ph.D. programmes. A range of expertise in various specialisations is available within the department. Faculty members of the department disseminate the outcome of research through research publications, seminars and through participations in symposia. Every year around 100 papers are being published in reputed journals.

The faculty also participated in a variety of activities relevant to academic life. These include, lecturing in CEP courses and refresher courses of other Universities, helping other institutions in critical review of their academic and research programmes, evaluating student's dissertations, serving as experts in different committees, peer review of research project proposals submitted to funding agencies, and contributing to various journals at home and abroad as referees and as members of editorial boards.

R & D Activities

The faculty of the Department of Chemistry is involved in attracting research funding through various national and international sponsoring agencies in addition to industrial support. During the year under review, the department has added 19 new sponsored projects with a total financial outlay of Rs. 9.3 crores and completed 15 projects. Eighty Seven projects are under investigation by various faculty members. The faculty involved were 33. The Department encourages the staff working on these projects to use the research outputs for obtaining their Ph.D. degree. Large number of students registered for departments Ph.D. programme have been financed through sponsored projects and individual CSIR and UGC fellowships.

Main areas of research activities include

Biophysical Chemistry; Coordination Chemistry; Bio-inorganic Chemistry; Organometallic Chemistry; Bio-organic Chemistry; Chemistry of Natural Products; Synthetic Organic Chemistry; Photochemistry and Spectroscopy; Polymer Chemistry; Thermodynamics; Electrochemistry; Solid state Chemistry and Physics; Catalysis; Theoretical Chemistry.

Sponsored Research Projects

During the year 2012-13, 19 new projects were started. There were 87 ongoing projects and 15 completed projects. Total 121 projects involving 34 faculties and Sanctioned Outlay is Rs. 93001190/-.

Sponsored Projects:	: 121
New	: 19
Ongoing	: 87
Completed	: 15

Name of the Project	Sponsored by	Status
“Organic inorganic hybrid materials of the conjugates of carbohydrates, calixarenes and proteins of -sheet lectins and -helical albumins”	DST	New
“New generation of molecular nanomagnets”	DST Nanomission	New
“Synthesis of uranium co-ordination complexes and probing its electronic and magnetic properties”	BRNS	New
“Synthesis and Characterization of L-Tellurocysteine and Related Derivatives”	DST	Ongoing
“Development and Characterization of Tin-Chalcogenide Thin Films and Nanostructures”	DST	Ongoing
“Cyclopalladated and -cuprated organochalcogen catalysts”	IRCC	Ongoing
“Investigation of the Physical Chemistry of Growth in Green Plants: A Theoretical Approach”	CSIR	Ongoing
“Theoretical Investigation of Magnetism in Molecules, Molecular Magnets, and Magnetic Materials”	DST	Ongoing
“Theoretical and Computational Investigation of Molecular Magnets and Extended Systems as Candidates of Exotic Nanomaterials with Useful Properties”	INDO-SPAIN cooperative project in Science and Technology, DST International Division	Ongoing
“Centre for Excellence in Nanoelectronics”	Ministry of Communications and Information Technology	Ongoing
“Indian Nanoelectronics User Programme”	Ministry of Communications and Information Technology	Ongoing
“Industry funded Project”	AMAT	Ongoing
“Inorganic-Protein Hybrids (IPH): Metallation of protein to generate metalloenzymes and novel materials using albumins and lectins”	DST	Ongoing
“Studies on synthesis of diterpenoids: Atisanes and aquariolide”	CSIR	Ongoing

Name of the Project	Sponsored by	Status
“J. C. Bose Fellowship”	DST	Ongoing
“SERC project”	DST	Ongoing
“Green Chemistry”	DST	Ongoing
“Award project”	IRCC	Ongoing
“Cyclodiophosphazanes as building blocks to design early-late metal heterobimetallics”	DST	Ongoing
“Ferrocenyl phosphonites, phosphinites and aminophosphines: Synthesis, Reactivity and, Catalytic and biological investigations”	CSIR	Ongoing
“Center for Excellence in Nanoelectronic Phase II”	MCIT	Ongoing
“National Center for Photovoltaic Education and Research”	MNRE	Ongoing
“New Strategies for the Synthesis of Natural Products and Natural Product like Molecules”	DST	Ongoing
“Design, synthesis of novel sugeroxasteroid-quinones a non-stroidal dissociated glucocorticoid receptor (GR) agonists for rheumatoid arthritis”	DST	Ongoing
“New Strategies for Diversity Oriented Syntheses of Natural Product like Molecules	Astra Zeneca Research Foundation	Ongoing
“Designing Pyrazole Derived Pd Precatalysts for CC CrossCoupling Reactions”	BRNS	Ongoing
“Studies of Iron Complexes of N/O-Functionalized N-Heterocyclic Carbenes in Homogeneous Catalysis”	Indo-French Project	Ongoing
“Designing Chiral N/O-functionalized N-heterocyclic Carbenes for Metal Mediated Catalytic Applications”	DST	Ongoing
“Asymmetric Base Free Michael Addition Reactions Using Chiral Bifunctional Nickel Catalysts of the N-heterocyclic Carbene Ligands”	IRCC Award Grant.	Ongoing
“Studies on Mechanism and Stereoselectivity in Transition Metal Catalyzed C-N Bond Formation Reactions”	BRNS	Ongoing
“Computational Studies on Transition State Models for Stereoselective Organocatalytic Reactions”	CSIR	Ongoing
“In Vitro Selection, Biochemical Characterization and Medicinal Chemistry of Novel RNA Cleaving Reduced Metal Ion Dependent DNA Enzymes”	DST & Max Plank Society	Ongoing
“Quadruplex DNA Stabilizing Agents Based on Novel Bisbenzimidazole Derivatives of 1,8 Naphthyridine: Synthesis, Biophysical, Biochemical and Computational Studies”	DAE-BRNS	Ongoing

Name of the Project	Sponsored by	Status
“Synthesis of Highly Antigenic Glycolipids and oligosaccharides of Mycobacteria”	DST	Ongoing
“Synthesis of C-glycoside analogs of Galactosyl Ceramide, a Potential HIV-1 Entry Inhibitor”	CSIR	Ongoing
“SG/ Exploring Novel Complexity Generating Pathways to Access Small Molecules for DOS Applications”	IRCC	Ongoing
“Identification of Ammonia Channelling Pathway in Purine Biosynthesis”	CSIR	Ongoing
“Structural and Biochemical Studies of Fork Barrier Aging Protein”	DBT	Ongoing
“Protein-Protein Interaction and Structural Studies of MST kinase Protein”	DST	Ongoing
“Computational approach to {3d-4f} Molecular-Nano-Magnets New Generation Molecular Magnetic Materials: Experiment and Theory”	DST	Ongoing
“New Generation Molecular Magnetic Materials : Experiment and Theory”	DST-AISRF	Ongoing
“Exploring catalytic reaction mechanism of iron containing metalloenzymes using density functional and hybrid QM/MM methods”	DST	Ongoing
“Computational exploration on the reaction mechanism of Fe-mediated catalytic reactions: Emphasis to Methane Monooxygenase and extradiol catecholic dioxygenase enzymes”	DST	Ongoing
“New generation Molecular Magnets	DST-Nanomission	Ongoing
“Design of lanthanide based single-molecule-magnets and validation through experimental studies”	DST	Ongoing
“Experimental and computational studies of the conjugates of calixarenes as receptors towards ions and molecules including those of lanthanides and actinides: Establishing the structural features of the species of recognition by <i>ab initio</i> methods including density functional theory	DAE BRNS	Completed
“Study of protein-carbohydrate interactions using model molecular systems as a first step of entry into glycobiology: Synthesis and characterization of oligopeptides and glycoconjugates, and experimental & computational studies of the resultant species of interaction	CSIR	Completed
“A lab on chip of Cardiac Diagnostics”	ADA	Completed
“Development of Hand Held Portable Device for the Detection of Explosives using Amplified Fluorescent Polymers”	ADA	Completed

Name of the Project	Sponsored by	Status
“Synthesis and scale up of high contrast processable electrochromic polymers based on conjugated dialkoxyhiophenes”	DST	Completed
“Asymmetric Synthesis of Pyranonaphthoquinones through Dötz Annulation and Asymmetri Methods”	BRNS	Completed
“Development of Dimeric Fischer Carbenes: A Bidirectional DötzBenzannulation Approach to DimericPyranonaphthoquinones”	DST	Completed
“Asymmetric Allylation of Carbonyl Derivatives through -Allylpalladium: Synthesis of N-Heterocycles”	CSIR	Completed
“Synthesis and Biochemical Evaluation of Chemically Modified RNA Cleaving 10-23 & 8-17 DNA Enzymes”	DST	Completed

Patents

Kumar, A.

“A Modified Grignard Metathesis (GRIM) Polymerization Process for the Syntheses of Conjugated Polymers,” Indian Patent Application No 3447/MUM/2012, Filed on December 6, 2012.

Conferences/Symposia/Workshops/Seminars (participated/Papers presented)

Kulkarni, S.S.

“Orthogonally Protected D-Glucosamine and D-Galactosamine Building Blocks for the Synthesis of Mucin Type Oligosaccharides”, *Flash communication, International Carbohydrate Symposium*, Madrid, Spain. July 26, 2012.

Delivered an invited lecture on “Strategies in glycoconjugate synthesis”, at *5th Baltic Meeting on Microbial Carbohydrates*, Suzdal, Russia, September 3, 2012.

“Regioselective approaches for glycoconjugate synthesis, In *InvACS-IITB symposium*”, Hotel Taj Lands, Mumbai, October 1, 2012.

Delivered an invited lecture on “Serendipitous discoveries that changed the world”, at *INSPIRE camp*, Khalasa College, Matunga, November 17, 2012.

Singh, H.B

“Organochalcogen Chemistry: Role of Intramolecular Coordination”, in *Proceedings of School of Chemistry*, University of Hyderabad, March 7, 2013.

“Aspects of Organochalcogen Chemistry”, in *Proceedings of IRCC seminar*, IIT Bombay, March 4, 2013.

“2,6-Disubstituted Arylchalcogen Compounds: Facile Synthesis of Chalcogen Heterocycles”, a Plenary Lecture at *National Conference on Chalcogen Chemistry*, DIAT Pune, January 14-15, 2013.

Delivered an invited talk on “Organochalcogen and mercury Chemistry: Role of Intramolecular Secondary Interactions”, in *Symposium on Inorganic Chemistry at Interface*, IIT Kharagpur, October 14, 2012.

“Stabilising the unstable organochalcogens, in *Proceedings of IRCC award lecture*”, IRCC auditorium, IIT Bombay, August 29, 2012.

Delivered an invited talk on “Organochalcogen and mercury Chemistry: Role of Intramolecular Secondary Interactions”, in *CFM: Chemical Frontiers 2012*, Goa, August 14-16, 2012.

Singh V. K.

Regional Science Congress, M.S. University of Baroda, September 15, 2012.

Datta, S. N.

Delivered an invited lecture on “Rate of Production of Glucose Equivalent in C₄ Plant Cell: Effect of Temperature and Pressure, and Comparison with Experiment”, in *Proceedings of ISRAPs discussion meeting*, IIT Bombay, November 27, 2012.

Delivered an invited lecture on “Theoretical Investigation of Photomagnetic Properties of Organic Diradicals with Photochromic Spacers”, in *Proceedings of International Symposium on Electronic Structure and Dynamics of Molecular Systems*, IACS, Jadavpur, Kolkata, February 17, 2013.

Contractor A.Q.

“Water for India Project DST Group monitoring workshop”, October 31-November 1, 2012.

Kotha, S. and Waghule, G.

“Diversity Oriented Approach to Normuscopyridine and its Higher Analogues by Ring- Closing Metathesis”, in *Proceedings of House Symposium*, March 2, 2013.

Presented talk on “Diversity Oriented Approach to Crownphanes by Enyne Metathesis and Diels” Alder Reaction as Key Steps”, in *Proceedings of American Chemical Society Symposium*, IIT Bombay, October 1-2, 2012.

Kotha, S. and Ali, R.

Presented Poster on “Diversity-Oriented Approach to indane-based Spirocyclic compounds via Enyne-Metathesis, DielsAlder Reaction and a [2+2+2] Cycloaddition as Key Steps”, in *Proceedings of American Chemical Society Symposium*, IIT Bombay, October 1-2, 2012.

Kotha, S. and Chinnam A.K.

Presented Poster on “Synthesis of [4.3.3] Propellane Derivative using Weiss-Cook Reaction, Fischer-Indole Cyclization and RCM as Key Steps”, in *Proceedings of American Chemical Society Symposium*, IIT Bombay, October 1-2, 2012.

Balakrishna, M.S.

Invited Talk on “Structure and bonding in transition metal complexes”, in *Proceedings of National seminar on emerging trends in chemical sciences*, St. Aloysius College, Mangalore, February 14-16, 2013.

Invited Talk on “Reactivity of Organometallic complexes to get an insight into the ligand design for catalytic applications”, in *Proceedings of National seminar on emerging trends in chemical sciences*, St. Aloysius College, Mangalore, February 14-16, 2013.

Invited Talk on “Polydentate and hybrid phosphorus (III) based ligands: Synthesis, transition metal chemistry and their catalytic applications”, in *Proceedings of the 15th CRSI National Symposium in Chemistry*, BHU, Varanasi, UP, February 1-4, 2013.

Chaubey, B. and Balakrishna, M.S.

“Triazole appended phosphinites via CLICK reaction: Synthesis, reactivity and transition metal chemistry”, in *Proceedings of the 14th CRSI National Symposium in Chemistry*, IISER Trivendrum, Kerala, February 4-7, 2012.

Kumar, A.

Invited Talk on “New Approaches for Processability and Functionality in Conjugated Polymers based on 3, 4-Alkylendioxythiophenes: A Step Towards

Printable Electronics,” in *Proceedings of The Indo-Japan workshop on “Light-Matter Interaction at Molecular and Nanoscale Materials”*, Osaka University, October 15-16, 2012.

Invited Talk on “Conjugated Polymers based on Thiophenes for Printable Organic Electronic Devices,” in *Proceedings of IBSA Nanotechnology Workshop on Advanced Materials (Sensors)*, Johannesburg, South Africa, March 19-21, 2013.

Invited Talk on “Organic Photovoltaics and Conducting Polymers - Status, Opportunities and Challenges,” in *Proceedings of Saint Gobain Research Symposium*, Chennai, December 13, 2012.

Invited Talk on “Functional Conducting Polymers as a Generic Platform for Next Generation of Chemical and biomedical Sensor: Recent Advances, Challenges and Opportunities,” in *Proceedings of CGCRI*, Kolkata, August 21, 2012.

Invited Talk on “Challenges and Opportunities in Photovoltaic Devices Based on Conjugated Polymers: A Synthetic Chemistry Approach,” in *Proceedings of National Workshop on Polymer Solar Cells, NWPSC-2012*, IISER, Pune, April 21-22, 2012.

Kaliappan, K. P.

“Hybrid Natural Products: Natures Gift and Unlimited Opportunities for Chemists”, in *Proceedings of CFM 2012*, Goa, August 14-16, 2012.

“Hybrid Natural Products: Natures Gift and Unlimited Opportunities for Chemists”, in *Proceedings of IISER*, Pune, August 23, 2012.

“Agonies and Ecstasies in Total Synthesis”. In *Proceedings of RSC-West India IYC-Challenge Symposium*, Nagpur, August 31, 2012.

“Hybrid Natural Products: Nature’s Gift and Unlimited Opportunities for Chemists”. In *Proceedings of NIT*, Suratkal, January 18-19, 2013.

“Hybrid Natural Products to New Molecular Scaffolds: Challenges and Opportunities”, in *Proceedings of CRSI Bronze Medal Lecture*, BHU, February 2-5, 2013.

“Hybrid Natural Products: Natures Gift and Unlimited Opportunities for Chemists”, in *Proceedings of Chennai Chemistry Conference*, CLRI, February 8-9, 2013.

“Hybrid Approach to New Molecular Scaffolds”, in *Proceedings of 2nd Indo-UK Med Chem. Workshop*, IICT, Hyderabad, March 22-23, 2013.

“Learning from Nature: From Natural Products to New Molecular Scaffolds”, in *Proceedings of ICOS 19*, Melbourne, July 1-5, 2012.

“Molecules, New Molecules and More Molecules”, at Strathclyde University, Scotland, U.K., March 25, 2013.

“Agonies and Ecstasies in Total Synthesis”, at University of Edinburgh, Scotland, U. K., March 26, 2013.

Ghosh, P.

“Understanding the N-heterocyclic Carbene Influence”, in *Proceedings of RSC West India IYC Follow up Symposium 2012*, August 31, 2012.

Mishra, M.K.

“Treatment of resonances in e-N₂ and e-NO scattering using 1 and 2-D TDWP using LCP and 2-D e-nuclear surfaces”, in *Proceedings of ESDMC*, IACS, February 2013.

“Selective Photodynamic Control of Bond Dissociation”, in *Proceedings of Indian Science Congress*, KIIT University, Bhubaneshwar, January 6, 2012.

Sunoj R. B.

“Indo-German Symposium on Frontiers in Chemistry”, at IIT Bombay, September 2012.

Gordon Research Conference in Inorganic Reaction Mechanisms, Galveston, Texas, USA, March 2013.

National Symposium on “New Horizons in Chemistry”, IIT Bombay, October 2012.

Frontiers in Chemical Sciences (FICS2012), IIT Guwahati, December 2012.

Theoretical Chemistry Symposium (TCS 2012), IIT Guwahati, December 2012.

Chowdhury, A.

“Chemistry of Functional Materials”, at Goa, August 14-16, 2012.

RSC West India IYC challenge Symposium, Nagpur University, September 1, 2012, Nagpur.

National Fluorescence Workshop and Conference: FCS 2012 at Saha Institute of Nuclear Physics, Kolkata, December 4-9, 2012.

New Directions in Chemical Sciences, NDCS, IIT Delhi, New Delhi, December 9-11, 2012.

International Conference on “Pure and Applied Chemistry”, ICPAC 2012, Mauritius, July 2-6, 2012.

Fernandes R. A. and Halle M. B.

Presented a poster titled “Diastereoselective synthesis of (+)-nephrosterinic acid and (+)-protolichesterinic

acid,” in *Proceedings of House Symposium (IHS)*, Department of chemistry, IIT Bombay, March 10, 2012.

Mulay, S.V. and Fernandes, R.A.

Presented a poster titled “Dötzbenzannulation reaction in the total synthesis of various pyranonaphthoquinones and related molecules,” in *Proceedings of IITB-ACS Symposium in Chemistry*, IIT Bombay, October 2, 2012.

Halle, M.B., Chowdhury, A.K. and Fernandes, R.A.

Presented a poster titled “The development of orthoesterClaisen rearrangement in the total synthesis of natural products”, in *Proceedings of IITB-ACS Symposium in Chemistry*, IIT Bombay, October 2, 2012.

Nallasivam, J.L., Choudhary, D.A. and Fernandes, R.A.

Presented a poster titled “Development of Chiral Bis-Allylpalladium Catalysis: Asymmetric Allylation of Imines and An Efficient Route to Natural Product Synthesis,” in *Proceedings of IITB-ACS Symposium in Chemistry*, IIT Bombay, October 2, 2012.

Pullaiah, K. and Fernandes, R.A.

Presented a poster titled “Step-Economic and Protecting-Group-Free Synthesis of (+)-Cardiobutanolide and Hagen’s Gland Lactones,” in *Proceedings of 15th CRSI National Symposium in Chemistry (NSC-15)*, Department of Chemistry, Banaras Hindu University, Varanasi, Uttar Pradesh, February 1-3, 2013.

Presented a poster titled “Towards a Protecting-Group-Free Synthesis of (+)-Cardiobutanolide and Hagen’s Gland Lactones,” in *Proceedings of In-House Symposium-2013*, Department of Chemistry, IIT Bombay, March 2, 2013.

Nallasivam, J.L. and Fernandes, R.A.

Presented a poster titled “Enantioselective Allylation of Imines Catalyzed by (-)-Pinene Based Allylpalladium Catalyst: An Efficient Route to Synthesis of (R)-Propylpiperonylamine and (R)-Pipelicolic Acid,” in *Proceedings of 15th CRSI National Symposium in Chemistry (NSC-15)*, Department of Chemistry, Banaras Hindu University, Varanasi, Uttar Pradesh, February 1-3, 2013.

Venkati, B. and Fernandes, R.A.

Presented a poster titled A Chiral Pool Synthesis of (+)-cis and (•) trans- Disparlure, in *Proceedings of In-House Symposium-2013*, Department of Chemistry, IIT Bombay, March 2, 2013.

Patil, P.H., Chowdhury, A.K. and Fernandes, R.A.

Presented a poster titled Total synthesis of (+)-Murolic acid, in *Proceedings of In-House Symposium-2013*, Department of Chemistry, IIT Bombay, March 2, 2013.

Pradeepkumar, P.I.

Presented an invited talk on Functional Nucleic Acids as Potential Drugs as well as Drug Targets, in *Proceedings of the Strathclyde-IIT Bombay Meeting*, the Strathclyde University, Glasgow, UK, March 25, 2013.

Presented an invited talk on Chemically Modified Small Interfering RNAs as Potential Therapeutic Agents, in *Proceedings of Third International Conference on Natural Polymers*, Mahatma Gandhi University, Kottayam, Kerala, October 26-28, 2012.

Presented an invited talk on Molecular Modeling and Dynamics Studies of Functional Nucleic Acids: Small Interfering RNAs and G-Quadruplex DNAs, in *Proceedings of Accelerating Biology 2013*, CDAC, Pune, February 20-22, 2013.

Participated in a workshop titled Re-envisioning Education: The Craft of Teaching and Learning, in *The Valley School Bangalore*, December 22-31, 2012.

Anand, R.

“Identification of Molecular Tunnels in Purine Biosynthesis as Passages for Unstable Intermediates, Plenary Speaker at *ICPAC*, Mauritius, July 2012.

Invited talk on Structure Activity Relationship of an Enzyme with Unknown Function, in *Proceedings of Biochemical Society of India*, Mumbai, September 2012.

Invited talk on Form to Function: Structural and Mechanistic Insights into Guanine deaminase from *Nitromonas Europea*, in *Proceedings of Symposium on Frontiers of biophysics, biotechnology and Bioinformatics*, 37th Annual Meeting of Indian Biophysical Society, Mumbai, February 2013.

Invited talk on Identification of Molecular Tunnels: Ammonia Channeling in Purine Biosynthesis, in *Proceedings of Bilateral Symposia*, University of Strathclyde and University of Edinburgh, UK. March 2013.

Rajaraman, G.

“International conference in Molecular Magnets (ICMM), 2012. Orlando, USA. October 7-11, 2012.

Gharpure, S. J.

Invited talk on Tandem reactions in the synthesis of oxa- and aza-cycles, in *Proceedings of National Seminar on Recent Trends In Catalysts And Fine Chemicals Synthesis- A Green Approach*, VIT University, Chennai, April 20, 2012.

Invited talk on Stereoselective Synthesis and Applications of Donor-Acceptor Substituted Cyclopropanes (DACs), in *Proceedings of IITB-ACS Symposium in Chemistry*, October 1-2, 2012.

Invited talk on Stereoselective Synthesis and Applications of Donor-Acceptor Substituted Cyclopropanes (DACs), in *Proceedings of Advances and Opportunities in Chemical Sciences Chemistry Outreach Event*, RSC-WIS in association with K.T.H.M. College, Nasik, October 20, 2012.

Invited talk on Aromaticity and Aromatic Substitution. In *Proceedings of Workshop on Basic Concepts in Organic Chemistry KET's*, V. G. Vaze College of Arts, Science and Commerce, Mulund, October 22, 2012.

Invited talk on Stereoselective synthesis of cyclic ethers using vinylogous carbonate, in *Proceedings of 2nd International Conference on Emerging Trends in Chemical Sciences (ETCS12)*, School of Chemical Sciences, Solapur University, Solapur, November 2-4, 2012.

Invited talk on New Strategies for the Stereoselective Synthesis of Oxa and Aza-Cycles, in *Proceedings of Frontiers in Chemical Sciences (FICS) 2012*, Department of Chemistry, IIT Guwahati, December 2-4, 2012.

Invited talk on Synthesis of oxa and aza-cycles using tandem reactions, in *Proceedings of New Direction in Chemical Sciences (NDCS)*, Department of Chemistry, IIT Delhi, December 7-9, 2012.

“Diversity Oriented Synthesis using Vinylogous Functional Groups, in *Proceedings of 8th IndoFrench Conference in Organic Synthesis (IFCOS)*, Goa, April 1-3, 2013.

Sathiyarayanan A. M., Prasanna K. V. and Gharpure, S. J.

Poster presentation in A Mild and Efficient Generation of o-Quinone methides using (•)-Binolphosphoric Acid: Application to the Formal Synthesis of Myristinins B/C, in *Proceedings of ‘CATALYST 2013’ Dr. Reddy’s Chemistry Conclave, Journey towards sustainability*, Hyderabad, January 9, 2013

Kishore, N.

International conference on Molecular Magnetism (ICMM), Florida, USA, 2012.

Upadhyay, A. and Shanmugam, M.

“New horizons of Chemistry, in *Proceedings of in-house symposium*, Department of Chemistry, 2012.

Presented in New horizons of Chemistry an in-house symposium, Department of Chemistry, 2012.

Vaidya, S. and Shanmugam, M.

“New horizons of Chemistry, in *Proceedings of in-house symposium*, Department of Chemistry, 2012.

Presented in New horizons of Chemistry an in-house symposium, Department of Chemistry, 2012.

“Chemistry and bio-molecular science: Recent Developments in unraveling bio-molecular interactions quantitatively, in *Proceedings of National Conference on New Horizons in Chemistry*, Thakur College of Science & Commerce, Kandivli (E), Mumbai, October 23, 2012.

“Physico-chemical characterization of bio-molecular interactions: Proteins and complexes, at Central University of Rajasthan, February 26, 2013.

“CalorimetryL An essential requirement for quantitative understanding of biological processes, in *Proceedings of Symposium of Indian Society of Analytical Scientists*, the M S University of Varoda, August 21, 2012.

“Physical chemistry and bio-molecular science: An essential relation on unraveling bio-molecular interactions quantitatively, in *Proceedings of 49th Annual convention of Chemists*, National Institute of Technical Teachers’ Training and research, Bhopal, December 14, 2012.

“Calorimetry in protein folding intermediates, protein-solvent interactions, and drug-protein interactions, in *Proceedings of 2012 TA Users Meeting & Symposium*, New Orleans, USA, May 2-4, 2012.

“INSPIRE: Let us learn and move forward, at Kanya Mahavidyalaya, Jalandhar, August 17, 2012.

“INSPIRE: A journey to excellence. at Akal College of Pharmacy & Technical Education, Mastuana Sahib, Sangrur, March 23, 2013.

“Understanding bio-molecular interactions via thermodynamic approach: Proteins and Complexes, in *Proceedings of 8th National conference on Solid State and Allied Sciences*, Dr. H. S. Gaur University, Sagar, February 16, 2013.

Conferences/Symposia/Workshops/Seminars (Coordinated/Chaired by Faculty)

Singh, H. B.

Chaired the Session at 6th international Meeting on *Halogen Chemistry (HALOCHEM-VI)* held during December 6-8, 2012, at IISc, Bangalore.

Mishra, M. K.

Chaired the Session in *Theoretical Chemistry Symposium*, held on December 20, 2012, at IIT Guwahati.

Chaired a Session in Discussion Meeting on *Spectroscopy and Dynamics*, held on February 21, 2013 at Udaipur.

Invited Lectures

Murugavel, R.

Delivered an invited lecture at *INDO-UK join symposium* on Materials Chemistry, held at Royal Society of Chemistry, Burlington House, London, September 10, 2012.

Delivered an invite Lecture at the International conference on Functional Metalorganics and Hybrids, February 1-4, 2013, Kolkata.

Contractor, A. Q.

“CGCRI-Sensor Hub, August 24, 2012.

“3rd Trilateral Workshop on Nano, Water & Energy, November 19, 2012.

“Bangalore Nano, Bangalore, December 7, 2012.

“PLC Education Forum/PANIIT, Kolkata, December 10, 2012.

“Nagpur IC Impacts, February 20, 2013

“Indo-US STF Meeting, Varanasi, February 23, 2013.

Singh, V.K.

“Molecular Diversity from aromatics: Regional Science Congress, at M. S. University of Baroda, September 15, 2012.

“Oxonium ion mediated Reactions: Synthesis of polycyclic ethers, October 2012.

“Polycyclic ether and Atisanes, at IPCA Laboratories, Mumbai, January 4, 2013.

Delivered a Colloquium lecture on Molecular Complexity from Aromatics, a Department of Chemistry, February 16, 2013.

Kotha, S.

“Safety in Chemistry Labs, at the Department of Chemistry, IIT Bombay, April 2, 2012.

“Motivation and Inspiration, at Chaitanya College, Kothagudem, April 13, 2012.

“Metathesis: A big deal reaction, at the Department of Chemistry, Nagarjuna University, Guntur, April 27, 2012.

“Diversity oriented approach to unusual amino acid derivatives and peptides, at the following places: University of KwaZulu-Natal, Westville Campus, South Africa, on June 13 and 15, 2012; IIT Kanpur, on July 10, 2012; HC Brown Research Laboratories-

Acharya Group, Dombivali, Mumbai, on July 16, 2012; ACS-IITB symposium on October 1, 2012; at NOST, Agra, on October 11, 2012; Fellowship induction lecture, A.P. Akademi of Sciences, NGRI, Hyderabad, on December 24, 2012; 4th Indian Peptide Symposium 2013, Shaha Institute of Nuclear Physics, Kolkatta, on February 22, 2013, and at the School of Chemistry, University of Hyderabad, Hyderabad, on February 27, 2013.

“NMR spectroscopy, at ASN College, Tenali, July 24, 2012, at Nuzvid PG centre, Andra Pradesh, July 28, 2012, and Siddhardha Pharmacy College, Krishna University, Nugeveedu, July 28, 2012.

“Building block approach to unusual amino acid derivatives, at IRCC award lecture, IIT Bombay, August 22, 2012.

Motivation, Inspire Program, at SPP School of Pharmacy & Technology Management, at SVKM'S, NMIMS, on October 1, 2012 and at SVRM College, Nagaram, on October 20, and December 20, 2012.

Motivation, SVKC & Dr. Raju Arts & Science College, Penugonda, W. Godavari, October 21, 2012.

“Olefin metathesis: A big deal reaction, JNTU Hyderabad, November 24, 2012.

“Rongalite: A useful green reagent in organic synthesis, at JNTU Hyderabad, on November 24, 2012; at DIAT, Pune, on January 14, 2013; and at GVK Biosciences, January 18, 2013.

Sasidhar, Y. U.

“To Direct Or To Be Directed, at the 37th Annual Meeting of the Indian Biophysical Society, Department of Biophysics and Center for Excellence In Basic Sciences, University of Mumbai, January 13-16, 2013.

Balakrishna, M. S.

“Structure and Bonding, Lecture 2, Workshop for undergraduate students in Science, Homi Bhaba Centre for Science Education (HBCSE), BARC, Mumbai, December 25, 2012.

“Reactivity of organometallic compounds: An insight into catalytic pathways, Lecture 1, Workshop for undergraduate students in Science, Homi Bhaba Centre for Science Education (HBCSE), BARC, Mumbai, December 25, 2012.

“Simple tertiary phosphines to hexaphosphane ligands: Synthesis, transition metal chemistry and catalytic applications, Central University of Rajasthan, Jaipur, December 18, 2012.

Kumar, A.

“Science and Magic: Art of “Active” Learning and Research,” at the following:

HEMRL, Pune, on April 10, 2012; INSPIRE Camp, IISER, Mohali, on May 21, 2012; KVPY Camp, University of Jaipur, Rajasthan, on May 25, 2012; INPIRE Camp, Sapkal College of Engineering, Nasik, on July 7, 2012; Summer Training Camp at IGCAR, Kalpakkam, on June, 30, 2012; Chemistry Department, Delhi university, on July 23, 2012; CGCRI, Kolkatta, on August 21, 2012; Chemical Engineering, IITM, on September 10, 2012; INSPIRE Camp, Khalsa College, Mumbai, on November 19, 2012; PSG, Coimbatore, on November 23, 2012; IISc. Bangalore, on November 29-30, 2012; IIT Delhi, on December 9, 2012; INSPIRE CAMP, IIT Delhi, on December 26, 2012; and Nehru Science Centre, Mumbai, on February 21, 2013.

Ghosh, P.

“Understanding the N-heterocyclic Carbene Influence, at RSC West India IYC Followup Symposium 2012, on August 31, 2012, and at Malaviya National Institute of Technology (MNIT), Jaipur, on February 23, 2013.

“Career Paths in Chemistry NIIT Barrackpore, Kolkata, May 8, 2013.

Sunoj, R. B.

“National Symposium on New Horizons in Chemistry, IIT Bombay, October 2012.

“Frontiers in Chemical Sciences (FICS2012), IIT Guwahati, December 2012.

“Theoretical Chemistry Symposium (TCS 2012), BARC Young Scientist Meet (2012), IIT Guwahati, December 2012.

Chowdhury, A.

“RSC West India IYC challenge Symposium, Nagpur University, Nagpur, September 01, 2012.

“Chemistry of Functional Materials, Goa, August 14-16, 2012.

“National Fluorescence Workshop and Conference: FCS 2012, Saha Institute of Nuclear Physics, Kolkata, December 4-9, 2012.

“New Directions in Chemical Sciences, NDCS, IIT Delhi, New Delhi, December 9-11, 2012.

“International Conference on Pure and Applied Chemistry, ICPAC 2012, Mauritius, July 2-6 2012,.

Fernandes, R. A.

“Development of Asymmetric π -Allylpalladium Catalysis: An Efficient Enantioselective Allylation of Imines,” Under the theme Catalysis, XXV *International Conference on Organometallic*

Chemistry, Lisbon University, Lisbon, Portugal, September 2-7, 2012.

“Development of Dimeric Fischer Carbenes: A Bidirectional Dötz-Benzannulation Approach to Dimeric Pyranonaphthoquinones, *4th International Conference in Drug Discovery and Therapy*, Higher Colleges of Technology, Dubai, February 12-15, 2012.

“Dead Ends and Detours: Toward the Total Synthesis of Cardanolin 3, Actinorhodins and Asteriscunolides,” *National Symposium on Recent Advances in Chemistry* at Pondicherry, Department of Chemistry, Pondicherry University, March 22-23, 2013.

“From Chiral Catalysis to Asymmetric Total Synthesis,” In-House Symposium, Department of Chemistry, IIT Bombay, India, March 2, 2013.

“Challenges in Total Synthesis: From Opportunities to Solving Synthesis Puzzles,” Department of Chemistry, NITK Surathkal, August 3, 2012.

Mishra, M.K.

125th Foundation Day Lecture on Peace and Environment, Allahabad University, September 2012

Rajaraman, G.

“Computational approach to Lanthanide Molecular Nano Magnets, at the Department of Chemistry, University of Melbourne, Australia, on January 14, 2013 and at Theoretical chemistry symposium, IIT Guwahati, December 2012.

“Computational approach to new generation molecular nano magnets, Young Investigator award lecture, IIT Bombay, August 10, 2012.

“New direction in chemical sciences, The role of Molecular Modelling in the development of Molecule based magnets, New Delhi, December 7-9, 2012.

“Modelling Magnetic Materials: Where to from here? Nanoscience and Nanomaterials, JNU, Delhi, March, 2013.

“Modelling Chemical and Biological (Re)activity, Magnetic Exchange Coupling Mediated by Weak π - π Interactions: Theoretical Approach to Novel Single Chain Magnets February 26 - March 1, 2013.

Significant Awards/Distinctions

Mishra, M. K.

Associate Editor/Editorial Board, International Journal of Quantum Chemistry.
Member, Editorial Advisory Board, Advances in Quantum Chemistry.

Elected to The Council (2010-12), National Academy of Sciences, India.

Singh, H. B.

“Professor. S.C. Bhattacharya Award for Excellence in Pure Sciences, IIT Bombay Member 2012.

“Chemical Sciences Committee for Swarna-Jayanti Fellowship Award, (DST) 2012.

Member, IRCC Advisory Committee, IIT Bombay 2013-2014.

Kotha, S.

Fellow, Andhra Pradesh Akademi of Sciences
Fellow, Maharashtra Academy of Sciences
Editorial Board Member (*Indian J. Chem.* 2011-2013).
Editorial Board member (Journal of Amino Acids)
Editorial Board member (Catalysis Journal)

Kaliappan, K. P.

“Bronze Medal by Chemical Research Society of India (CRSI), Banaras Hindu University, Varanasi, February 2013.

Ghosh, P.

Editorial Board Member, Polyhedron, Elsevier Publishers (2011-2013)
“The IIT Bombay Research Paper Award, for the Year 2012.

Anand, R.

“Royal Society of Chemistry, Mumbai Chapter, Madam Curie Women Scientist Award, 2012.

Rajaraman, G.

“INSA young scientist medal for the year of 2013, by INSA.

Gharpure, S. J.

“ETs V. G. Vaze Alumni Achievers Award, January 2013. Selection as Thieme Chemistry Journal Awardees 2013, December 2013.

“B. M. Birla Science Prize in Chemistry, November 2012.

Kishore, N.

Editorial Board Member: The Journal of Chemical Thermodynamics, 2012 onwards.

“The Rev. Fr. L. M. Yedanapally Memorial Award for the Year 2011, by Indian Chemical Society.

Honorary Work

Datta, S. N.

Reviewed articles for: The Journal of Physical Chemistry, Chemistry Communication, and Spectrochimica Acta Part A.

Contractor, A. Q.

Expert Member For Water Technology, Indo-EU, DST Selection Committees, CSIR.

Singh, V. K.

Evaluated various Ph.D. theses from various universities, and research projects for DST, and CSIR.

Several manuscripts reviewed for the journals such as Journal of Organic Chemistry, Tetrahedron, Tetrahedron letters, Synthetic communications etc.

Kotha, S.

Reviewer to various journal articles.
Reviewed proposals from DST, BRNS & CSIR,
External examiner to Ph. D. thesis, Selection committee member (BARC, IICB, NIT-Goa)

Member-Board of studies- M. S. University, Baroda.

Kumar, A.

Served in the editorial board of Polymer Reviews.

Ghosh, P.

Currently the X-ray single-crystal diffraction facility incharge and the immediate-past incharge of the NMR and GCMS facilities at the Chemistry Department, IIT Bombay.

For Joint Entrance Examination (2013) Served as a Paper Setter.

JEE Answer Freezing Committee (2012): Served as a member of the answer freezing committee for the JEE.

MNIT, Jaipur (2013): Served as an expert for NMR and Mass spectrometer in the national equipment purchase committee.

Sunoj, R. B.

Reviewer DST, CSIR, DAE-BRNS Projects
Reviewer and adjudicative reviewer for royal society of chemistry journals such as Chemical Communications, Physical Chemistry Chemical Physics, Dalton Transactions, and Organic and Biomolecular Chemistry.

Reviewer for American chemical society journals: Journal of American chemical society, Organic Letters, and Journal of Organic Chemistry.

Reviewer for Wiley-VCH journals: European Journal of Organic Chemistry and European Journal of Inorganic Chemistry.

Reviewer for Elsevier journals: Tetrahedron and Tetrahedron Letters.

Reviewer for Journal of Chemical Sciences (An Indian Academy of Sciences publication)

Ph.D. Thesis examiner for IIT Kanpur, University of Kerala, and Osmania University.

Fernandes, R.A.

Referee for Ph.D. theses from Pune University and NITK Suratkhal.

Refereed papers from International Journals: Tetrahedron, Tetrahedron Letters, Eur. J. Org. Chem., Journal of Chemical Sciences, RSC Advances, Current Medicinal Chemistry, etc.

Pradeepkumar, P.I.

Reviewed papers for Mini-Reviews in Medicinal Chemistry and Research proposals for DBT and DAE-BRNS.

Rajaraman, G.

Reviewer and adjudicative reviewer for a number of journals including J. Am. Chem. Soc., Chem. Comm., Dalton. Trans., J. Mater. Chem., Phys. Chem. Chem.Phys., Eur. J. Inorg. Chem., J. Phys. Chem., Polyhedron etc.

Reviewer for research proposal from DST and BRNS, India.

Gharpure, S. J.

Functioned as a referee for following journals: Tetrahedron (Elsevier); Tetrahedron Letters (Elsevier); Journal of Chemical Science (Indian Academy of Sciences and Springer); Chemistry Asian Journal (Wiley); Journal of Organic Chemistry (American Chemical Society); Organic Letters (American Chemical Society); Synthesis (Thieme)

Shanmugam, M.

Reviewed papers for International Journal such as Chemical communication.

Extension Activities

Kumar, A.

Set up the facility for fabrication and characterization off organic electronic device.

Ghosh, P.

Set up a State of the Art Organometallic Synthesis Laboratory having Glove box, High-vacuum line, Fume Hoods (3), High pressure reactor (1) and GC/GCMS instrument etc.

Sunoj, R. B.

As the convener for IIT Bombay's first supercomputing facility, has set up the 'Space Time' high performance computing cluster.

Faculty members and their Specializations

1) A. K. Singh

General: Organic Chemistry,

Specific: *Chemistry of vision and photocontrol of structure and function of biomolecules* - Retinal-bound photoreceptor proteins - synthesis and characterization of bacteriorhodopsin analogs. Development of photoswitchable systems, photo-switchable enzymes as reagents.

Biomolecular caging - Synthesis of novel phototriggers and their applications in caging of drugs and bioactive natural products.

Excited state studies of linear polyenes - Synthesis, photochemical and photophysical studies of linear polyenes including retinoids, diphenylpolyenes, indolic polyenes.

Fluorescence probes - Synthesis of neutral hydrophobic probes for various applications including characterization of microenvironment of organized assemblies and proteins, and as diagnostics.

Radioprotective/antioxidant agents - Vitamin A and E related radioprotective / antioxidant compounds - synthesis and assay of their antiradical abilities.

Organic nanoparticles - Synthesis, characterization and biomedical applications.

2) S. Durani

General: Organic Chemistry

Specific: Bio-Organic Chemistry , Structural and Computational Biology Medicinal Chemistry

3) M. K. Mishra

General: Physical Chemistry

Specific: Quantum Chemistry

4) Pradeep Mathur

General: Inorganic Chemistry

Specific: Organometallic Chemistry

5) H. B. Singh

General: Inorganic Chemistry

Specific: Organometallic Chemistry

6) Sambhu N. Datta

Relativistic Quantum Theory

Theoretical Aspects of Photosynthesis

Molecular Magnets and Materials

7) A. Q. Contractor

General: Physical Chemistry

Specific: Electrochemistry

8) B. L. Tembe

General: Physical Chemistry

Specific: Theoretical Chemistry, Statistical Mechanics, Molecular Dynamics

9) C.P. Rao

Inorganic Chemistry; Coordination

Chem.; and Bioinorganic, Biomimetic and Biointeraction Chemistry of model Molecules and Protein/enzyme; Sensors for cations and anions; Binding of glycoconjugates with Lectins and glycosidase inhibitors; Computational modeling; artificial metalloenzymes; molecular mechanics and molecular dynamics simulations of protein-small molecular interactions

10) V. K. Singh

General: Organic Chemistry

Specific: Organic Synthesis and Photochemistry

11) Sambasivarao Kotha

General: Organic Chemistry

Specific: Unusual amino acids, peptide modifications, metathesis reaction, Suzuki-Miyaura cross-coupling reaction, and new synthetic methodology.

12) G. K. Lahiri

General: Inorganic Chemistry

Specific: Transition metal ions mediated intramolecular and intermolecular organic transformations via the activation of C-H and C-X (F, Cl, Br) bonds. Development of mononuclear and multinuclear ruthenium and osmium complexes as efficient photo-redox assemblies. Development of heterogenized homogeneous metal cluster based catalysts for enantioselective organic transformations. Development of new class of metal complexes as possible models for the active site of metalloenzymes

13) Y. U. Sasidhar

General: Physical Chemistry

Specific: Protein folding

14) Nand Kishore

General: Physical Chemistry

Specific: Biothermodynamics and Biophysical Chemistry

15) M. S. Balakrishna

General: Inorganic Chemistry

Specific: Main group chemistry; Transition metal organometallic chemistry, Homogeneous Catalysis & Biological Studies

16) R. Murugavel

Inorganic Chemistry

Materials Chemistry

17) Anil Kumar

General: Organic Chemistry

Specific: Synthetic Polymer Chemistry

18) M. Ravikanth

General: Inorganic Chemistry
Specific: Porphyrin and its analogs : Synthesis and Photodynamics

19) I.N.N. Namboothiri

General: Organic Chemistry
Specific: Organic Synthesis, Physical Organic Chemistry/ Reaction Mechanism

20) K.P. Kaliappan

General: Organic Chemistry
Specific: Organic Synthesis and Chemical Biology

21) Anindya Datta

Ultrafast dynamics of molecules and materials

22) R. B. Sunoj

General : Organic Chemistry
Specific: Computational and applied theoretical chemistry

23) Prasenjit Ghosh

General : Inorganic
Specific: Organometallic Synthesis; Homogeneous Catalysis.

24) G. Naresh Patwari

General : Physical Chemistry
Specific: Experimental Spectroscopy and Chemical Dynamics.

25) Arindam Chowdhury

Experimental Physical Chemistry: Imaging, spectroscopy and dynamics of single fluorescent molecules/luminescent nanocrystals

26) Rodney A. Fernandes

General : Organic Chemistry
Specific : a) Synthetic Organic Chemistry: Asymmetric Synthesis of Natural Products, Asymmetric Catalysis. b) Organometallic Chemistry: Chiral Palladium Catalysis and Asymmetric Reactions. c) Enzymatic Chemistry: Chemo-Enzymatic Synthesis

27) P.I. Pradeepkumar

General : Organic Chemistry
Specific : Chemical Biology of Nucleic Acids

28) Ruchi Anand

General : Physical Chemistry
Specific : Protein Crystallography

29) Suvarn S. Kulkarni

Organic Synthesis, Glycochemistry, Chemical glycobiology

30) Gopalan Rajaraman

General : Inorganic Chemistry
Specific : Applied computational Chemistry

31) Maiti Debabrata

General : Inorganic Chemistry
Specific : Synthetic Methodology and Organometallic Chemistry

32) Maheshwaran Shanmugam

Coordination chemistry, molecular magnetism, small molecule activation

33) Santosh J. Gharpure

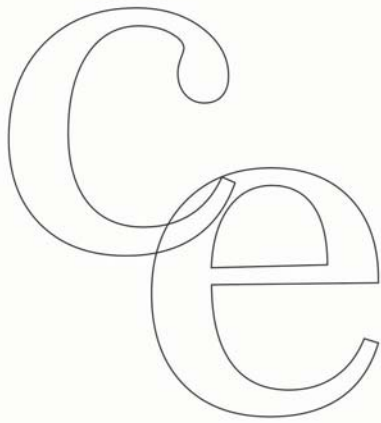
General : Organic Chemistry
Specific : Organic synthesis, new synthetic methods, asymmetric synthesis, natural product synthesis, catalysis, organometallic chemistry

34) Rajarshi Chakrabarti

General : Physical Chemistry
Specific : Statistical mechanics and its application to chemical, soft matter & biology inspired physics. polymer physics and biology inspired physics.

35) Sandip Kar

General: Physical Chemistry
Specific : Systems biology, Chemical kinetics, Nonlinear dynamics, Bifurcation theory, Stochastic modeling, Cell cycle modeling, dynamics of Signaling pathways, Oscillatory chemical and biological systems, Pattern formation, computational Biology.



Civil Engineering

Introduction

The Department of Civil Engineering with its multifaceted faculty continues to maintain and cultivate its strong links with the building and construction industry and academic and research institutions both within and outside the country. Besides high quality teaching and instruction at both UG and PG levels, the department is actively involved in basic and applied research and consultancy and provides high quality technical advisory support through various R&D projects and consultancy to various organisations. The department has attracted significant amount of sponsored research funding from government and private agencies and is delivering excellent output in terms of implementable solutions and large number of research publications in quality journals having high impact factor. The department disseminates the knowledge gained from its high quality research through training programmes and interacts with world renowned personalities through workshops and conferences. The students and faculty have won prestigious national and international awards and recognitions, and are continuing to bring laurels to the department and the institute. The department has a strength of 42 core faculty members.

Academic Programmes

The Department of Civil Engineering offers broad-based undergraduate B.Tech. degree programme. A dual degree (B.Tech.-M.Tech.) programme is also run in structural engineering. M.Tech. (admissions through GATE/sponsorships) and Ph.D. (admissions through selections/sponsorships) programmes are offered in the following five specialisations:

- Transportation Systems Engineering
- Geotechnical Engineering
- Water Resources Engineering
- Structural Engineering
- Geodesy and Remote Sensing

This year, 57 M.Tech. and 41 Ph.D. students were admitted in the above specialisations. In the first year, 117 students were on rolls for the B.Tech. programme. The students that graduated from the department are as follows:

Degree Awarded :

B.Tech.	: 75
Dual Degree	: 19
M.Tech.	: 39
Ph.D.	: 12

R&D Activities

The Department of Civil Engineering is actively involved in basic and applied research and consultancy and provides high quality technical advisory support through various R&D projects and consultancy to various organisations. The department has attracted significant amount of sponsored research funding from government and private agencies.

Sponsored Research

Sponsored Research Projects : 75

New	: 20
Ongoing	: 42
Completed	: 13

The department received 20 new sponsored projects with a sanctioned outlay of Rs. 4,02,55,201. These are as follows:

Sr.	Project Title	Agency Name
1	Development of Indian Highway Capacity Manual	Central Road Research Institute
2	Development of a Prototype for Activity Based Travel Demand Model in the Context of Developing Economy	Council of Scientific and Industrial Research
3	Design of Assorted Blast Doors	Defence Research & Development Organisation
4	Evaluation of the Effectiveness of Locally Available Fibres for Water Storage Tank Construction in Rural Villages for Watershed Management	Department of Science & Technology(DST)
5	Design of the Floating Structure for Fishing Nets for the Purpose of Cage Fishing	DST
6	Computational Modelling of Mechanics of De-adhesion of Single cell and Cell Collectives.	DST
7	Investigation of Trapped Waves between Perforated Barriers.	DST
8	FAST Track “Water Management Under Uncertainty in Climate Change Impacts on River Basin Hydrology”	DST
9	Endowment Interest for Civil Engineering Department	Endowment Interest for Civil Engineering Deptt.
10	C V Raman International Fellowship Award for African Researchers (Mr. Shigalla Mahongo)	Federation of Indian Chambers of Commerce and Industry
11	Statistical Characterisation of Expanded Metal Mesh for Structural Design	Institute for Steel Development & Growth
12	Indo-US Science & Technology Forum, New Delhi	Indo-US Science & Technology Forum, New Delhi
13	Studies on Dredging of Sediments and Rocks in Mumbai Harbor	Jaisu Shipping Company Pvt. Ltd.
14	Studies on Sludge accumulated in Versova Lagoons	Municipal Corporation of Greater Mumbai
15	Static and Dynamic Analyses of Earth Pressure Reduction on Retaining Walls Using compressible Geo-inclusions.	Ministry of Earth Sciences
16	Analysis of Soil Sample from ONGC’s CLUSTER-7 Mumbai High	Oceanking Survey Services India Pvt. Ltd.
17	Numerical Modeling of Oil-spill Dispersion for Maharashtra coast	Rajiv Gandhi Science and Technology Commission
18	Characterization of Soils and Building Materials	Sumer Infrastructure Pvt. Ltd.
19	UKIERI_UK_India Education and Research Initiative	UK India Education and Research Initiative
20	Hydrological Impact of Global and Local changes in a Metro City.	Ministry of Water Resources

Consultancy Work

As many as 308 consultancy projects worth about Rs. 17,10,92,524 were undertaken during the year by the department. Twenty seven faculty members were involved in the consultancy work.

Patents

Singh, D.N.

“A Methodology to Determine Tensile Strength of the Soil from its Penetration Resistance” (*Provisional Indian Patent Application No. 220/MUM/2012*)

“A Novel Method for Determining Cracking Characteristics of Fine-grained Soils using Laser Microscopy” (*Provisional Indian Patent Application No. 2578/MUM/2012*)

“Determination of Swelling Properties of Soils from Suction Measurements” (*Provisional Indian Patent Application No. 2579/MUM/2012*)

“A Novel Technique for Determining Elastic Properties of Soils” (*Provisional Indian Patent Application No. 2580/MUM/2012*)

“A Methodology to Establish Drying-path Soil Water Retention Curve of Fine-grained Soils” (*Provisional Indian Patent Application No. 3043/MUM/2012*)

“A Methodology to Investigate Influence of Thermal Energy on Soil Fabric” (*Provisional Indian Patent Application No. 3046/MUM/2012*)

“Apparatus and Method for Establishing Soil Water Characteristic Curve and Determining Hydraulic Conductivity of Soils” (*Provisional Indian Patent Application No. 130/MUM/2013*)

Extension Activities

In order to encourage and facilitate interaction amongst practitioners and researchers, activities such as conference, workshop, video course, short-term course, CEP course were organised.

Conferences/Workshops: National Conference on “Hydraulics and Water Resources”, December 7-8, 2012, IIT Bombay; IITB-Purdue Workshop on “Droughts and Climate Change”, March 12-13, 2013, IIT Bombay; International Conference on Transportation Planning and Implementation Methodologies for Developing Countries (10th TPMDC-2012), December 12-14, 2012, IIT Bombay; Asiafuge-2012, the First Asian International Workshop on Physical Modelling in Geotechnics, November 14-16, 2012.

Video Courses: Course on “Soil Dynamics” for National Programme on Technology Enhanced Learning (NPTEL Phase II), sponsored by MHRD (See <http://npTEL.iitm.ac.in/> for details; freely available on you tube since July 2012); NPTEL & YouTube web-casted video courses on Fluid Mechanics and Watershed Management and these were rated as popular engineering video courses.

Short-Term Courses/CEP Courses: “Finite Element Method & Applications in Civil Engineering”, July 2-6, 2012; CEP Course & Training to Engineers, Water Resources Department, Government of Maharashtra, June 25-July 7, 2012; 2nd PMGSY Training Course, August 24-26, 2012; Training workshop on “Construction and Quality Control of Cement Concrete Pavement” for the Quality Control Personnel of Sion-Panvel Special State Highway Project at IIT Bombay on January 16, 2013; one-day workshop on Rheology and “Rheometer for Concrete”, April 10, 2013; one-day workshop on “Offshore Structures & Sacs Applications”, April 2, 2013; CEP Course (Open), on “Urban Drainage Management: State-of-the-Art 2012”, July 4-6, 2012, IIT Bombay.

Visitors to the Department

Prof. Shashi Nambisan, Director, Institute for Transportation, Iowa State University, delivered a lecture on “Ongoing Research Projects in Institute for Transportation (InTrans), Iowa State University” on July 23, 2012.

Mr. C.M. Dordi, Vice President (Technical Services) Gujarat Ambuja Cements Ltd., delivered a lecture on “Ten Golden Rules of QA & QC of Concrete Works” on August 9, 2012.

Prof. Mandar M. Dewoolkar, University of Vermont, USA, delivered a lecture on “Some Aspects of Liquefaction Potential Evaluation and Residual Strength of Liquefiable Soils” on August 13, 2012.

Mr. C.M. Dordi, Vice President (Technical Services) Gujarat Ambuja Cements Ltd., delivered a lecture on “Correct Steps of Concrete Making” on August 27, 2012.

Shri Chandra Shekar Sharma, Fosroc India, Bangalore, delivered a lecture on “Repairs and Rehabilitation of Infrastructures” on October 4, 2012.

Dr. Deepak Datye, Senior Engineering Specialist for Civil Engineering at SIMULIA in Providence, USA, delivered a lecture on “Applications of Abaqus for Geo-Technical Applications” on October 29, 2012.

Prof. Pushkin Kachroo, Director Transportation Research Center, University of Nevada, Las Vegas,

delivered a lecture on “Feedback & Control for ITS Applications” on January 8, 2013.

Prof. K.S. Rao, Civil Engineering Department, IIT Delhi, delivered a lecture on “Static and Dynamic Stability Analyses of Chenab Bridge Abutments: 2D and 3D Case Studies” on January 28, 2013.

Dr. K. Seetharamulu, (Rtd.) Professor of IIT Delhi, delivered a lecture on “Conceptualization while Understanding Structures” on March 6, 2013.

Mr. K. Gifford Goodhue, Jr., Director of Technology & Business Development, KB International, delivered a lecture on “The Advantages & Benefits of Slurry Polymers & Additives for Foundation Projects” on March 22, 2013.

Prof. Chandrakant S. Desai, Regents’ Professor (Emeritus), University of Arizona, Tucson, AZ., USA, was at IIT Bombay as Distinguished Visiting Professor during January 1 - February 28, 2013. He delivered a lecture series at IIT Bombay during this period on “Constitutive Modeling for Engineering Materials” highlighting the significance in solution (computer) procedures.

Conferences/Symposia/Workshops/Seminars (participated/Papers Presented)

Bajoria K.M

Sixth International Conference on High Performance Structures and Materials, 2012 at New Forest, UK.

International Conference on Civil Engineering and Materials, Paris, France.

ICCEM-International Conference on Civil Engineering and Materials, July 7-8, 2012, Paris, France.

Balaji, R

Treasurer, Hydro-2013 Conference, IIT Bombay.

IIT Bombay and National Institute of Oceanography Workshop, March 7-8, 2013, NIO Goa.

Workshop on Climate and Drought, IITB-Purdue University, March 12-13, 2013, IIT Bombay.

Seminar on Emerging trends in development of marine infrastructure, February 28, 2013, DGNP, Mumbai.

Second International Workshop on Geosynthetics and Modern Materials in Coastal Protection and Related Applications, March 4-5, 2013, IIT Madras.

National Workshop on Integrated Coastal Zone Management and Planning, July 16-17, 2012, IIT Madras.

Workshop on Coastal and River Zone Management: Regulations and Development, IIT Bombay.

Banerjee, Sauvik

Participated and delivered invited lecture on “Assessment of Infrastructure Using Wave Propagation and Vibration SHM Techniques” at *IC-IMPACT: Canada-India Workshop on Building Healthy Communities*, February 21-22, 2013, Radisson Blu, Nagpur, India

Chandiramani, N. K.

Presented one invited paper and one contributed paper at *Fourth International Congress on Computational Mechanics and Simulation*, December 9-12, 2012, IIT Hyderabad.

Choudhury, D.

Participated and delivered an invited lecture as Humboldt Fellow on February 9, 2013, at International Humboldt Kolleg on *Management of Water, Energy and Bio-resources in Changing Climate Regime: Emerging Issues and Environmental Challenges (IHK-2013)*, February 8-9, 2013 at Jawaharlal Nehru University (JNU), New Delhi.

Participated and chaired Technical Session VI on January 11, 2013 at *4th International Seminar on Forensic Geotechnical Engineering (4ISFGE-2013)*, organized by Technical Committee TC 302 of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), January 10-12, 2013, Bengaluru.

Participated, delivered Keynote Lecture and chaired a Technical Session (3A) on a theme “Geotechnical Engineering” on December 20, 2012, at Structural Engineering Convention (SEC-2012), *8th Biennial Conference*, December 18-20, 2012 at SVNIT, Surat.

Participated, delivered an invited lecture at the *International Workshop on Seismic Requalification of Geotechnical Structures (SRGS)*, jointly organized by UK-India Education and Research Initiative (UKIERI), Indian Geotechnical Society (IGS), IIT Guwahati and IIT Delhi, India, December 17, 2012, IIT Delhi.

Participated and chaired a Technical Session 9D40 on a theme “Special Techniques of Earthquake Geotechnical Engineering and Dynamic Foundations” on December 15, 2012 at *Indian Geotechnical Conference (IGC-2012)*, organised by Indian Geotechnical Society (IGS), New Delhi, December 13-15, 2012, IIT Delhi.

Participated, delivered an invited lecture and co-chaired a Technical Session on November 1, 2012 during the *International Conference on Ground Improvement and Ground Control (ICGI-2012): Transport*

Infrastructure Development and Natural Hazards Mitigation, organised by Technical Committees TC 211, TC 214, TC 202 and TC 303 of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), October 30-November 2, 2012, Wollongong, Australia.

Participated, chaired Technical Session 7B on September 20, 2012 and conducted an international meeting of ISSMGE Technical Committee TC 212 Deep Foundations as the Secretary of this committee on September 19, 2012 at the *9th International Conference on Testing and Design Methods for Deep Foundations*, IS-Kanazawa 2012, organized by JGS, Technical Committees TC 212 and TC 205 of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), September 18-20, 2012, Kanazawa, Japan.

Attended meeting of Technical Committee TC 207 Soil Structure Interaction during *12th Baltic Sea Geotechnical Conference (12BC-2012)*, Infrastructure in Baltic Sea Region, organized by Technical Committee TC 207 of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) and German Geotechnical Society (DGGT), May 31 - June 2, 2012 at Rostock, Germany.

Participated, presented and co-chaired Technical Session 4 on "Performance Based Design in Geotechnical Earthquake Engineering" on May 28, 2012, at *2nd International Conference on Performance-Based Design in Earthquake Geotechnical Engineering (II PBD-2012)*, organized by Technical Committee TC 203 of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), held during May 28-30, 2012, Taormina, Italy.

Dasaka S. Murty

Fifth Asian-Pacific Symposium on Structural Reliability and its Applications (APSSRA), May 23-25, 2012, Singapore.

National Conference on Geosynthetics in Infrastructure, August 25-26, 2012, Hyderabad.

International conference on Ground Improvement and Ground Control (ICGI 2012), October 30-November 2, 2012, Wollongong, Australia.

Deo, M.C.

Chairman, *Hydro-2013 Conference*

Chairman, *IIT Bombay-Purdue University Workshop on Droughts*

Seminar on Emerging Trends in Development of Marine Infrastructure, February 28, 2013, DGNP, Mumbai

CSIR-NIO, Goa - *IIT-Bombay workshop*, February 7-8, 2013 at CSIR-NIO, Goa

Eldho T.I

National Conference on Emerging Vistas of Technology in 21st Century, April 14-15, 2012, GTU, Ahmedabad.

National Conference on Innovations in Civil Engineering, SCMS College of Engineering, April 19-20, 2012, Karukutty, Kerala.

Fifth National Conference on Recent Advances in Civil Engineering, November 29-December 1, 2012, Cochin, Kerala.

Organizing Secretary, *Hydro 2012*, IIT Bombay, *Conference on Hydraulics & Water Resources*, December 6-7, 2012.

Chaired a Session in *HYDRO2012 Conference*, IIT Bombay.

Chaired a Session in *Fifth National Conference on Recent Advances in Civil Engineering*, November 29 - December 1, 2012, Cochin, Kerala

Janga Reddy, M.

Served as Organizing Secretary of *IITB-Purdue Workshop on Droughts and Climate Change*, March 12-13, 2013, IIT Bombay.

Served as Joint-Organizing Secretary of *National Conference on Hydraulic and Water Resources (HYDRO 2012)*, December 7-8, 2012, IIT Bombay.

Jangid, R.S.

15th World Conference on Earthquake Engineering, Paper No. 1249, September 24-28, 2012, Lisbon.

Jothiprakash, V.

Basin Wise Studies for Impact of Climate Change on Water Resources, Central Water Commission, Ministry of Water Resources, February 6, 2012.

Workshop on Basin Management Studies with reference to the Climate Change, SVNIT, Surat, April 27, 2012

II Indo-Italian Workshop on Advances in Fluvial Hydraulics and Water Resources Development and Management, Venice, Italy, July 19-20, 2012.

17th National Conference on Hydraulics, Water Resources, Coastal and Environmental Engineering, HYDRO-2012, Indian Institute of Technology Bombay, Mumbai, November 7-8, 2012.

International Conference on Civil Engineering & Infrastructural Issues in Emerging Economies, SASTRA, Thanjavur, February 27-28, 2013.

Indian Institute of Technology Bombay and National Institute of Oceanography Workshop, NIO Goa, March 7-8, 2013

Workshop on Climate and Drought, IITB-Purdue University, IIT Bombay, March 12-13, 2013.

Krishna Rao K.V.

As a deputed member from the Institute, attended *CUSP Partners Workshop* held during October 15-17, 2012 at Kimmel Center, New York, New York

Attended and presented a paper at the *conference CODATU XV* (Theme: The role of urban mobility in (re) shaping cities.) held during October 22-25, 2012 at Addis Ababa, Ethiopia

One of the organisers (Chairman) of the *International Conference on Transportation Planning and Implementation Methodologies for Developing Countries* (10th TPMDC-2012), December 12-14, 2012, IIT Bombay, India.

Mandal, J. N.

International Conference State of the Art and Practice in Geotechnical Engineering, Geo congress -2012, ASCE, March 25-29, 2012, Oakland, CA, USA.

5th Asian Regional Conference on Geosynthetics, Geosynthetics Asia- 2012, December 13-15, 2012, Bangkok, Thailand.

Keynote lecture - *Proceedings of First National Conference in the Emerging Vistas of Technology in 21st Century NCEVT12*, April 14-15, 2012, Ahmedabad, 103-114.

Patil, G. R.

92nd Transportation Research Board Annual Meeting, Washington D. C., January 2013.

National Conference on Urban Mobility Challenges, Solutions, and Prospects, IIT Madras, July 2012

Recent Advances in Civil Engineering RACE2013, KLE Societys M. S. Sheshgiri College of Engineering, Belgaum, May 2013

Rao, E.P

Participated in *2012 International SWAT Conference* and presented a paper at New Delhi, India, July 18-20, 2012.

Tom V. Mathew

International Conference on Transportation Planning and Implementation Methodologies for Developing Countries (10th TPMDC-2012), December 12-14, 2012, IIT Bombay.

Vedagiri, P.

92nd Annual Meeting of Transportation Research Board, January 13-17, 2013, Washington DC, USA.

National conference on Urban Mobility Challenges, Solutions and Prospects, July 13-14, 2012, IIT Madras.

National workshop on Using Science and Data in Road Safety and Management, February 15-16, 2013, IIT Madras.

National Workshop on “Sustainable Transportation for Indian Cities (STIC 2013)”, March 22, 2013, CSIR-CRRI, New Delhi.

One of the organisers (Co-ordinator) of the *International Conference on Transportation Planning and Implementation Methodologies for Developing Countries* (10th TPMDC-2012), December 12-14, 2012, IIT Bombay.

Organised the *4th National Civil Engineering Students Symposium (AAKKAR)*, March 9, 2013, Civil Engineering Association, IIT Bombay. (CEA Faculty in-Charge)

Viswanadham, B.V.S.

International Seminar on Centifuge modelling organized by K-water, Daejeon, Korea, during December 12-13, 2012.

First Asian Workshop on Physical Modelling in Geotechnics, Asiafuge 2012, November 14-16, 2012.

Geoapps, organised by Indian Geotechnical Society Hyderabad Chapter during March 16, 2013, IIIT Hyderabad.

Invited Lectures

Balaji, R.

“Wave-structure Interaction: Beyond Regular and Random Waves” in the one-day *Workshop on Offshore Structures & Sacs Applications*, April 2, 2013 at IIT Bombay.

“Tides and Currents: A friend or foe for coastal engineers?” in the *National Workshop on ICZM* held during July 16-17, 2012 at IIT Madras.

Chandiramani, N. K.

“Acceleration/Drift Feedback Control of MRD Connected Buildings, Computational Solid Mechanics session SOM 11”, *Fourth International Congress on Computational Mechanics and Simulation*, IIT Hyderabad, December 9-12, 2012

Choudhury, D.

“Need for research on Geotechnical Earthquake Engineering and Research Ethics”, on March 25, 2013, at Gujarat Technological University (GTU), Gandhinagar, Gujarat.

“Some Studies on Static and Seismic Stability of Embankments”, one-day *Seminar on Embankments: Design and Construction*, jointly organized by Indian Geotechnical Society Chennai Chapter and IIT Madras, Chennai, March 9, 2013.

“Role of Combined Pile-Raft Foundation and Energy Pile in Climate Change Piles through Dynamically Liquefied Soil”, at *International Humboldt Kolleg (IHK-2013)*, organized by Jawaharlal Nehru University (JNU), New Delhi, and supported by Alexander von Humboldt Foundation, Bonn, Germany, February 9, 2013..

“Advances in Seismic Design Issues of Various Geotechnical Structures”, jointly organized by Indian Geotechnical Society (IGS), Kolkata Chapter and Department of Civil Engineering, Jadavpur University, Kolkata, India, January 5, 2013.

Keynote lecture on “Advanced Design Issues of Various Geotechnical Structures Under Earthquake Conditions”, organized by Applied Mechanics Department of Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat, India, December 20, 2012.

“Seismic Behaviour of Earth Retaining Structures and Design Issues”, *UKIERI International Workshop on Seismic Requalification of Geotechnical Structures (SRGS)*, jointly organized by UK-India Education and Research Initiative (UKIERI), Indian Geotechnical Society (IGS), IIT Guwahati and IIT Delhi, India, December 17, 2012.

“Modern Design Techniques for Reinforced Soil-Walls to Mitigate Seismic and Tsunami Hazards”, International Conference on Ground Improvement and Ground Control : Transport Infrastructure Development and Natural Hazards Mitigation (ICGI 2012), jointly organized by Centre for Geomechanics & Railway Engineering, and SMART Infrastructure Facility, University of Wollongong, NSW, Australia, ISSMGE TC 211, TC 214, TC 202, TC 303, October 31, 2012.

As panel member for session 11 (Physical Sciences) on the topic “Research and Developments at IIT Bombay : Advances in Earthquake Engineering”, *Indo-Global Education Summit & Expo 2012*, organized by The Indus Foundation, USA and India, on September 8, 2012, Hyderabad.

Dasaka S. Murty

Workshop on Emerging Trends in Geotechnical Engineering (ETGE 2012), June 8, 2012, IIT Guwahati.

Eldho, T.I.

“Integrated Sustainable Water Resources Management & Scope of Modern Techniques”, *International Conference on “Sustainable Development and Governance(ICSDG): Building Commerce and Communities”*, Amrita University Coimbatore, December 13, 2012.

Keynote lecture on “Indias Water Resources and Climate Change”, *National Conf. on Innovations in Civil Engineering*, SCMS College of Engineering, Karukutty, Kerala, April 19, 2012.

“Integrated Water Resources Management Necessity of Cooperation and Sharing”, Indian Water Works Association, World Water Day Celebration, March 21, 2013.

“Coastal Hydrodynamics and Transport Modeling Using FEM”, *Workshop on Marine Environmental Modeling*, NIO Goa IIT Bombay, March 7, 2013, NIO Goa.

“Integrated Coastal Urban Flood Modelling Using Numerical Models, GIS & Remote Sensing”, Dept. of Civil Engg., Anna University, November 20, 2012.

“Hydro-Geological Aspects of Rain Water Harvesting”, and “Rainwater Harvesting & Roof Catchment System”, Dept. of Civil Engg., NIT Bhopal, Rainwater Harvesting Course, January 12, 2013.

“Applications of GIS & Numerical Methods for Watershed Modeling”, and Mathematical Modeling of Water Resources Systems, Dept. Civil Engg., College of Engineering, Trivandrum, May 28, 2012.

“Watershed Modeling Using Numerical Methods, GIS and Remote Sensing”, Dept. of Civil Engg., College of Engineering, Trivandrum, May 29, 2012.

Gupta Kapil

“Urban Flooding and Climate Change”, National Water Academy, Khadakwasla, Pune, May 2, 2012.

Inamdar, M.

Sub-cellular, Single and Collective cell Modeling: Mechanics across Cell-scales. Cell Mechanics Meeting, RRI, Bangalore.

Modeling Collective Cell Migration in Epithelial Sheets: How far can simple mechanics take us?, Physics Colloquium, IIT Kanpur.

“Force Production in Curling Filaments: Application to Microtubule Protofilaments”, *PhysCell2012*, Hyeres, France, Poster (2012).

“Modeling Collective Cell Migration in Response to Wound Healing”, *International Conference on Mathematical and Theoretical Biology*, Pune.

Jothiprakash, V.

“Introduction to Basic Knowledge of Hydrology-needed for Rainwater Harvesting”, *CEP Course on Rainwater Harvesting and Sustainable Water management*, IIT Bombay, on March 30, 2012.

“Water Management Studies in a run-off river basin”, *Workshop on Basin Management Studies*, SVNIT, Surat on April 27, 2012.

“Reservoir Inflow Modeling Using Artificial Intelligence Techniques and its Use in Real Life”, *II Indo-Italian Workshop on Advances in Fluvial Hydraulics and Water Resources Development and Management*, Venice, Italy, July 19, 2012.

“Genetic Algorithms for Reservoir Operating Policies”, *TEQIP - STTP on Genetic Algorithm and Neuro Fuzzy Applications in Engineering (GANEUF AE-2012)*, Government Engineering College, Aurangabad, December 20, 2012.

“Real Time Reservoir Inflow Forecasting Using ANN”, *TEQIP - STTP on Genetic Algorithm and Neuro Fuzzy Applications in Engineering (GANEUF AE-2012)*, Government Engineering College, Aurangabad, December 20, 2012.

“Multi-Reservoir Inflow Prediction Using Soft Computing Techniques”, *TEQIP - STTP on Genetic Algorithm and Neuro Fuzzy Applications in Engineering (GANEUF AE-2012)*, Government Engineering College, Aurangabad, December 21, 2012.

“Water Resources Management Scenario in India”, *National Workshop on Recent Advances in Water Resources Management*, Department of Civil Engineering, Maulana Azad National Institute of Technology Bhopal, January 31, 2013.

“Introduction to Water Resources Systems Modelling Techniques”, *National Workshop on Recent Advances in Water Resources Management*, Department of Civil Engineering, Maulana Azad National Institute of Technology, Bhopal, January 31, 2013.

“Time series modeling using soft computing Techniques”, *International Conference on Civil Engineering & Infrastructural issues in Emerging Economies*, SASTRA, Thanjavur, February 27-28, 2013.

“Motivating the Civil Engineering Students with Recent Developments and Future Scope in Civil Engineering,” *AMACE*, February 26, 2013, Kancheepuram, Tamil Nadu.

“Nonlinear Dynamic Analysis of Oceanographic parameters - A Chaotic Approach”, *Indian Institute of Technology Bombay and National Institute of Oceanography Workshop*, March 7-8, 2013, NIO Goa.

“Meteorological Drought Assessment in Agniar River Basin”, *IITB-Purdue University Workshop*, March 13, 2013, IIT Bombay,

Juneja, A.

Lecture on “Embankment failure in residual soils of western coast of India”, *Symposium on Geotechnical Practices*, JNTU Hyderabad, November 2012.

Lecture on “Liquefaction and Cyclic Mobility of Sands Injected with Air Bubbles”, in the Civil Engineering Department, Kasetsart University, Bangkok, May 2012.

Krishna Rao K.V.

“Planning of Mass Rapid Transit Systems in Indian Context”, *Conference on Urban Infrastructure*, organised by Nashik Center of Association of Consulting Civil Engineers (ACCE) on July 13-14, 2012, Nashik, Maharashtra.

“Flexible Pavement Design” at the *2nd PMGSY Training Course* organised as a CEP course at IIT Bombay, August 24-26, 2012.

“Sustainable Urban Transportation Planning Through Transit Oriented Development”, *National Conference on Transportation Infrastructure Needs and Challenges in India (TINCH)*, October 11-12, 2012, Department of Civil Engineering, Osmania University College of Engineering, Hyderabad, India.

“Sustainable Urban Transportation Planning Through Transit Oriented Development”, *International Conference on Transportation Planning and Implementation Methodologies for Developing Countries (TPMDC)*, December 12-14, 2012, IIT Bombay, India.

Patil, G. R.

“Real Time Traffic Counting System using Video Image Processing”, *National Conference on Urban Mobility Challenges, Solutions, and Prospects*, IIT Madras, July 2012.

Prakash, Nanthagopalan

“Sustainable Development from Efficient Utilisation of Resource”, organised by L&T, Mumbai on (World Environment Day) June 5, 2012.

“Design of Cementitious Paste and Concrete: A conceptual approach”, KSR college of Engineering, Tiruchengode, Tamil Nadu on March 8, 2013.

“Sustainable Development in Construction: The way Forward”, *National level Technical Symposium* held in NSN College of Engineering and Technology, Karur, Tamil Nadu, March 9, 2013.

RAAJ Ramsankaran

“Terrestrial Laser Scanning and its Applications” in the ISRO-sponsored one-week *Special Course on Lidar Data Processing and Applications*, National Remote Sensing Center, Hyderabad, November 19-23, 2012.

Invited speaker in the DST, DRDO and CSIR-sponsored *International Meet on the Impacts of Climate Change on Water*, Karunya University, Coimbatore. August 17-18, 2012.

Rastogi, A.K.

Groundwater Modeling of Large Aquifer System for Sustainable Development delivered at *TERI Business Council for Sustainable Development*, hosted by LAFARGE, October 9, 2012, Mumbai.

“Solute Transport Modeling by Finite Element Method” Invited Expert Lecture delivered at Remediation Technology and Modeling of Assessment of Groundwater Contamination - (January 21-25, 2013) Residential Program sponsored by Central Pollution Control Board NewDelhi, conducted at NGRI Hyderabad, January 21, 2013.

Viswanadham, B.V.S.

“Studies on the Performance of Hybrid Geosynthetic Reinforced Slopes” was delivered at Korean Advanced Institute of Science and Technology, Daejeon, Korea, December 10, 2012.

“Centrifuge Model Studies on Slope Protection Systems” at K-Water, Daejeon, Korea, December 13, 2012.

“Centrifuge Modeling of Earthen Dams” was delivered on July 7, 2012 at Training Programme for Irrigation Engineers at IIT Bombay.

“Use of Geosynthetics in Earthen Dams” was delivered on July 7, 2012, at Training Programme for Irrigation Engineers at IIT Bombay.

Significant Awards/Distinctions**Bajoria, K.M**

“Excellent Research Paper Award” for the research paper by K M Bajoria and P A Jadhav (2012) titled: “Buckling of Simply Supported Piezoelectric FGM Plates Subjected to Electro-Mechanical loading using Higher-order Shear Deformation Theory”, *International Conference on Civil Engineering and Materials*, Paris, France.

Choudhury, D.

Adjunct Professor, since January 2013, at the Academy of Scientific and Innovative Research (AcSIR), New

Delhi, connected to CSIR, Central Building Research Institute (CBRI), Roorkee, India.

INAE Young Associate, since January 2013, given by Indian National Academy of Engineering, New Delhi, India.

Deo, M.C.

Fellow, Indian National Academy of Engineering (INAE).

The most cited author in Civil Engineering from India as per Google Scholar (~1400, Nov. 2012)

Dharamveer Singh

“Marquis Whos Who in America”, USA, 67th Edition, 2013

Gupta Kapil

The “UKIERI (British Council) Visiting Fellowship Award” by the University of Exeter, Exeter, U.K., December 2012

Inamdar, M.

The “Innovative Young Biotechnologist Award (IYBA) for the Year 2012” by the Department of Biotechnology, Ministry of Science & Technology, Government of India.

Jothiprakash, V.

Received the “Dr. P.K. Patwardhan Technology Development Award, 2011” from Indian Institute of Technology Bombay during Teachers Day celebrations on September 5, 2012.

Juneja, A.

Received the “Excellence in Teaching Award”, Indian Institute of Technology Bombay, during Teachers Day celebrations on September 5, 2012.

Received the “Best paper Award on Instrumentation” from the Indian Geotechnical Society during the IGC 2012, New Delhi.

Krishna Rao K.V.

Received the “Excellence in Teaching Award”, Indian Institute of Technology Bombay, during Teachers Day Celebrations on September 5, 2012.

RAAJ Ramsankaran

DST INSPIRE Faculty Award 2012

Subimal Ghosh

Young Scientist Award 2012 from Indian National Science Academy (INSA) in Engineering and Technology.

Young Investigator Award 2012 from Industrial Research & Consultancy Centre, Indian Institute of Technology Bombay, Mumbai.

Honorary Work

The faculty of the department served in various capacities as follows:

Balaji, R.

Reviewed papers for: Journal of Engineering Applications of Computational Fluid Mechanics, ISH Journal of Hydraulics Research and International Journal of Ocean and Climate Systems.

Technical Review Committee Member, 5th Indian National Conference on Harbour and Ocean Engineering, February 5-7, 2013, NIO, Goa.

Banerjee, Sauvik

Reviewed technical papers for international journals: Journal of Nondestructive Evaluation, Nondestructive Testing and Evaluation, Journal of Sound and Vibration, International Journal of Advanced Structural Engineering.

Chandiramani, N. K.

Reviewer for: Journal of Sound and Vibration; ASME Journal of Dynamic Systems, Measurement and Control; Structural and Multidisciplinary Optimization, Applied Mathematical Modeling.

Choudhury, D.

Managing/Handling Editor for the June 2012 issue (Volume 6, Issue 3) of ISSMGE Bulletin, published by International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), London, U.K.

Editorial Board Member of 'ISSMGE Bulletin', published by International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), London, U.K.

Editorial Board Member of the following Journals: (i) Disaster Advances (*ISSN: 0974-262X*) (Quarterly Journal); SCIE and SCOPUS indexed with Impact Factor 0.692, published from India; (ii) Indian Geotechnical Journal (*ISSN: 0046-8983*) (Quarterly Journal), Springer, SCIE and SCOPUS indexed, published by Springer in association with Indian Geotechnical Society, New Delhi, India; (iii) International Journal of Geotechnical Earthquake Engineering (IJGEE) (*ISSN: 1947-8488*) (Semi-Annually Journal), IGI publishing; (iv) Electronic Journal of Geotechnical Engineering (EJGE) (*ISSN: 1089-3032*), SCOPUS indexed, published from USA; (v) Journal of Civil Engineering and Science (JCES) (*ISSN: 2227-4634*), SCOPUS indexed, published from USA; (vi) Journal Dataset Papers in Geosciences (*ISSN: 2314-5323*), SCOPUS indexed, published from USA; (vii) ISRN Civil Engineering Journal (*ISSN: 2090-5114*), SCOPUS indexed, published from USA; and (viii) The Scientific World Journal, Civil Engineering, published by Hindwai Publishing Company.

Reviewer of several papers from various Geotechnical Engineering and Earthquake Engineering international and national journals.

Reviewer for (i) GeoCongress 2013, Annual Conference of Geo-Institute, ASCE, March 3-6, 2013, San Diego, CA, USA organized by Geo-Institute, ASCE, USA; (ii) Indian Geotechnical Conference (IGC-2012), December 13-15, 2012, IIT Delhi, India, Annual Conference of Indian Geotechnical Society, New Delhi.

Reviewer for sponsored research project proposals of 2012 for The Portuguese Foundation for Science and Technology (FCT), Lisbon, Portugal.

Reviewer for NPTEL Phase-II web courses on "Ground Improvement" and "Advanced Geotechnical Engineering" developed by IIT Kanpur.

Technical Committee Member, Reviewer for The 9th International Conference on Testing and Design Methods for Deep Foundations (IS Kanazawa 2012) during September 18-20, 2012, Kanazawa, Japan, jointly organized by Japanese Geotechnical Society (JGS), International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) and Kanazawa University.

International Scientific Committee Member, Second International Conference on Performance-Based Design in Earthquake Geotechnical Engineering during May 28-30, 2012, Taormina, Italy, jointly organized by International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) Technical Committee TC 203, European Technical Committee ERTC-12 on Application of Eurocode 8 and Italian Geotechnical Society.

Member of Award Nomination Committee of 'Unsaturated Soils' Technical Committee of Geo-Institute, American Society for Civil Engineers (ASCE), Reston, VA, USA. Secretary and one of the Key Members of the Technical Committee TC 212 Deep Foundations of International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), UK to develop International ISSMGE Guidelines for Combined Pile-Raft Foundations technical document/code.

Member of International Building Code (IBC) Review Committee for IBC 1808 on 'Foundations'. Member of Technical Committee on Earthquake Engineering and Soil Dynamics of Geo-Institute of American Society of Civil Engineers (ASCE), USA.

Member of Technical Committee TC 203 - *Earthquake Geotechnical Engineering* of International Society of Soil Mechanics and Geotechnical Engineers (ISSMGE), U.K.

Reviewer and Expert Member for M.Tech. & Ph.D. thesis evaluation during Research Week of Gujarat Technological University (GTU), Gandhinagar, Gujarat, India.

Selection Committee Member and Mentor for INSPIRE Student Award Programme of Department of Science and Technology (DST), New Delhi, Government of India.

Academic Expert Member of the Subject Board of UG and PG Courses of the Department of Civil and Environmental Engineering, Veermata Jijabai Technological Institute (VJTI), Mumbai.

Expert Member of the Board of Courses and Studies (BOCS) for 4-year B.Tech. course of the Department of Civil Engineering, Indian School of Mines, Dhanbad nominated by the Director of ISM, Dhanbad.

Model Question Paper Setter for Civil Engineering Discipline for the Maharashtra Public Service Commission (MPSC), Govt. of Maharashtra. Syllabus Setter for Civil Engineering Discipline and Expert Member for the Union Public Service Commission (UPSC), Govt. of India.

Examiner for Ph.D. thesis from University of Technology Sydney (UTS), NSW, Australia, and Ph.D. thesis from IIT Delhi, IIT Roorkee, IISc Bangalore, Visvesvaraya Technological University (VTU) of Belgaum (Karnataka), Jadavpur University of Kolkata. Also, Examiner for M.S. thesis from IIIT Hyderabad.

Dasaka S. Murty

Reviewed Ph.D. thesis submitted to NIT Surat and JNTU Hyderabad. Reviewed research papers submitted to Indian Geotechnical Journal and Soils and Foundations.

Deo, M.C.

Chief Editor, International Journal of Ocean and Climate Systems, Multi-Science Publ., UK; Associate Editor of ASCE Journal of Computing in Civil Engg.; Chairman, Editorial board of ISH Journal of Hydraulic Engineering, Taylor and Francis, UK.

Member of: Maharashtra Coastal Zone Regulation Authority (2012~), Hydrology Project Group, Govt. of Maharashtra; Governing Council, Central Water and Power Research Station; Technical Advisory Committee, Central Water and Power Research Station; Technical Advisory Council, National Institute of Ocean Technology; Project Management Board, National Institute of Ocean Technology; World Bank Consultant for an Institutional Review; Editorial Board, Applied Ocean Research, Elsevier, UK; Editorial Board, International Journal of Ships & Offshore Structures, Taylor & Francis; Editorial Board, Open Ocean Engineering Journal, Bentham Press, UK; Editorial

Board, Journal of Advances in Civil Engineering, Hindawi Pub., New York.

Reviewed a large number of national and international journal papers.

Reviewed Project Proposals from Professors of Oxford and other British universities, sent by UK Research Council.

Desai, Y.M.

Reviewer for PhD / MTech dissertations for candidates from various IITs, NITs, universities.

Reviewer of papers for various international and national journals.

Eldho TJ

Chairman, Board of Governors, IHRD College of Engineering, Adoor, Govt. of Kerala; Associate Editor of International Journal of Ecology and Development; Editor-in-Chief of the Journal "International Journal of Water Resources and Environmental Management" published by Research Science Press; Associate Editor ISH Journal of Hydraulic Engineering, Taylor & Francis; Editor, Journal of Civil Engineering & Sciences; Referee Ph.D. Thesis: IIT Madras, IIT Delhi, IIT BHU, Anna University; Technical Review Committee Member of ICAR, Rubber Dam project implemented by Indian Rubber Manufacturing Research Association, Thane; Organizing Secretary of *Hydro2012*, held at IIT Bombay.

Reviewed Project proposal for DST, New Delhi, 2012-13; Convenor, UGAPEC, IIT Bombay; Technical Review Committee Member, International Conference, Recent Advances in Engineering, Technology and Management, S.P. College of Engineering, Mumbai, May 2012; Technical Review Committee Member, International Conference, on SWAT, IIT Delhi, 2012; Member, Board of Studies, S.P. College of Engineering, Mumbai, 2012-13; Technical Advisory Committee Member of Water Supply & Rainwater Harvesting, MCGM, Mumbai.

Gupta Kapil

Member, UNESCO Working Group: Sustainable Urban Water Strategies, VII IHP, 2008-2013; Member, Editorial Board, Urban Water Journal; National Member, Urban Flooding Expert Committee, National Disaster Management Authority, Government of India; Member, Expert Committee on drafting the "Urban Drainage Manual", CPHEEO, Ministry of Urban Development, Government of India.

Janga Reddy, M.

Reviewed technical papers for journals: Journal of Hydrologic Engineering (ASCE); Hydrological Science Journal; Water Resources Management, Journal of Hydrology, Environmental Modeling and Software; Water Management Journal, Journal of Earth Science

and Systems, Applied Soft Computing; Journal of Hydroinformatics, Journal of Water Resources Planning and Management,

Jangid, R.S.

Reviewer for research papers of Advances in Structural Engineering; ASCE Journal of Structural Engineering; Bulletin of Earthquake Engineering, Earthquake and Structures, Engineering Structures; International Journal of Physical Sciences; International Journal of Structural Stability and Dynamics; Journal of Engineering for the Maritime Environment; Journal of Seismology and Earthquake Engineering; Journal of Sound and Vibration; Journal of Vibration and Control, Marine Structures, Mechanical Systems and Signal Processing, Structural Control and Health Monitoring, Soil Dynamics and Earthquake Engineering; Proceedings of the Institution of Mechanical Engineers; Part M. Structural Engineering & Mechanics, Sadhana; Academy Proceedings in Engineering Science, Scientific Research and Essays; and The Open Ocean Engineering Journal.

Member of Editorial Boards: The Open Ocean Engineering Journal, The Open Construction and Building Technology Journal, Earthquakes and Structures Journal.

Independent Director, ETC Network Limited.

Jothiprakash, V.

Evaluated Ph.D. thesis from NIT Surathkal; MNIT Jaipur; SVNIT Surat; Anna University and IIT Kanpur.

Member of: Interdisciplinary Programmes Committee (Centre for Urban Science and Engineering-(C-USE)) for the year 2013; National Service Scheme (NSS) Coordinator, IIT Bombay; and Executive Council Member (2012-2014) Indian Society for Hydraulics, Pune.

Juneja, A

Reviewer for-DST funded project proposals; international journal papers of high impact factor (e.g. Geotechnical Testing Journal, ASTM; Journal of Materials in Civil Engineering, ASCE; Ground Improvement, ICE; Soils and Foundations, JGS; Canadian Geotechnical Journal, NRC Research Press)

Core-member ATC-18 “Deep excavations and Mega Foundations” of ISSMGE

Member TC 305 “MegaCities” of ISSMGE

Member International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE)

Member American Society of Civil Engineers (ASCE)

Life Member Indian Geotechnical Society (IGS)

Life Member Indian Roads Congress (IRC)

Krishna Rao K.V

Member of the Technical Advisory Committee for the project “Capacity Augmentation Work of Mumbai-Pune

Corridor”, appointed by MSRDC, Maharashtra Government, Mumbai

Mandal, J.N.

Editorial board member of: Journal of Civil Engineering (JCE) under International Academy of Science and Technology; International Journal of Structural and Civil Engineering Research (IJSCER); International Journal of Research in Engineering and Technology (IJRET).

Reviewer of: Indian Geotechnical Journal (IGJ), DST Research Proposal, NPTEL Phase-2 Video course.

Patil, G. R.

Coordinator for the 10th Transportation Planning and Implementation Methodology for Developing Countries (TPMDC), organized at IIT Bombay in December 2012.

Session Chair at *National Conference on Recent Advances in Civil Engineering RACE 2013*, organized by KLE Societys M. S. Sheshgiri College of Engineering, Belgaum in May 2013

Paper reviewed for *Journals*: Transportation Research Record, Network and Spatial Economics, European Journal of Operations Research, International Journal of Advances in Engineering Sciences and Applied Mathematics.

Prakash, Nanthagopalan

Reviewer for Indian Concrete Institute; KSCE Journal of Civil Engineering; CSIR - Extra Mural Research; Indian Journal of Engineering and Material Science; Academy Proceedings in Engineering Science.

Technical Review Committee Member, International Conference on Rehabilitation and restoration of structures, IIT Madras.

Review of Ph.D. thesis from Jawaharlal Nehru Technological University Kakinada.

RAAJ Ramsankaran

Reviewer of: Journal of Indian Society of Remote Sensing and Journal of Hydrology and Hydromechanics.

Raje, D

Reviewer of: Hydrological Sciences Journal, Water Resources Management, Journal of Water and Climate.

Rao, E.P

Reviewer of: Journal of Hydro-environment Research, The Arabian Journal for Science and Engineering, The Institution of Engineers (India)

Rastogi, A.K.

Directors nominee as Expert in the Faculty Selection Committee, Dept. of Civil Engg., MANIT, Bhopal.

Vice-Chancellors Nominee as Expert in the Faculty Selection Committee in the Centre for Water Engineering and Management, Central University of Jharkhand, Ranchi.

Boards Nominee as Expert in the Faculty Selection Committee, Dept. of Hydrology, IIT Roorkee.

Expert, National Board of Accreditation, to assess M. Tech. Programme of Hydraulic Engineering, College of Engineering, Trivandrum.

Reviewer of: DST research proposal “Delineation of salinity intrusion in selected districts of the Malabar Coast of Kerala and feasibility studies on its alleviation through strategic management of inland fresh water resources, “Delineation of Fresh - salt water interface for the coastal aquifer along Coramandel coast confined between Nagapattinam and Kodiyakkara using combined Geo electrical and Geo magnetic surveys and Hydro chemical methods; “ Performance studies of electrokinetic process for remediation of soil contaminated with heavy metal”; “Groundwater Seepage and its Impact in Chilika Lagoon and Near Shore Area in Orissa State”; “Delineating physico-chemical dynamics of discharging groundwater to sea in coastal areas of the Bay of Bengal”.

Reviewer, Indian National Committee on groundwater research proposal “Spatio-Temporal Modeling of Groundwater Quality using Artificial Neural Network”, Proposal for 3rd GEM IITD IndoFrench Research Seminar, IndoFrench Centre for the Promotion of Advanced Research, Proposal entitled “Development of multi-objective optimization model for conjunctive use of surface and groundwater resources considering climate change impacts”.

Member of the following committees: Advisory Committee, Dept. of Civil and Environment Engineering, VJTI, Mumbai; Board of Studies of Dept. of Civil and Water Management Engineering, SGGS; Institute of Engineering and Technology, Nanded; Expert Panel, Indian National Committee on Groundwater, Govt. of India; Expert Panel, Indian National Committee on Hydraulics, Govt. of India; External Expert on Research and Recognition Committee for the Board of Studies, Civil Engineering, appointed by the Vice Chancellor, University of Mumbai; Member National Scientific Advisory Committee, Fifth International Groundwater Conference - IGC 2012; Member Technical Programme Committee, International Conference on Green Technologies ICGT 2012;

Main convener of the session: Groundwater Systems Planning and Management; also Chaired the session in AOGS AGU 2012 Joint Assembly held at Singapore, August 13-17, 2012; Delivered a key-note address entitled “Role of Inverse Modeling in Groundwater System Simulation” in *Fifth International Groundwater Conference IGWC2012*, held at Aurangabad, December 18-21, 2012; chaired the

session: “Models and its Application in Groundwater Management” Theme V in *Fifth International Groundwater Conference IGWC 2012*, held at Aurangabad, December 18-21, 2012.

Singh D.N

Launched a new journal and became its Editor-in-Chief: Environmental Geotechnics, ICE Publishing, London, UK

<http://www.editorialmanager.com/envgeo/>

Subimal Gosh

Editorial board member of the Scientific World Journal. Reviewer of: Intergovernmental Panel on Climate Change Assessment Report five reports (Working Group II); Journal of Geophysical Research; Water Resources Research; Journal of Hydrology; Geophysical Research Letters; Climatic Change; Journal of Hydrologic Engineering etc.

Tom V. Mathew

Member, Research Council, National Transportation Planning and Research Centre, NATPAC, Trivandrum, Kerala (2013)

One of the organisers of the International Conference on Transportation Planning and Implementation Methodologies for Developing Countries (10th TPMDC-2012), held during December 12-14, 2012, IIT Bombay, India.

Viswanadham, B.V.S.

Guest Editor(s): For a special issue on Physical Modelling in Geotechnics of Geotechnical Engineering Journal of the SEAGS & AGSSEA.

Chairman, Asiafuge-2012, the First Asian Workshop on Physical Modelling in Geotechnics, November 14-16, 2012.

Reviewer for papers in the following journals: ASCE Journal of Hazardous Toxic, and Radioactive Waste Management; ASCE Journal of Materials in Civil Engineering; ASCE Journal of Geotechnical and Geoenvironmental Engineering; Geotextiles and Geomembranes; Geosynthetics International; International Journal of Physical Modelling in Geotechnics, Indian Journal of Geosynthetics and Ground Improvement; Indian Geotechnical Journal, Ground Improvement Journal, Soils and Foundations Journal, Sadhana Journal, Waste Management Journal.

Visiting Professors

Prof. Chandrakant S. Desai, Regents’ Professor (Emeritus), University of Arizona, Tucson, AZ, USA, was at IIT Bombay as Distinguished Visiting Professor during January 1- February 28, 2013. He delivered a lecture series at IIT Bombay during this period on “Constitutive Modeling for Engineering Materials”

highlighting the significance in solution (computer) procedures.

Faculty Members and their Specializations

1. Ajit Srividya

Structural reliability, Optimization, Quality systems

2. Avijit Maji

Highway planning, Geometric design, Innovative intersection/interchange design, Traffic operations

3. K.M Bajoria

Structural engineering: Computer aided design, Non-linear analysis, Nuclear structures.

4. P. Banerji

Structural engineering: Earthquake analysis, Risk assessment, Artificial neural networks, Nuclear structures.

5. Sauvik Banerjee

Structural Engineering: Structural and solid mechanics, Ultrasonic wave propagation in solids, Non-destructive quality evaluation of composites, Structural health monitoring, Dislocation mechanics, Multiscale materials modeling.

6. R. Balaji

Ocean/coastal engineering, Coastal structures, Modeling of coastal processes.

7. N. K. Chandiramani

Active vibration control, Nonlinear dynamics, Stability; Computational mechanics; Solid mechanics.

8. D. Choudhury

Geotechnical Engineering: Geotechnical earthquake engineering, Earth retaining structures, Slope stability, Anchor, Pile, Bearing capacity problems, Earth dams, Seismic effects on reinforced soil-wall, Dynamic soil-structure interaction problems, Tsunami resistant design of waterfront structures, Seismic behavior of Landfills, Seismic Ground Characterization, Behavior of Subgrade soil under cyclic railway and airways loads, Soil dynamics, Machine foundations, GIS-GPS based hazard analysis, Soil liquefaction, Seismic microzonation, Centrifuge modeling, Numerical and analytical modeling of geotechnical problems.

9. Dasaka S. Murty

Geotechnical Engineering: Site investigation, Stability of shallow and deep foundations, Reliability-based design, Ground improvement, Landfill engineering and modeling of soil and rock.

10. M.C. Deo

Ocean Engineering: Random data analysis using artificial intelligence techniques, Neural networks,

Genetic programming, Model trees, Locally weighted learning, Support vector machines, Soft computing, Data mining, Statistical and stochastic analysis, Hydrology (random data analysis using soft computing tools)

11. Y.M. Desai

Structural Engineering: Wind induced vibrations, Computational mechanics, Nonlinear analysis, Finite elements, Parallel computing, Fiber reinforced polymer composites, Composites in construction.

12. D.M. Dewaikar

Geotechnical Engineering: Offshore foundations, Ground improvement, Seepage.

13. Dharamveer Singh

Characterization of pavement materials (asphalt, hot mix asphalt, soil, and aggregates), Recycled asphalt mixes, Warm mix asphalt, Locally available materials, Stabilization of soil and aggregates, Intelligent asphalt compaction, Constitutive modeling of pavement materials, Simple performance tests (rutting, fatigue, dynamic modulus) on asphalt mixes, Pavements (flexible and rigid) design and evaluation, Forensic investigation of pavements, Pavement maintenance and rehabilitation

14. S.L. Dhingra

Transportation Systems Engineering: Modeling, Simulation, Economics, Environmental impact assessment, GIS, Expert systems, Artificial intelligence, Genetic algorithms, Fuzzy set theory.

15. T.I. Eldho

Water Resources Engineering: Groundwater flow, pollutant transport, remediation numerical & experimental investigations, computational fluid dynamics Incompressible viscous flows, Shallow water flow, Estuary dynamics, Pollutant transport watershed management applications of numerical models Geographical information systems, Remote sensing.

16. Siddhartha Ghosh

Structural Engineering: Performance-based seismic design, Reliability-based seismic design, Plastic design of steel structures, Analysis and design of special plate shear walls.

17. K. Gopal Rao

Remote Sensing: Digital image processing (DIP) of multispectral, thermal and microwave data, Digital elevation modelling (DEM), Geographic information systems (GIS), Artificial neural networks (ANN), Applications of RS, GIS, DEM and ANN in hydrology.

18. A. Goyal

Structural Engineering: Base isolation systems and energy absorbing devices, Earthquake analysis and

design, Liquid storage tanks, Bridges, Vibration control of structures, Service life assessment of buildings.

19. Kapil Gupta

Water Resources Engineering: Urban water supply systems, Urban drainage, Urban water infrastructure management, Flood protection structures, Computational fluid dynamics, Optimization, Environmental impact assessment, Water quality analysis and modeling, Constructed wetlands, Urban disaster management.

20. M. Inamdar

Structural Engineering: Solid mechanics, Cellular adhesion and motility, Mechanics of soft materials, Dissipation in structural and mechanical systems.

21. Janga Reddy Manne

Water Resources Engineering: Water resource systems, Evolutionary computation for single and multi-objective optimization, Stochastic-hydrology, Soft computing applications in hydrology, Climate change impacts on watersheds, water resources and agriculture, Design and performance evaluation of drip and sprinkler irrigation systems, Application of remote sensing and GIS tools in watershed development and management, Precision agriculture and developing decision support systems for water resources management.

22. R.S. Jangid

Structural Engineering: Structural mechanics, Structural dynamics and earthquake engineering, earthquake-resistant design, Base isolation for a seismic design of structures, Seismic isolation of bridges and liquid storage tanks, Non-classically damped system, Vibration control using tuned mass dampers.

23. V. Jothiprakash

Water Resources Engineering: Water resources systems analysis, Reservoir operation, Policy issues, Multi-objective analysis, Stochastic hydrological modeling, Irrigation water management.

24. A. Juneja

Geotechnical Engineering: In-situ and laboratory engineering properties of soil, Numerical and physical modeling in geotechniques, Earthwork, Ground improvement.

25. Tarun Kant

Structural Engineering: Solid mechanics, Plates, Shells, Fiber reinforced polymer composite laminates, Higher order theories, Thermal stresses, Transient dynamic techniques, Finite elements, Numerical techniques, Polymer composites in construction, Composite mechanics, Computational mechanics.

26. K.V. Krishna Rao

Transportation Systems Engineering: Travel demand modeling, Evolutionary algorithms, Neural networks and GIS in transport planning, Traffic design and analysis.

27. J.N. Mandal

Geotechnical Engineering: Geosynthetics for civil engineering construction.

28. Nagendra Rao Velaga

Transportation Systems Engineering: Intelligent Transportation Systems (ITS), Transportation accessibility and mobility, GIS and GNSS applications in transport, ICT and smart-mobile phone applications in ITS.

29. B.S. Pani

Water resources engineering: Diffusion of jets and plumes, Multiple diffusers, Offshore pipelines, Scour problems, Cooling water structures.

30. G. R. Patil

Transportation systems planning, Network optimization, Freight transportation modeling, Traffic operations, Demand modeling, Traffic emissions

31. Nanthagopalan Prakash

High performance concrete, Sustainable construction materials, Mineral and chemical admixtures in concrete, Rheology of cement-based materials.

32. RAAJ Ramsankaran

Remote sensing and geographical information systems and its applications to water resources engineering.

33. D. Raje

Water Resources Engineering: Stochastic hydrology, Uncertainty quantification, Water resources systems, Climate change impacts and adaptation

34. E.P. Rao

Remote Sensing: Remote sensing applications to water resources, Runoff modeling, Water distribution systems optimization.

35. A.K. Rastogi

Aquifer remediation strategies, Inverse modeling of the aquifers and auto calibration of field models, Solute transport modeling involving hydrodynamic dispersion in aquifers, Ground water flow modeling of unconfined and confined aquifers, Well hydraulics modeling, Groundwater systems planning and management and coastal aquifer hydrodynamics modeling

36. Ravi Sinha

Structural Engineering: Earthquake engineering, Vibration control and isolation, Structure rehabilitation and condition monitoring, Disaster management.

37. D.N. Singh

Geotechnical Engineering: Environmental geotechnics, Radioactive waste disposal, Solid waste utilization, Geotechnical centrifuge modeling.

38. Subimal Ghosh

Water Resources Engineering: Uncertainty modeling, Water resources systems, Hydroclimatology.

39. Tom.V.Mathew

Transportation Systems Engineering: Traffic flow modeling and simulation, Transportation network optimization, control and management.

40. P. Vedagiri

Pedestrian flow modeling, Traffic flow modeling and simulation, Traffic monitoring, management and control, Road safety audit, Public transit system design and operations.

41. G. Venkatachalam

Geotechnical Engineering: Finite element analysis, Digital image processing, Digital terrain modeling, Centrifuge, Numerical and GIS modeling of landslides.

42. B.V.S. Viswanadham

Geotechnical Engineering : Centrifuge modeling, Soil reinforcement, Ground improvement, Environmental geotechnics-waste materials behaviour, waste containment systems.



Computer Science & Engineering

Introduction

The Department of Computer Science and Engineering at the Indian Institute of Technology Bombay is one of the largest departments in the country. The department's teaching and research activities are handled by forty faculty members. Currently, about hundred Ph.D. students, more than two-hundred M.Tech. students and more than two-hundred and fifty B.Tech. students form the student pool of the department. While several research activities are pursued by individual faculty and external collaborators, the department houses about ten research labs spanning the areas of networks, databases, embedded systems, computer graphics, language technologies, machine learning and geospatial systems.

This year we are extremely proud to announce that **Prof. D B Phatak from the department of Computer Science and Engineering was honored with the Padma Shri award**, the fourth highest civilian award of the Republic of India. Another significant award this year was the 2012 Influential paper award from the IEEE International Conference on Management of Data to a paper co-authored by two of our faculty members, S. Sudarshan and S. Chakrabarti. This award is given to the paper(s) from the same conference 10 years earlier, which has/have had the most influence over the past 10 years.

Several events were organized by the faculty and students of the department as well. Pushpak Bhattacharya chaired the organization of the 24th International Conference on Computational Linguistics in IIT Bombay. This was the first time that this prestigious conference was organized in India.

Academic Programmes

Degrees Awarded

B.Tech.	: 59
Dual Degree	: 18
M.Tech.	: 112
Ph.D.	: 8

Fellowship Details

1. Microsoft India Research India Pvt Ltd. For Ph.D students	: 1
2. IBM Ph.D. Fellowship	: 2
3. TCS Ph.D. Fellowship	: 5
4. Vijay Vashee/Vincent Fernandes Scholarship	: 5

R & D Activities

Sponsored Research Projects

Sponsored Projects

No. of Ongoing Projects	: 81
No. of New Projects	: 12
No. of Completed Projects	: 10
Faculty Involved	: 39

List of Sponsored Research Projects

Project Title	Name of the Agency	Status
“SanGeniX: A comprehensive Next Generation Sequence (NGS) data analysis solution”	Department of Biotechnology	New
“Designing a Smarter and Greener Electric Grid: A Sensor-data Driven Approach”	Department of Electronics & Information Technology	New
“Some Train Pathing Problems”	Department of Science & Technology	New
“Development and Development and Demonstration of Mobile based ICT Advisory to Farmers”	Department of Science & Technology	New
“Exploring Technologies and Solutions to Architect the Carrier-Class Data-Center and Cloud Networking Environment”	International Business Machines Corporation.	New
“Query Optimization for Massively Parallel Data Processing Informatica”	Business Solutions Pvt. Ltd.	New
“Scalability of Complex Event Processing Engines”	ISPAT Industries	New
“Indo-US Wowkshop on “Internet Driven Computer Vision”	Indo-US Science & Technology Forum, New Delhi	New
“Hardware and Software optimization, and testing of Low Cost Access Devices (LCAD)”	Ministry of Human Resource Development	New
“Teachers Empowerment, Students Empowerment, and Integration Tools for Empowerment (Synchronous Delivery), abbreviated as the Talk to a Teacher project (Phase 2)	Ministry of Human Resource Development	New
“Mining cluster filesystem performance logs”	Netapp India Private Limited	New
TCS Research Scholar program	Tata consultancy Services	New
“Development of Techniques and Tools for Formal Verification of Computer Systems with Improved Precision and Scalability”	Board of Research in Nuclear Sciences	Ongoing
“Development and Evolution of Sanskrit Word -Net (PHASE II)”	Central Institute of Indian Languages	Ongoing
“India Telco Summit”	Conferences on Indiatelco Summit	Ongoing
“Development of English to Indian Language Machine Translation system (EILMT) PHASE-II”	Department of Information Technology	Ongoing
“Development of Dravidian WordNet: An integrated WordNet for Telugu, Tamil, kannada & Malayalam”	Department of Information Technology	Ongoing
“SPARC: Spectrum Aware Rural Connectivity	Department of Information Technology	Ongoing

Project Title	Name of the Agency	Status
“Development of Radiosonde for Meteorological System”	Defence Research & Development Organisation	Ongoing
“Structural Health Monitoring with Networked Embedded Systems”	Department of Science & Technology	Ongoing
“Rural Technology Action Group(RuTAG)”	Department of Science & Technology	Ongoing
“Databases and Information Retrieval”	Department of Science & Technology	Ongoing
“Endowment Interest for CSE/KReSIT Department”	Endointcse	Ongoing
“Entity & Relation Search on the Uncertain Web”	Google	Ongoing
“IBM Faculty Award 2011 / Prof. Ganesh Ramakrishnan”.	International Business Machines Corporation.	Ongoing
“Unrestricted Research Project Grant	Microsoft Research Lab India pvt. Ltd.	Ongoing
“Availability Analysis of Storage Systems”	Netapp India Private Limited	Ongoing
“Yahoo! Fellowship for Karthik Ramachandra”	Yahoo INC.	Ongoing
“High quality domain specific statistical machine translation system from English to Indian Languages”	Yahoo INC.	Ongoing
“Design and Development of Gigabit Networking Solutions for C&I Applications”	Bhabha Atomic Research Centre	Ongoing
“BRNS/ Analysis of SCADE Lustre models: Runtime Monitoring & Testing”	Board of Research in Nuclear Sciences	Ongoing
“High-Speed Switching Fabric for Transport Networks and Distributed Processor Interconnects”	Board of Research in Nuclear Sciences	Ongoing
“Fiber to the home-key Ingredient Technologies for Energy Conservation and Bridging the Indian Digital divide”	Department of Information Technology	Ongoing
“Development of Indradhanush: An integrated Word Net for Bengali, Gujarati, Kashmiri, Konkani, Oriya, Punjabi & Urdu”	Department of Information Technology	Ongoing
“Virtualized Cloud Computing Infrastructure using Light Trails and very fast switching”.	Department of Information Technology	Ongoing
“Network Sanitization”	Department of Information Technology	Ongoing
“Deploying omnipresent Ethernet based data-centers in actual networks - Validation of project periscope”	Department of Information Technology	Ongoing
“PHASE II —Development of Indian Language to Indian Language Machine Translation System (II-IL-MT)”	Department of Information Technology	Ongoing

Project Title	Name of the Agency	Status
“Development of Cross Lingual Information Access (CLIA) System Phase II”	Department of Information Technology	Ongoing
“Immersive Digital Heritage”	Department of Science & Technology	Ongoing
“Support for Cloud Computing related research”	International Business Machines Corporation.	Ongoing
“Cloud Collaboratory”	International Business Machines Corporation.	Ongoing
“Parallel Computing Research Prospects” Geo-spatial data base Management- The Ganga River Basin Management Project (GRBMP)”	Intel Technology India PVT. LTD. Ministry of Environment & Forests	Ongoing
“OSCAR++ (Open Source Courseware Animations Repository)”	Ministry of Human Resource Development	Ongoing
“IITB-NSN: Next Generation Optical Access”	Nokia Siemens Networks.	Ongoing
“Development of Multilingual Resources and Technologies for Indian Languages”	Xerox Corporation	Ongoing
“Yahoo Inc./Yahoo Research Grant 2010”	Yahoo INC	Ongoing
“Bridging Query Intent to Catalogs and Annotated Documents”	Yahoo INC.	Ongoing
“GCC Resource Center”	Department of Information Technology	Ongoing
“DST/ Advanced Research Lab for Geospatial Information Science and Engineering”	Department of Science & Technology	Ongoing
“SwarnaJayanti Fellowship for Large Scale Gene Expression Analysis on High Performance Parallel Computers for Functional Genomics and Systems Biology”	Department of Science & Technology	Ongoing
“GEYSERS: Generalized architecture for dynamic infrastructure services”	European Commission	Ongoing
“Prof. Umesh Bellur/Virtual Machine Placement in Infrastructure Clouds”	International Business Machines Corporation.	Ongoing
“Empowerment of Student & Teachers through Synchronous & asynchronous instruction”	Ministry of Human Resource Development	Ongoing
“E-Yantra : Roboot Enhanced Teaching of Subjects in Engineering Colleges - Centrally Sponsored scheme of National Mission of Education through Information & Communication Technology”	Ministry of Human Resource Development	Ongoing
“Project OSCAR++, Open Source Course-ware Animation Repository for higher education”	Ministry of Human Resource Development	Ongoing

Project Title	Name of the Agency	Status
“Creation of Machine translation tools and resources for English to Dravidian Languages”	Ministry of Human Resource Development	Ongoing
“Microsoft Research India Outstanding Young Faculty Award”	Microsoft Research India Outstanding Faculty Award (under IRCC)	Ongoing
“Unrestricted Grant for Research Support (M/s. Microsoft Research Lab India Pvt. Ltd., Bangalore)”	Microsoft Research Lab India pvt. Ltd.	Ongoing
“Microsoft Grant (Microsoft Research Lab India Pvt. Ltd, Bangalore)”	Microsoft Research Lab India pvt. Ltd.	Ongoing
“Interference and Affinity Characterization of VMs for Server Consolidation in Infrastructure Clouds (Yahoo Software Development India Pvt.Ltd., Bangalore)”	Yahoo Inc.	Ongoing
“Development of NE-Wordnet : An Integrated Wordnet for North East Languages- Assamese, Bodo, Manipuri & Nepali”	Department of Information Technology	Ongoing
“Semantic Linkage between the Web, Internet and Wikipedia: Discovery and Exploitation in Search and Aggregation”	Hewlett Packard Co.	Ongoing
“2008 IBM Faculty Award”	International Business Machines Corporation.	Ongoing
“Research Collaboration on Mobile and Wireless Systems, with Microsoft Research India (MSRI)”	Microsoft Research Lab India pvt. Ltd.	Ongoing
“Information Aggregation from tables on the Web”	Yahoo Inc.	Ongoing
“IBM Faculty Award / Building a self-aware and self-tuning distributed system using queuing theoretic and control theoretic approaches”	Sponsored by International Collaboration Projects	Ongoing
“IBM Faculty Award”	International Collaboration Projects	Ongoing
“IBM Faculty Award/ Supratik Chakraborty/ Approximate search and coverage based verification techniques for flattened circuits with locally specified reference models”	International Collaboration Projects	Ongoing
“Microsoft Award/Soumen Chakrabarti/ Scalable annotation, search & aggregation of semistructured graph and text data models”	International Collaboration Projects	Ongoing
“Large Scale Application Development and Knowledge Dissemination in Natural Language Processing and Text Mining (HP Labs, Bangalore)”	Private Organisations	Ongoing
“TCS-IIT Bombay Laboratory for Intelligent Systems”	Private Organisations	Ongoing

Project Title	Name of the Agency	Status
“Formal Verification of Large State Transition Systems (M/s. General Motors India Pvt. Ltd., Bangalore)”	Private Organisations	Ongoing
“Building Check-Dams for Drinking Water: A Teaching and Research Initiative”	Donation	Ongoing
“RTL Symbolic Simulation”	International Collaboration Projects	Ongoing
“IBM Faculty Awards-IBM Global Services India Pvt. Ltd”	Private Organisations	Ongoing
“Sponsorship Towards Creating a Logic Base at IIT Bombay”	Private Organisations	Ongoing
“Developmental Informatics”	Private Organisations	Ongoing
“Association For Computing Machinery - International Collegiate Programming Contest - IBM Canada Ltd”	International Collaboration Projects	Ongoing
“Exchange of Ideas on Data Mining and Data Cleaning Projects-Microsoft Research”	International Collaboration Projects	Ongoing
“Interest of Endowment Fund of the CFDVS”	Donation	Ongoing
“Indo-US Workshop on “Internet Driven Computer Vision”	Indo-US Science & Technology Forum, New Delhi	Completed
“ITB-CommTel Multi-Service Transport Platform (MSTP) Development (CommTel Networks Pvt. Ltd., Mumbai)”	COMMTEL Networks PVT LTD.	Completed
“PERISCOPE: Pragmatic Efficient Reliable Internet working solution using Consumer-Centric Omnipresent Ethernet”	Department of Information Technology	Completed
“Logical Methods for Compositional Shape Analysis”	Microsoft Research Lab India pvt. Ltd.	Completed
“StrucFus (Infrastructure for information fusion System)”	VETENSKAPSRADET	Completed
“Development of tool for formal verification of VHDL based data and control dominated designs used in safety critical systems”	Board of Research in Nuclear Sciences	Completed
“Analyzing programs manipulating recursive data structures”	Microsoft Research Lab India pvt. Ltd.	Completed
“IBM Faculty Award, Prof. P Bhattacharya/ Integrating Indian Language processing resources and tools and semantic search capabilities with the UIMA Platform”.	International Collaboration Projects	Completed
“Microsoft India Distinguished Research Award/Linguistic Data Management of Indian Language Resources”	Private Organisations	Completed
“Development of Indian Language to Indian Language Machine Translation System (II-IL MT) : Consortium Leader : IIIT Hyderabad”	Information Technology	Completed

Consultancy Projects

No of Jobs	:	19
Faculty involved	:	6

Extension Activities

Essential Abstractions on GCC Workshop:

The GCC Resource Centre of CSE department held its annual workshop on Essential Abstractions on GCC from June 30- July 3, 2012.

GCC is an acronym for GNU Compiler Collection. It is the de-facto standard compiler generation framework for all distros on GNU/Linux and many other variants of Unix on a wide variety of machines and is one of the most dominant softwares in the free software community. It supports several input languages for a variety of operating systems on more than 30 target processors. More back ends can be added by describing new target processors using the specification mechanism provided by GCC.

November 6, 2012 : Five-day UNL School

Linking Deep Semantics and Indian Languages the goal of Natural Language Processing (NLP) can be said to be representing and processing of meaning in text. A five-day unique event investigating Linkage of Universal Networking Language (http://en.wikipedia.org/wiki/Universal_Networking_Language) - which represents meaning- and constitutional languages of India was held at IIT Bombay.

July 12, 2012: Yahoo! University hack day

University hack day was held at IITB in F. C. Kohli auditorium from July 26-29, 2012.

Visitors to the Department

Mr. Girish Bharambe, NVIDIA, Pune, delivered a lecture on “Introduction to GPU Computing”.

Mr. Vinayak Borkar, University of California, Irvine, delivered a lecture on “Scaling Datalog for Machine Learning on Big Data”.

Dr. Shweta Agarwal, University of California, Los Angeles, delivered a lecture on “Functional encryption systems from hard lattice problems”.

Raju Rangaswami, Florida International University, delivered a lecture on “Non-blocking Writes”.

Prof. Masahiro Fujita, University of Tokyo, delivered a lecture on “SAT-Based Automatic Rectification and

of Debugging Combinational Circuits with Look-up Table Insertions”.

Dr. Saikat Guha, Microsoft Research India, delivered a lecture on “Measuring and Fingerprinting Click-Fraud in Ad Networks”.

Dr. Mausam, University of Washington, delivered a lecture on “Decision-Theoretic Crowdsourcing”.

Dr. Anand Deshpande, Persistent Systems, Pune, delivered a lecture on “How will technology shifts in Cloud Computing, Analytics and Mobility affect the job market in India?”.

Karim El Defrawy, HRL Laboratories, delivered a lecture on “SMART: Secure and Minimal Architecture for (Establishing a Dynamic) Root of Trust”.

Dr. Akshay Sundararaman, IRISA, France, delivered a lecture on “Approximate Verification of the Symbolic Dynamics of Markov Chains”.

Dr. Nisheeth Vishnoi, Microsoft Research India, Bangalore, delivered a lecture on “Theory as a Lens to the Sciences: Evolution”.

Mr. Michael Buchheim, Rovi Corporation, delivered a lecture on “Rovi Corporation and the Digital Entertainment Market”.

Dr. Ashutosh Gupta, IST Austria, delivered a lecture on “Proof Transformations for Verification”.

Prof. Kai-Ming Ting, Monash University, delivered a lecture on “DEMass: A Density Estimator for Large Data Sets”.

Mr. Pritish Kamath, Microsoft Research India, Bangalore, delivered a lecture on “VP versus VNP and depth four lower bounds”.

Prof. Ambuj Singh, University of California at Santa Barbara, delivered a lecture on “Querying and Mining in Dynamic Graphs”.

Prof. Amr Albaddi, University of California, Santa Barbara, delivered a lecture on “SQL or NoSQL? That is the Question”.

Dr. Sanchit Misra, Intel, Intel Corporation, delivered a lecture on “Tutorial on Intel Knights Corner”.

Prof. Rajkumar Buyya, Cloud Computing and Distributed Systems (CLOUDS) Lab, University of Melbourne, Australia and CEO, Manjrasoft Pvt. Ltd, Melbourne, delivered a lecture on “Market-Oriented Cloud Computing: Challenges and Opportunities”.

Dr. Sourangshu Bhattacharya, Yahoo! Labs, delivered a lecture on “Segmenting Web-Domains and Hashtags using Length Specific Models”.

Prof. B. Ravindran, IIT Madras, delivered a lecture on “Which skills to learn? Useful Spatio-Temporal Abstraction in Reinforcement Learning”.

Mr. Vanish Talwar, delivered a lecture on “Breaking the Manageability Wall in Large Scale Data Centers”.

Prof. Niloy Ganguly, IIT Kharagpur, delivered a lecture on “Alphabetic Bipartite Networks: Theory and Applications”.

Mr. Manish Gupta, University of Illinois, Urbana-Champaign, delivered a lecture on “Outlier Detection for Information Networks”.

Mr. Suyash Awate, University of Utah, USA, delivered a lecture on “Image Processing in Medicine and Biology: Problems in Image Reconstruction and Shape Analysis”.

Prof. Jim Kurose, University of Massachusetts, delivered a lecture on “Networking Challenges for the Smart Grid”.

Prof. Joseph Halpern, Cornell University, delivered a lecture on “Beyond Nash Equilibrium: Solution Concepts for the 21st Century”.

Prof. Jeffrey Bilmes, University of Washington, delivered a lecture on “Turning Big Data into Core Data”.

Prof. Anil Kulkarni, Department of Electrical Engineering, IIT Bombay, delivered a lecture on “Power Grids: Normal Operation and Failures”.

Prof. Sandor Fekete, TU Braunschweig, delivered a lecture on “Algorithms for Complex Problems”.

Dr. Rupesh Nasre, University of Texas, Austin, delivered a lecture on “Irregular Algorithms on GPUs”.

Prof. Xavier Viennot, LaBRI, France, delivered a lecture on “The Strahler Analysis of Binary Trees in Computer Science and in Other Sciences”.

Prof. Alan Mycroft, Cambridge University, delivered a lecture on “Types for Access Capabilities in Multi-Core Systems”.

Dr. Partha Pratim Talukdar, Carnegie Mellon University, delivered a lecture on “Graph-based Large-scale Knowledge Harvesting from Text”.

Dr. Mythili Vutukuru, Movik Networks, delivered a lecture on “Exploiting Physical Layer Information in Wireless System Design”.

Prof. Hugh Durrant-Whyte, National ICT Australia (NICTA), delivered a lecture on “Data, Learning and Automation”.

Conferences/Symposia/Workshops/Seminars (participated/Papers Presented)

Chakraborty Supratik

Participated in *ACM India Annual Event*, Chennai, January 2012

Participated in *School on Software Engineering, International Conference on Theoretical Aspects of Computing*, September 2012

Participated in *International Symposium on Automated Technologies for Verification and Analysis (ATVA)*, Thiruvananthapuram, October 2012.

Bhattacharyya Pushpak

Participated in *Indradhanush Workshop*, Patiala, 2012. Participated in *Indowordnet Workshop*, Hyderabad, from July 23-25, 2012.

Participated in *WordNet Workshop*, IIT Bombay, December 16, 2012.

Participated in *Eye-Tracking and NLP Workshop*, Mumbai, December 2012.

Singh Smriti, Damani Om P., Sarma Vijayanthi M. “Noun Group and Verb Identification for Hindi” *24th International Conference on Computational Linguistics, COLING 2012*.

Damani Om P., Chedda Pankhil, and Chaudhari Dipak

“Wikipedia is a practical alternative to the Web for measuring Co-occurrence based Word Association” - *4th Conference on Language and Technology, CLT 2012*.

Sangodkar Amit and Damani Om P.

“Re-ordering Source Sentences for SMT” - *The Eighth International Conference on Language Resources and Evaluation, LREC 2012*.

Gokani Mihir and Chaudhuri Parag

“Path Synthesis for Motion Graphs in Blender”, *Blender Conference 2012*, Amsterdam, October 12-14, 2012

Churi Viraj, Bhagwat Gaurav and Chaudhuri Parag, “Directable Animation of Non-Photorealistic Fluids”, *Eighth International Conference on Computer Graphics Theory and Applications (GRAPP) 2013*, Barcelona, Spain, February 2013.

Sarawagi Sunita

Participated in *38th International Conference on Very Large Databases*. Istanbul, Turkey. August 27- 31, 2012.

Khedkar Uday

Participated in *19th International Static Analysis Symposium (SAS) 2012 Conference* in Deauville France from September 10-14, 2012.

Bhattacharyya Pushpak

Participated *Computational Linguistics Conference (COLING 2012)*, Mumbai, December 10-14, 2012.

Participated in *European Conference on Machine Learning (ECML PKDD 2012)*, Bristol, U.K., September 24-28, 2012.

Participated in *Empirical Methods in Natural Language Processing (EMNLP CoNLL 2012)*, Jeju Island, Korea, July 12-14, 2012.

Participated in *Lexical Resources Engineering Conference (LREC 2012)*, Istanbul, Turkey, May, 2012.

Participated in *Translation Process Research Workshop*, Copenhagen, August 2012.

Organized *5th International Sanskrit Computational Linguistics Symposium (5th SCLS)* at IIT Bombay together by the Cell for Indian Sciences and Technology in Sanskrit (CISTS), the Department of Humanities and Social Sciences (H&SS) and the Center for Indian Language Technology (CFILT), Department of Computer Science and Engineering (CSE) from January 4-6, 2013

Nath J. Saketha

International Conference attended: *ICML 2012* (Edinburgh)

Jagadish M. and Iyer Sridhar

A Method to Construct Counterexamples for Greedy Algorithms. *ACM Conf on Innovations and Technology in Computer Science Education (ITiCSE)*, Haifa, Israel, July 2012.

Ramkumar Rajendran, Iyer Sridhar and Murthy Sahana

“Literature Driven Method for Modeling Frustration in an ITS”, *IEEE International Conference. on Advanced Learning Technologies (ICALT)*, Rome, Italy, July 2012.

Sahasrabudhe Sameer, Shah Adeet, Thakkar Mohini, Thakkar Varun, and Iyer Sridhar

“Mathmazing: 3D gesture recognition exergame for arithmetic skills”, *STEM Workshop, in International Conference on Computers in Education (ICCE)*, Singapore, Nov 2012.

IyerSridhar and Murthy Sahana

“Demystifying Networking: Teaching non-majors via analogical problem solving”, *ACM Symposium on Computer Science Education (SIGCSE)*, Denver, USA, March 2013.

Kadam Kapil, Sahasrabudhe Sameer and Iyer Sridhar

“Improvement of mental rotation ability using Blender 3D”, *IEEE International Conference on Technology for Education (T4E)*, Hyderabad, India, July 2012.

Pal Yogendra and Iyer Sridhar

“Comparison of English versus Hindi medium students for programming abilities acquired through video-based instruction”, *IEEE International Conference on Technology for Education (T4E)*, Hyderabad, India, July 2012.

Sudarshan S.

Presented talk as part of Influential Paper Award, *IEEE International Conference on Data Engineering (ICDE)*, April 2012

Presented research paper, and invited talk *International Conference on Management of Data (COMAD)*, December 2012

Participation and paper presentation by students**Sankaran Abhisekh, Adsul B., Madan V., Kamath P. and Chakraborty S.**

Presented a paper “Preservation under Substructures Modulo Bounded Cores” at *WoLLIC 2012*, Rio de Janeiro

John Ajith and Chakraborty S.

Presented a paper “Extending Quantifier Elimination to Linear Inequalities on Bit Vectors” at *TACAS 2012*, Rome.

Katariya Namit, CSE B. Tech, and Iyer Arun, CSE Ph.D.

Attended the *IEEE International Conference on Data Mining* held in Berlin, Germany in December 2012.

Conferences/Symposia/Workshops/Seminars (Coordinated/Chaired by Faculty)**Iyer Sridhar**

Conducted a Workshop on “Research Methods in Educational Technology”, on February 2- 9, 2013.

Invited Lectures**Chakraborty Supratik**

“Quantifier Elimination for Linear Modular Equalities, Disequalities and Inequalities”, *IMPECS Workshop on Program Analysis*, IISc Bangalore, September 2012

“Practical Quantifier Elimination for Linear Bit-vector Inequalities”, *Workshop on Making Formal Verification Scalable and Usable*, January 2013
“Some Network Models in Systems Biology: A Critical Look”, delivered *invited talk at ACTREC*, Kharghar, March 2013

“Abstract Interpretation in Software Model Checking, School on Software Engineering”, *International Conference on Theoretical Aspects of Computing*, September 2012

“Word-level Symbolic Trajectory Evaluation”, *Intel Israel Development Centre*, Haifa.

Chaudhuri Parag

Workshop on Introduction to Graph and Geometric Algorithms on “Motion Graphs”, March 14-16, 2013, Bengal Engineering and Science University, Shibpur, West Bengal

Diwan A.A.

“Zero-sum Ramsey theory”, delivered a lecture at the *WALCOM 2013 pre-workshop school on graph and geometric algorithms*, ISI Kolkata and RKVM University, Belur.

Bhattacharyya Pushpak

Invited Talk, Sentiment Analysis in New Terrain, *CSI Convention*, Goa, February 23, 2013.

Invited Talk, “Word Sense Disambiguation: A Multilingual Resource Constrained Perspective”, *India Research Network Meeting, Samsung*, Bangalore, November 19, 2012.

Invited Talk, “Projection in Multilingual Web”, Dagstuhl Seminar on Multilingual Web, September 3-7, 2012.

Distinguished Lecturer Talk, “Sentiment Analysis in New Terrain”, CSE Department, University of Houston, USA, September 10, 2012.

Distinguished Lecturer Talk, “Multilingual Resource Constrained Word Sense Disambiguation”, CSE Department, University of Houston, USA, September 15, 2012.

Invited speaker, *Dagstuhl Seminar on Multilingual Semantic Web*, Wadern, Germany, September 3-7, 2012.

Chandran Sharat

“Using Shape Spaces for Deducing Visibility in SfM”, Invited Talk Rutgers, State University of New Jersey, July 12, 2012.

Sudarshan S.

Talk on Concurrency and Consistency in Distributed Data Storage Systems <<http://research.microsoft.com/>

[apps/video/default.aspx?id=168534](http://research.microsoft.com/apps/video/default.aspx?id=168534)> MSR India 2012 Summer School on Distributed Algorithms, Systems and Programming, Bangalore, May-June 2012.

Talk on Holistic Optimization by Prefetching Query Results <<http://www.cse.iitb.ac.in/%7Esudarsha/Pubs-dir/prefetch-sigmod12.pdf>> Karthik Ramachandra and S. Sudarshan, invited talk at COMAD, December 2012.

IEEE International Conference on Data Engineering (ICDE), delivered a talk as part of Influential Paper Award, April 2012.

Significant Awards/Distinctions

Phatak Deepak B

Prof. Deepak B Phatak honoured with the Padma Shri on Republic Day 2013

Sarawagi Sunita

Runners for the best paper award at ICDM 2012.

Sudarshan S.

IEEE International Conference on Management of Data 2012, Influential Paper Award for the paper, Gaurav Bhalotia, Arvind Hulgeri, Charuta Nakhe, Soumen Chakrabarti, S. Sudarshan: Keyword Searching and Browsing in Databases using BANKS. ICDE 2002.

This award is given to the paper(s) from the same conference 10 years earlier, which has/have had the most influence over the past 10 years.

Fellowship of the Indian National Academy of Engineering (INAE)

Honorary Work

Chakraborty Supratik

Served as a member of ACM India Council.

Coordinated the ACM India Doctoral Dissertation Committee 2012

Chaudhuri Parag

Organizing Co-Chair, *Eighth Indian Conference on Vision, Graphics and Image Processing 2012*, IIT Bombay, Mumbai.

Editorial Board Member (Associate Editor) on *Journal of Computer Animation and Virtual Worlds* Program Committee Member for *Computer Graphics International (CGI) 2013*

Conference and International Symposium on Visual Computing (ISVC) 2012

Reviewer for *The Visual Computer Journal*, Springer

Sarawagi Sunita

Program Committee Member: ACM SIGKDD KDD 2012, WWW2012.
Reviewer, NIPS 2012.

Bhattacharyya Pushpak

Organizing Chair, Computational Linguistics Conference, 2012 (COLING12), December 8-15, 2012, IIT Bombay.

Program Committee member of *5th International Sanskrit Computational Linguistics Symposium (5th SCLS)* at IIT Bombay, January 4-6, 2013.

Invited Panel, Data Scientists: How to address the need of the future, TCS TACTICS Day, New Delhi, February 12, 2013.

Scientific Committee member of LREC 2012, *Eighth International Conference on Language Resources and Evaluation*, May 21-27, 2012

Nath J. Saketha

Reviewer for *ICML2013*, *ICVGIP 2012*; PC Member for *AAAI2012*, *ICPRAM2012*.

Iyer Sridhar

Reviewed papers for several international conferences.

Chandran Sharat

Program Co-Chair, *ICVGIP*
Top Tier Program committee reviewer: *WACV*, *ACCV*, *CVPR*, *ICCV*, *Eurographics*
Reviewer of Proposals: *DST*
Ph.D Evaluation: Chetan Arora (IIT Delhi), Suthambara (IISc),
Darshak Thakore (M.S. University, Baroda)

Sudarshan S.

Associate Editor of *ACM Transactions on Database Systems*, *IEEE Transactions on Data and Knowledge Engineering*

Faculty Members and their Specializations**1. Sharat Chandran**

Computer Graphics, Image Processing, Vision. High Performance Computation.

2. Bharat Adsul

Formal methods in Concurrency, Logics and Games.

3. Srinivas Aluru

Parallel algorithms and applications, bioinformatics and systems biology, combinatorics scientific computing, applied algorithms

4. Varsha Apte

Performance Evaluation of Computer Systems and Networks

5. Kavi Arya

Functional Programming Applications (Domain Specific Languages), Embedded Systems/ Parallel Programming Languages, Distance Learning

6. Ashwin Gumaste

Optical Networks, Telecommunication Networks, Data Centers, Carrier Ethernet

7. Umesh Bellur

Autonomic Computing of Distributed Applications, Adaptive & QoS aware Event Broker Networks, Functional and Architectural adaption in pervasive computing, Middleware design for sensor networks, Object & Aspect oriented computing, Service oriented Computing

8. Pushpak Bhattacharyya

Natural Language Processing and Linguistics, Machine Translation and Machine Learning

9. Supratim Biswas

Parallel and Distributed Processing, Neural Nets, Architecture

10. Soumen Chakrabarti

Hypertext databases, Data mining

11. Supratik Chakraborty

Formal Methods, Formal Verification, Automata Theory, Logic and its Applications.

12. Parag Chaudhuri

Computer Animation, Computer Graphics and Geometric Computer Vision

13. Kameswari Chebrolu

Wireless Networks

14. Om P. Damani

Natural Language Processing

15. Dhananjay Madhav Dhamdhare

Distributed Algorithms, Programming Languages, Operating Systems, Optimizing Compilers

16. Ajit Diwan

Graph Theory, Algorithms.

17. Sridhar Iyer

Mobile Computing, Distributed Systems, Educational Software.

18. Saketha Nath J

Machine Learning, Data Mining, Convex Optimization

19. Rushikesh K Joshi

Object Oriented Systems, Distributed Systems, Software Architectures

20. Uday Khedkar

Programming Languages, Compilers, Data Flow Analysis.

21. Purushottam Kulkarni

Sensor and Wireless Networks, Distributed Systems and Data Dissemination. Developing solutions to problems in above areas for non-urban/rural settings.

22. Bernard Menezes

Information Appliances, Electronic Commerce, Java Security, Parallel Computing, Time Series Forecasting

23. Gopalakrishnaswami Nagaraja

Machine Intelligence, Pattern Recognition,

24. Deepak B Phatak

Data Base Management Systems, Software Engineering, System Performance Evaluation, Distributed Client Server Information Systems.

25. Krithi Ramamritham

Databases, real-time systems, and distributed applications, Dynamic Data in sensor networks, embedded systems, mobile environments and the web.

26. Bhaskar Raman

Computer networks, Wireless systems, Communication system design for developing regions

27. Ganesh Ramakrishnan

Statistical Relational Learning, Graphical Models, Some other topics in Machine Learning such as Support Vector Machines, Information Extraction

28. Abhiram G Ranade

Algorithms and Combinatorial Optimization

29. Krishna Shankaran Narayanan

Formal Methods, Bio-inspired Computing

30. Anirudha Sahoo

Computer networks, Voice routing, QoS in networks, wireless networks, wireless sensor networks, WiMax

31. Amitabha Sanyal

Functional Programming, Compilers, and Programming Languages

32. Sunita Sarawagi

Databases, data mining, and machine learning. Her current research interests are web information extraction, data integration, graphical models and structured learning.

33. Nandlal L Sarda

Databases, Information Systems, Software Engineering

34. Sivakumar G

Automated Reasoning, Logic Programming, Rewrite Systems, Networks, Distributed Systems

35. Milind Sohoni

Combinatorial Optimization, Mathematical Programming, Algorithms

36. Sudarshan S (Head of the Department)

Database Systems

37. Sundar Vishwanathan

Algorithms, Combinatorics, Complexity Theory.

38. S.Akshay

Formal Methods

39. Trivedi Ashutosh

Formal Methods in Verification and Synthesis, Cyber-Physical Systems



Earth Sciences

Introduction

The Department of Earth Sciences was constituted in 1982 from the erstwhile Geology section of the Department of Civil Engineering. Before that, it used to run the M.Sc. programme in Applied Geology since 1964. The department now offers academic programmes leading to M.Sc. in Applied Geology & Applied Geophysics and to M.Tech. in Geo-exploration and Petroleum Geosciences. It also offers a Ph.D. programme. The department has a total of 19 core faculty members.

Academic Programmes

The Department of Earth Sciences offers the following five academic programs. During this calendar year, M.Sc.- Ph.D integrated course in Geology and Geophysics was introduced.

- (i) M.Sc. Applied Geology (2 years)
- (ii) M.Sc. Applied Geophysics (2 years)
- (iii) M.Tech. Geoexploration (2 years)
- (iv) M. Tech. Petroleum Geosciences (2 years)
- (v) M.Sc.- Ph.D. integrated (5 years)
- (vi) Ph.D.

Student Intake:

Ph.D.	: 20
M.Tech. (Geoexploration)	: 20
M.Tech. (Petroleum Geoscience)	: 11
M.Sc. (Appl. Geology)	: 33
M.Sc. (Appl. Geophysics)	: 16
M.Sc.-Ph.D. integrated (Geology)	: 03
M.Sc.-Ph.D. integrated (Geophysics)	: 03

Degrees Awarded:

Ph.D.	: 08
M.Tech.	: 27
M.Sc. (Appl. Geology)	: 30
M.Sc (Appl. Geophysics)	: 14
PG Diploma	: 05

The M.Sc. curriculum emphasizes on basic science while the M.Tech. (Geoexploration) programme offers specializations in applied field mineral, groundwater, petroleum explorations.

The department signed an agreement with BG India under which two visiting faculty positions have been funded by the BG India. BG India also provides fellowships to two M.Tech. students of Petroleum Geoscience course. It has given a grant for development of a laboratory.

R&D Activities

The research activities in the department are focused on both basic research and applied aspects, addressing the issues of national needs. The major research and application areas include natural history, inorganic- and organic-geochemistry, hydrocarbon and mineral exploration, seismology, engineering geology, remote sensing, geothermal energy, tectonics, gravity, and electromagnetism. As part of the ISRO-sponsored moon mission programme of the country, the faculty are participating in research projects on terrestrial analogues for planetary exploration. This department boasts of two DST-sponsored national facilities. The Ar-Ar geochronology facility is fully operational and the mineral chemistry (EPMA) facility is being developed. The remote sensing laboratory is identified by DST as a nodal center to coordinate the national programme on Hyperspectral Remote Sensing and its applications. Besides these, several new state of the art facilities are established with funding from various agencies.

Sponsored Projects:

Ongoing Projects (No.)	: 34
New Projects (No.)	: 08
Completed Projects (No.)	: 07
Faculty involved	: 19
Sanctioned outlay	: Rs.15857600

Consultancy:

No. of Jobs	: 56
No. of faculty involved	: 05
Income generated	: Rs.9687097

Sponsored research projects, both in pure and applied geology and geophysics, were carried out in the department. The research facilities in the department include Ar-Ar Geochronology laboratory, XRD, ICP-AES, Cathodo-luminescence microscope, SEM-EDS, EPMA, mineral separation equipment, Laser Raman Spectrophotometer, FTIR, GC-MS, MT, multi electrode

resistivity instrument, UV-visible spectrophotometer, experimental hydrothermal system, fluorescence microscope, digital seismographs, gravimeter, instruments for evaluating triaxial-, uniaxial-, and tensile strength of rocks, fluid-inclusion setup, digital image processing and high precision GPS and GIS facilities, and a computer lab with Sun Workstation.

Details of New Sponsored Research Projects Initiated in 2012-13

Project Title	Name of Agency	Amount
The geomagnetic and heat flow modelling of the Indian subcontinent	DOS	59 lakhs
Tectonothermal evolution of the Balaram-Abu Road granulite terrane of the South Delhi Fold Belt, Rajasthan	DST	15.68 lakh
Exhumation and Denudation history of the Western and central Arunachal Himalaya : Low Temperature thermochronology Investigation	MoES	93 lakhs
Application of imaging spectroscopy and thermal remote sensing techniques in delineating palaeo-channel related Calcretes; an investigation in parts of Rajasthan and Gujarat for Carnotite exploration.	ISRO	37,93,680/-
Simulation of Lunar Reflectance Spectra Using Radiative Transfer Modeling and Spectroscopy of Lunar Analogues	ISRO	15,00,000/-
Case studies for Sr isotope ratio based numerical dating of Senonian and Oligocene-Miocene geological events in the western Tethys and adjacent seas	Hungarian Scientific Research Fund (OTKA)	

Details of Infrastructure

- Ar-Ar geochronology facility
- EPMA facility
- SEM-EDS
- ICP-ES
- XRD
- GC-MS
- Pyrolyser
- Laser Raman Spectroscope
- Thermal Emission Spectrometry setup
- Thermal Conductivity Measurement setup
- Thermal Imager
- Field portable FTIR
- Goniometer for hemispherical reflectance/emission measurements
- Sand Box Deformational Rig
- Petrog point counter stage for grain counting
- Multi-electrode electrical Resistivity Meter
- Proton Precision Magnetometer
- Magneto-Telluric equipment
- Digital seismographs
- Cerchar abrasivity index apparatus
- Fracture toughness apparatus
- Bending strength apparatus
- Blast vibration monitor
- High Precision Real Time Kinematic Global Navigation Satellite System
- Fission Track Thermochronology Laboratory
- Scintrex CG5-Autograv Gravimeter (Land)
- Thermo 6500 Fourier Transform Infrared Spectrometer
- Mineral Measurement setup
- LINKAM Heating stages- TMS 94, 1200dc and 1500dc- for Melt inclusion Geothermometry
- Rock crushing and mineral separation laboratory

Visitors to the Department

Mr. Vishwanath, HZ/Vedanta, Udaipur, delivered a talk on “Mineral Exploration for Pb-Zn mines in India” on Monday, October 15, 2012.

Mr. Vishwanath delivered a lecture on Mineral Beneficiation Practices with Special Reference to Lead- Zinc Sulfides on March 22, 2013.

Dr. P. Pradip and **Dr. Beena Rai**, TRDDC, Pune, delivered lectures on October 12, 2012, and February 25, 2013, respectively.

Dr. R.N. Gupta, Ex Director, NIRM, KGF, Karnataka, visited the department.

Roberto Weinberg, Monash University, Australia, visited the department in March 2013.

Conferences/Symposiums/Workshops/Seminars (participated/ Papers Presented)

Radhakrishna, M., Subba Rao, B.V.P., Rao, S.B., Chandrasekharam, D.

A Geophysical Perspective on the Seismicity, Tectonics and associated Volcanism in the Eastern Andaman Offshore Region, *AOGS-AGU(WPGM)*, Singapore, August 13-17, 2012.

Datta, S

13th International Palynological Congress and the *9th International Organization of Palaeobotany Conference*, August 23-30, 2012, Tokyo, Japan.

T.K.Biswal

International Conference on Earth Sciences and Climate Change held in Chicago, US, August 21-22, 2012.

G. Mathew

INQUA, Bern Switzerland, 2012
3rd APLED, Okayama, Japan, 2012

Banerjee S.

Participated in the *29th IAS Meeting of Sedimentology Schlading*, September 10-13, 2012, Schlading, Austria and presented a paper in the oral session.

Participated in the *29th Convention of Indian Association of Sedimentologists*, December 20-22, 2012, Pondicherry University and presented a paper.

Saraswati, P.K

European Geosciences Union General Assembly, Vienna, April 22-27, 2012.

4th International Geologica Belgica Meeting 2012, Brussels, Belgium.

European Geosciences Union General Assembly, Vienna, April 22-27, 2012.

4th International Geologica Belgica Meeting 2012, Brussels, Belgium.

D. Ramakrishnan

IGARSS-2012 at Munich, Germany, during September 2012.

Summer School at Gabriel Lippmann, Luxembourg.

T. N. Singh

CO₂ sink capacity in decoaled mine area, *International Conference on Engineering for Infrastructures*, Rizwi Engineering College, Mumbai.

G.N. Jadhav

XXVI International Mineral Processing Congress (IMPC 2012), September 24-28, 2012 at The Ashok Convention, Hotel Ashok, New Delhi, India.

IWMOD, Karnataka, from December 7-8, 2012, of the *IGCP-599(UNESCO)* at EDC, Geological Society of India, Bangalore.

National Workshop on Luminescence Materials Devices and Applications(LMDA) at Physics Dept., Faculty of Sciences, The M.S. University of Baroda, during November 26-27, 2012.

2nd Seminar on Drilling Technology at IDT-ONGC-Dehradun, April 10-11, 2012.

Delivered key note address on “Implication of ore microscopic characterisation for beneficiation of low grade iron ores,” *LGO-2013*, at NML, Jamshedpur, March-2013.

G. Mathew

DST-sponsored *National Field Workshop on the Geology of Kachchh Basin, Western India: Present Status and Future Perspectives*

Malay Mukul

Rock Deformation and Structures (RDS-II), *National Conference*, University of Lucknow, Lucknow, October 1-3, 2012.

Brainstorming Session (workshop) on Goals of Solid Earth Geosciences in India in the Next Decade, September 6-7, 2012, IIT Kharagpur.

Honorary Work

The faculty of the department served in various capacities as follows:

Chandrasekharam, D.

Attended the Board of Directors meeting of the International Geothermal Association held at Nairobi between November 19-20, 2012.

Saraswati, P.K.

Served as member, Board of Governors, Rajiv Gandhi Institute of Petroleum Technology; Member, Expert Committee, SERB, DST; Member of the Editorial Boards of: Journal of Petroleum Geology (Blackwell, UK), Energy Exploration and Exploitation (Multi Science Pub., UK), Journal of the Geological Society of India (Bangalore), Indian Journal of Geology (Kolkata), Journal of Palaeontological Society of India (Lucknow), and Indian Journal of Geosciences (GSI, Kolkata).

Singh, T.N.

Served as Member, Technical Advisory Group, North Eastern Railway, Guwahati.

Jadhav, G.N.

Served as Registered Guest faculty with Regional Training Institute, Geological Survey of India (GSI), Western Region (WR), Jaipur, and Ore Petrography for Officers of GSI, WR, 2012; as President, Indian Institute of Mineral Engineers (IIME)-Mumbai-Pune Chapter; Member, Editorial Board, Journal of Geological Society of India, Bangalore, Karnataka; Member, Executive Committee, Indian Institute of Mineral Industry (IIME), Jamshedpur, Jharkhand; Member, Board of Examiners (Ph.D. Thesis), ISM, Dhanbad, Jharkhand; Member, Board of Examiners (M.Sc., M.Phil. and Ph.D.), Solapur University, Solapur; Member, Board of Studies (Geology, Geoinformatics and Environment), Solapur University, Solapur; Paper Setter of Geology, Geoinformatics and Environment, (M.Sc., M.Phil. and Ph.D.), Solapur University, Solapur; Member, Board of Studies (Geology), St. Xaviers College, Fort, Mumbai; Member, Resource Mobilization Committee, IMPC-2012, New Delhi; Session Chairman, IMPC-2012, September, 2012 at New Delhi; Member, Seminar Advisory Committee, -LGO-2013 at NML, Jamshedpur, March-2013; Session Chairman, NCLA-2013, January 8-10, 2013 at PES, Bangalore; Member, DAC Meeting, IIT Bombay, February 26, 2013; and Session Chairman, LMDA-2012, November 26, 2012 at Baroda.

Patel, S.C.

Served as Member of: Standing Committee for Earth Science Olympiad, appointed by the Ministry of Earth Sciences, New Delhi; Expert Committee appointed by the DST, New Delhi, for establishing an Electron Probe Micro-Analyser facility at BHU, Varanasi; Expert Committee appointed by the Wadia Institute of Himalayan Geology, Dehra Dun, for establishing a Laser Ablation Multi-Collector ICP-MS facility at the Institute; and Selection Committee for faculty in geology at NIT, Raipur. Also served as Examiner of

Ph.D. thesis in geology from the Pondicherry University and as Reviewer of research papers in the Journal of the Geological Society of India.

George Mathew

Served as Member, Editorial Board, for fast track articles in JGSI. Also reviewed papers for: International Journal of Earth Sciences, International journal of Remote Sensing, Journal of Earth System Science and Journal Geological Society of India.

Ramakrishnan, D.

Served as National Co-ordinator, DST Committee on Hyperspectral Remote Sensing and Applications;

Member of: UGC Committee to evaluate the Deemed University status of Indian Institute of Space Science and Technology (IIST), ISRO, Trivandram; UGC Selection committee to recruit Senior Research Fellows; DST Work Group Committee on Hyperspectral Remote Sensing and Spectral Signature Development; and expert committee on National Airborne Geophysical Data Acquisition Programme; evaluated Ph.D Thesis for NIT Suratkal and JNTU Hyderabad; served as reviewer for: International journal of Remote Sensing, Journal of Earth System Sciences, Digital Earth, Current Science, and Geophysics.

Datta, S.

Reviewed manuscripts for: International journal of coal geology; Palaios; Asian journal of Earth Sciences; and Journal of Earth System Science.

Malay Mukul

Served as Member, PAMC for Geosciences, Ministry of Earth Sciences, New Delhi.

Mukherjee, S.

Served as Associate Editor for International Journal of Earth Sciences (IF: 2.3); reviewed and edited 12 manuscripts/articles from April 2012 onwards; served as Lead Guest Editor for the Geosciences of the Himalaya-Karakoram-Tibet Volume in International Journal of Earth Sciences and for the Tectonics of the Himalaya, Geological Society of London, Special Volume.

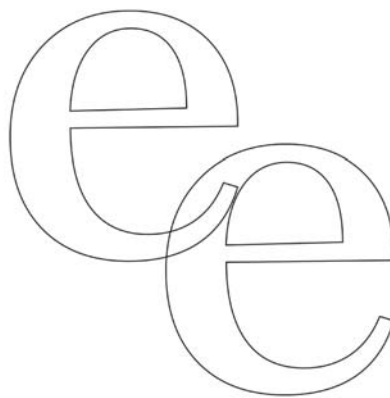
Faculty and their Specializations

1. **D. Chandrasekharam**
Geochemistry, Igneous Petrology, Geothermics
2. **D. Ramakrishnan**
Geomorphology and Remote Sensing
3. **E. Chandrasekhar**
Geo-electromagnetism and Geophysics.

4. **George Mathew**
Crystallography and Mineralogy
5. **G. Mohan**
Seismology, General Geophysics
6. **Gajananrao Narayanrao Jadhav**
Mineral Deposit Studies, Fluid-Melt Inclusions,
Economic Geology
7. **H.K. Singh**
Seismology
8. **H.S. Pandalai**
Ore Geology, Mining Geostatistics
9. **Hetu C. Sheth**
Igneous Petrology and Volcanology
10. **Kanchan Pande**
Isotope Geology, Geochronology, Geochemistry
11. **Malay Mukul**
Structural Geology, Neotectonics, GPS Geodesy
12. **Munukutla Radhakrishna**
Gravity, Magnetic, Geodynamics
13. **Pratul K. Saraswati**
Micropalaeontology, Stratigraphy, Petroleum
Geology
14. **Santanu Banerjee**
Sedimentology, Basin Analysis
15. **Soumyajit Mukherjee**
Structural Geology
16. **Suresh C. Patel**
Metamorphic Petrology
17. **Suryendu Dutta**
Organic Geochemistry, Petroleum Geology
18. **Tapas Kumar Biswal**
Structural Geology and Precambrian Geology.
19. **Trilok Nath Singh**
Engineering Geology, Rock Mechanics

Emeritus Professor

20. **B.K. Sahu**
Sedimentology, Mathematical Geology, Mineral
Deposit Modelling



Electrical Engineering

Introduction

The Department of Electrical Engineering has lot of achievements to its credit largely due to the tremendous hard work and confidence of the excellent teaching from 62 faculty members and students of this department. The department can claim numerous innovations in curriculum and in governance. Any visitor to department can easily sense the enthusiasm and positive energy all around, among students, staff and faculty. Presently department has more than 450 under graduates and 670 post graduate students. Recently joined faculty members of the Department are Dr. Bhaskaran Muralidharan, Dr. Bipin Rajendran, Dr. Gaurav Kasbekar.

The department has a very vibrant postgraduate programme with a strong focus on research and development. The number of postgraduate students is more than the number of undergraduate students in Electrical Engineering and lot of importance is attached to the Master's students as they constitute the backbone of research and development. The department offers Master of Technology (M. Tech.) programme in five research areas or specializations:

- Communications & Signal Processing (termed as EE1)
- Control and Computing (EE2)
- Power Electronics and Power System (EE3)
- Microelectronics and VLSI (EE4)
- Electronic Systems (EE5)

The department has received generous contributions from several donors in the past. Many sponsored research projects are being undertaken in the department. Currently, 12 projects in process have received major funding of more than Rs.1 crore each. Ministry of Human Resources Development, Department of Electronics and Information Technology, Bhabha Atomic Research Centre, Department of Science and Technology, Defence Research Development Organization, Indian Space Research Organization, Mahanagar Telephone Nigam Ltd, Bharat Sanchar Nigam Ltd, L&T Infotech, Tata Teleservices, Bharti, Texas Instruments, Intel,

Microsoft Research, Tata Consultancy Services, Applied Materials (USA) and Hitachi (Japan) are the major funding agencies. Important facilities established in the department due to the financial aid received from various quarters are given below:

- Center for Excellence in Nanoelectronics (with support from Ministry of Communications and IT) setup in 2005.
- National Center for Photovoltaic Research (with support from Ministry of New and Renewable Energy) setup in 2010.
- Tata Teleservices IIT Bombay Center for Excellence in Telecom (with support from Tata Teleservices and Department of Telecom) setup in 2008.
- Power Anser Lab (with support from Tata Consultancy Services) setup in 2007.
- Girish Gaitonde Lecture Hall Complex (with donations from Mr Girish Gaitonde) setup in 2000.
- Wadhvani Electronics Lab (with donations from Mr. Romesh Wadhvani) setup in 2001.
- L. R. Gadre Wireless Complex (with donations from Mr. Aniruddha Gadre) *setup in 2004.*
- Bharti Center for Communication (with support from Bharti Foundation) setup in 2009.

The CEN's (Center of Excellence in Nanoelectronics) objective is to create technically sophisticated manpower for nanoelectronics research, including inter-university network. In addition to the research activities, CEN is also involved in developing technologies that can be commercially availed by the industries. Also Indian Nanoelectronics Users Program (INUP) in department is an initiative to create and spread the expertise of nanoelectronics in India, jointly run by the Centres of Excellence in Nanoelectronics at the Indian Institute of Technology, Bombay (IITB) and Indian Institute of Science, Bangalore (IISc), with financial support from the Department of Information Technology (DIT), the Ministry of Communication and Information Technology (MCIT), Government of India.

The department faculty members have also created video courses under National Program on Technology Enhanced Learning (NPTEL).

Some of the major equipment purchases are detailed below.

- Chemical Mechanical Polishing system (CMP)- Prof. U. Ganguly costing US\$ 1,73,460 (~Rs. 1.80 crores)

Some of the Significant Collaborations done by EE Faculties are as follows:

Duttagupta, S.P.

University of Pune (common PhD/MSc students, joint sponsored research project), IIT Hyderabad (joint sponsored research project)

Girish Kumar

Solutions for Radiation emitted through cell phone towers and other devices, BMS Wellness Pvt. Ltd., 2011-2012.

Antenna Testing, Nelco Limited, Mumbai, 2012-2013.

Academic Programme

The department offers a comprehensive B. Tech programme in Electrical Engineering and an intensive M. Tech programme in each of the five specializations. The department was pioneer in initiating the five year Dual Degree programme (B. Tech +M. Tech degree) in the specializations of microelectronics and communications. The Ph.D. programme offers exciting opportunities for research in emerging areas. Post Doctoral Fellowships are also offered in select areas.

The department has instituted following scholarships for department students with outstanding academic performance.

- Prof. Revankar Memorial Scholarship
- Prof. Shankar Memorial Scholarship
- TCS Scholarship
- Akshay Dhoke Scholarship

New courses, student exchange programmes:

We have couple of Ph. D. students enrolled with IIT B Monash Research Academy, Joint Venture between IIT Bombay and Monash University, Melbourne, Australia.

Student Intake

B.Tech.	: 60
Dual Degree	: 63
M.Tech.	: 140
Ph.D.	: 63

Degree Awarded

B.Tech.	: 41
Dual Degree	: 40
M.Tech.	: 125
Ph.D.	: 20

R & D Activities

The department is involved in a variety of frontier and traditional areas in electrical engineering research, under the main thrust areas of: Communications Network & Internet, Signal and Speech Processing, Wireless & Mobile Communications, Optimal Control and Computing, Power System Analysis and Computation Power System Protection, Signal Processing Application, Speech Processing, VLSI System and Hardware Design, Devices and IC Technology, MEMS Design and Technology, Flash Memory Devices. The department received grants from various sources towards many new projects during the year apart from various ongoing projects. The major funding agencies include DRDO, ISRO, DST, MHRD, MCIT and Applied Materials (USA).

Sponsored Research Projects

Ongoing Projects	: 117
New Projects	: 40
Faculty involved	: 55
Completed Projects	: 24

List of sponsored research projects initiated and ongoing in 2012-2013

Name of the Project	Sponsored by
Reliability Assessment of the Passive systems and its integration into PSA,	Atomic Energy Regulatory Board
Reliability of HKMG Devices,	Applied Materials Inc..
Study of Aluminium Oxide films for passivation of crystalline silicon solar cells,	Applied Materials Inc.
Silicon/Silicon-Germanium/Germanium Vertical Gate All Around (GAA) Transistor Pathfinding (GATP) Project	Applied Materials Inc. .
Activity Recognition in Social Media	Asian office of Aerospace Research and Development, USA.
Off-line and real-time simulator for electric vehicle/hybrid electric vehicle systems	The Automotive Research Association of India.
Design and Qualification of a High Density Readout Chip for Silicon Strip Detectors	Board of Research in Nuclear Sciences.
Super Critical Online UPS	Datar Power Management Pvt. Ltd..
Designing a Smarter and Greener Electric Grid: A Sensor-data Driven Approach	Department of Electronics & Information Technology, New Delhi.
Green Symbiotic Cloud Communications	Department of Information Technology, New Delhi.
Simulation Centre for Power Electronics and Power Systems,	Department of Information Technology, New Delhi.
Investigations into the performance of solar PV panels and their power conditioning at high altitude for UAV applications	Defence Research & Development Organization
Development of MWIR Type II InAs/GaSb based Superlattice heterostructures for third generation IR photodetectors	Defence Research & Development Organisation.
Development of LWIR Type II InAs/GaSb based Superlattice heterostructures for third generation IR photodetectors	Defence Research & Development Organisation
Dielectrics & their Integration into Nano scale Logic and memory devices	Department of Science & Technology.
Synthesis of high quality testable circuits and diagnosis for performance oriented faults	Department of Science & Technology
Disinfestations of Selected Nuts and Spices Using Microwave Energy	Department of Science & Technology
Computer Aided Design of hardware Accelerated Tsunami Prediction System	Department of Science & Technology
Modular Power Electronic Converters for High Power Applications	Department of Science & Technology

Name of the Project	Sponsored by
Design, Fabrication & Testing of RF Front End Components for 60 GHz WPAN Networks,	Department of Science & Technology
RF Power amplifier design for 4G Applications	Department of Science & Technology
Distributed Computation for Optimization over large network and high dimensional data analysis	Department of Science & Technology
India-UK Advance Technology Center of Excellence in Next Generation Networks and Services- Phase 2	Department of Science & Technology
IU-ATC Phase 2-e-Health-ICT towards Healthcare Delivery	Department of Science & Technology.
Spintronic Devices Based on GaN Heterostructures and Materials	Department of Science & Technology.
Monolithic Integration of High Performance Germanium based Infrared Detector on Silicon	Department of Science & Technology
Indo-Russian Project: Algebraic Varieties over Fields & Linear Error Correcting Codes	Department of Science & Technology
Technical Feasibility of TV White Space Operation in India	Ford Foundation.
Analytic and Algorithmic Issues of Complex Networks	International Business Machines Corporation
A Fast Turnaround, Hierarchical IP Design Methodology	International Business Machines Corporation.
Many core Computing: Network-on-Chip using Projective Geometry and Parallel Circuit Simulation	Intel Technology India Pvt. Ltd.
A 14GHz Phase Locked Loop and Millimeter-Wave Circuits in Standard 90nm CMOS Technology	Indian Space Research Organisation.
Dynamic Logic in 65 nm VLSI	Maxim India Integrated Circuit Design Pvt. Ltd..
Data receiver for high-speed multi-lane serial I/O	Maxim India Integrated Circuit Design Pvt. Ltd.
Design and test of Equalizer and Built-in-Test schemes for Multi-lane Serial I/Os for Chip-to-chip Communication	Maxim India Integrated Circuit Design Pvt. Ltd.
Microwave Enhanced Air Heating and Drying Systems for Value Addition of Agro-Based Products Dehydration and Disinfestations	Ministry of Food Processing.
Village Communication Network by Rural Internet Service Provider leveraging on Fiber to the Village	Ministry of Human Resource Development.
Dissemination of Solar PV Laboratory training Kit in 165 Educational Institute	MNRE
Table Top Model for studying the CSF flow rate through a shunt tube using MEMS transducer array	Nipro Tube Glass Ltd.
Capture, share, relive, remix : light field and computational photography	Nokia India Pvt. Ltd., Bangalore.

Consultancy Projects

No. of Jobs	: 17
No. of faculty involved	: 14

Patents

No. of patents granted	: 3
No. of patents filed	: 14

Patents Granted are listed as follows:

Shrivastava, M., Gossner, H., Ramgopal Rao, V., Shojaei Baghini, M.

“Field-effect device and manufacturing method thereof, Issue date: January 2013.

Shrivastava, M., Gossner, H., Ramgopal Rao, V., Shojaei Baghini, M.

“A DeMOS Device realized using dual STI process, United States Patent 8,097,930, Issue Date: January 17, 2012.

Thakkar Rajesh, Shrivastava, M., Shojaei, M., Sharma, D.K., Ramgopal Rao, V., Patil, M.B.

“A Novel Architecture for Improving Slew Rate in FinFET-based Op-Amps and OTAs United States Patent # 8,089,314, Date of Patent: January 3, 2012.

Patents Filed are listed as below:

Vineeth A., and Shojaei Baghini, M.

“Frequency to Digital Sigma Delta Based Frequency Modulation/Frequency Shift Keying (FM/FSK) Receiver Design”, Patent application No. 1598/MUM/2013, filed in May 2013 (India).

Xavier and Shojaei Baghini, M.

“Hysteretic Controlled DC to DC Buck Converter”, Patent application No. 3257/MUM/2012, filed in November 2012 (India).

Gowdhaman, S.K., Shojaei Baghini, M., Anavangot, V., Mukherjee, J.

“Frequency to Voltage converter, PCT Application No. PCT/IN2012/000475, filed on July 5, 2012.

Kumar, G., Shojaei, M.S., and Arrawatia, M.

“A Fully Differential Electromagnetically Coupled Microstrip Antenna, Indian Patent Application No 1258/MUM/2012, Filed on April 20, 2012.

“Simultaneous Dry Blanching and Drying of Button Mushroom using Microwave Enhanced Hot Air Heating System”, Indian Patent Application No. 219/MUM/2013, Filed on January 24, 2013.

Sharma, G.R., Patil, T.C., Shyamasunder, S., and Dutttagupta, S.P.

Nanoscale Flow Rate Measurement of Cerebrospinal Fluid.

Patil, T.C., Ramesh, P., and Dutttagupta, S.P.

Body Glucose based Nano-Biofuel Cell for In-Vivo Applications

Das Achintya, Dutttagupta, S.P., and Gandhi, M.N.

Optimization of Ion Selective Barrier Layer Thickness to Lower Degradation of Thermal Neutron Detector.

Rashmi, R., Dutttagupta, S.P., Ray, K.P., Kamble, S.D., Gandhi, P.S., and Aiyar, R.P.R.C.

3-D antenna using Micro-stereo-lithography Process

Nag, Sandeep Goud Surya, Sharma Dinesh and Ramgopal Rao, V.

“Voltage Profile Based Biphasic Constant Current Stimulator with Artifact Suppressor”, Indian Patent application no. 2562/MUM/2012.

C. Vijaya Bhaskar Reddy, Khaderbad Mrunal Abhijit, and Ramgopal Rao V.

“Polymer piezoresistive microcantilever CO sensor and method of making the same”, Indian Patent Application No 2276/MUM/2012 Filed on August 8, 2012.

Shrivastava, M., Christian Russ, Gossner, H., and Ramgopal Rao, V.

“ESD Robust Drain Extended MOS Device”, Docket no: INF 2010 P 51532, United States Patent pending.

Raval, H. N., Khaderbad Mrunal Abhijith, and Ramgopal Rao, V.

“Carbon Monoxide Gas Sensing using Organic Field Effect Transistor and Method of Fabricating the same”, Indian Patent Application No 1923/MUM/2012, Filed on July 3, 2012.

Kumar Vijay, Sharma, N.N., and Ramgopal Rao, V.

“Closed Micro-channel for Electrowetting on Dielectric based Microfluidics using E-beam Lithography”, Indian Patent Application: 1950/MUM/2012, Date of Filing : July 5, 2012.

Extension Activities

Gadre V.M.

Principal Investigator in BRNS Project (Project No 10BRNS010) from the Board of Research in Nuclear Sciences.

Karandikar Abhay

Member, Advisory Board, Bharti School of Telecommunications Technology and Management, IIT Delhi, 2013.

Member, Academic Committee, College of Military Engineering, Pune 2013.

Chair, Working Group 3, ITU-T Focus Group on “Bridging the gap: From Innovations to Standards”, 2012-13, International Telecommunications Union (ITU-T)

Contributing author, Technology Vision 2035 on ICT and Telecom, TIFAC, 2013.

Jury member, Indian Semiconductor Association (ISA) Techno vision awards 2013.

Jury Member, Economic Times Telecom Awards 2012.

Member, Technology Appraisal Committee, TIFAC Innovation Program, DST, 2012.

Selection committee member, CDAC, 2012.

Member, Research and Recognition Committee of Board of Studies, Mumbai University, 2012-13.

Following CEP Courses were conducted by the department during the last year

Renewable Energy Technology, May 14-18, 2012

IC Design and Fabrication, Advanced Data Network, and Foundation of VLSI CAD, on July 19, 2012.

VLSI Technology, Power Electronics, Physics of Nanoscale Devices I, Sensors in instrumentation, and Image Processing, on July 20, 2012

Statistical Signal Analysis, on July 25, 2012

Taguchi Methods for Optimization, and Triz Innovation, in August 2012.

Role of Technology in Crime and Crime Prevention, and Semiconductor Technology and Manufacturing, in November 2012.

Following CEP Courses were conducted in January 2013: Introduction to digital signal processing; Role of R F Microelectronics Chief Design; Radar Systems; Physics of Nanoelectronics Devices II; Embedded Systems Design; Matrix Computers; Growth and characterization of Nanoelectronic Material; Information Theory and coding; Restructured Power System; Computer Vision; Physics of Transistors; First course in optimization; Application of Power electronics in power systems; and Nanoelectronics.

Following CEP Courses were conducted in February 2013: Problem solving and Opportunity creation using TRIZ Innovation; Problem solving and Opportunity creation using TRIZ Innovation; Induction Machine

Modeling, Control and Drives; and Problem solving and Opportunity creation using TRIZ Innovation.

Conferences/Symposia/Workshops/ Seminars (participated/papers presented)

Kumar Animesh

Signal Processing and Communications (SPCOM) conference, IISc Bangalore, July 2012.

TV White Space and Cognitive Radios Workshop, Department of Electrical Engineering, IIT Bombay, December 16- 17, 2012

Rajendran Bipin

26th International Conference on VLSI Design, 2013.

Non-Volatile Memories Workshop, 2013.

Manjunath, D.,

“In-Network Estimation of Frequency Moments, *International Journal of Advances in Engineering Sciences and Applied Mathematics*, 2013.

Girish Kumar

National Conference on Recent Trends in Microwave Techniques and Applications (Microwave 2012), Jaipur, India, July 2012.

National Conference on Harmful Effects of Mobile Phone Radiations on the Health of Human Beings, Barwani, India, September 2012.

Conference on Engineering, NUiCONE, Ahmedabad, India, December 2012.

Conference on Communications, Devices and Intelligent Systems, Kolkata, India, December 2012.

Building Smart Human Cities, Bhopal, India, March 2013.

Gadre V.M.

Participated in the National Communications Conference (NCC-2012), IIT Kharagpur, India, held during February 3-5, 2012.

Participated in Conference on Signal Processing and Communications, SPCOM 2012 held at Indian Institute of Science, Bangalore, during July 22-25 2012.

Duttgupta, S.P.,

VLSI Design (Technical Program Committee, Session Chair), January 2013, Pune, India.

“Bandwidth Enhancement using Gap-Coupled Hexagonal Microstrip Antennas in L Band”,

Microwave and Optical Technology Letters, accepted for publication, 2013.

“Effect of channel dimensions on PEM fuel cell Performance using 3-D Modeling, *International Journal of Renewable Energy Research*, accepted for publication, 2013.

Rajbabu, V.,

Presented paper at ICVGIP 2012, December 2012, Mumbai, India.

Faculty from EE department organised the Eighth Indian Conference on Vision, Graphics And Image Processing from December 16-19, 2012.

Bhaskaran Muralidharan

W.E.Heraeus stiftung workshop on spin orbit driven transverse transport phenomena in Bad Honnef, Germany (invited participation) December 2012.

Chakrabarti Subhananda

“Enhancement (100 times) of photoluminescence in pulsed laser deposited ZnO thin films by hydrogen ion implantation, *SPIE Photonics West*, OPTO, San Francisco, USA, Janaury 2013.

“P-type ZnO films by phosphorus doping using plasma immersion ion-implantation technique, *SPIE Photonic West*, OPTO, San Francisco, January 2013.

“Optimizing the Multilayer InAs/GaAs Quantum Dot Heterostructure to Produce Bilayer like Uniformity by Using Annealing and Variable Spacer Thicknesses for Long Wavelength (1.3 μ m or 1.55 μ m) Applications, *Materials Research Society Meeting*, Boston, USA, November 25 - 30, 2012.

“Dependence of Oxygen Pressure on the Structural, Electrical and Optical Properties of Pulsed Laser Deposited ZnO Thin Films, *Materials Research Society Meeting*, Boston, USA, November 25 - 30, 2012.

“A comprehensive study on MBE grown InAs sub-monolayer quantum dots with different capping combination, *North American Molecular Beam Epitaxy Conference*, Georgia, Atlanta, USA, October 2012.

“Evidence of long wave excited state transition at high temperature (200K) in 35 layer In_{0.50}Ga_{0.50}As/GaAs quantum dot infrared photodetector, *North American Molecular Beam Epitaxy Conference*, Georgia, Atlanta, USA, October 2012.

“Demonstration of very large responsivity (~25 A/W) of quaternary capped InAs/GaAs quantum dot infrared photodetector under 45-degree angle incidence measurement, *North American Molecular Beam*

Epitaxy Conference, Georgia, Atlanta, USA, October 2012.

“Extension of the bilayer into multilayer InAs/GaAs Quantum dot heterostructure for application in long wavelength (1.3 μ m) devices and the use of annealing to increase homogeneity, *North American Molecular Beam Epitaxy Conference*, Georgia, Atlanta, USA, October 2012.

“Spectral broadening due to post growth annealing on long wave InGaAs/GaAs quantum dot infrared photodetector with quaternary barrier layer, *Electronics Materials Conference 2012*, Penn State, USA, June 2012.

“Demonstration of High responsivity(~2.2 A/W) and Detectivity(~10¹¹ Jones) in the Long wavelength (~10.2 μ m) from InGaAs/GaAs quantum dot Infrared photodetector with quaternary In_{0.21}Al_{0.21}Ga_{0.58}As capping, *SPIE Defence, Sensing and Security Conference 2012*, Baltimore, USA, April 2012.

“Analysis of Thermal Stability of PL Peak Wavelength in GaAs_{1-x}N_x Capped InAs Quantum Dots, *MRS Spring Meeting*, San Francisco, USA, April 2012.

“10-Fold Enhancement in Photoluminescence Efficiency Due to Low Energy H- Ion Irradiation over InAs/GaAs Quantum Dots, *MRS Spring Meeting*, San Francisco, USA, April 2012.

“Impact of Barrier Thickness on the Structural and Optical Properties of Multilayer(x10) Coupled InAs/GaAs Quantum Dots Using Bilayer(X2) Quantum Dots as the Seed for Strain Patterning, *MRS Spring Meeting*, San Francisco, USA, April 2012.

“A Detailed Investigation into Strain-coupled Bi-layer InAs/GaAs Quantum Dots: Impact of Variation in Deposition Rate, Barrier Thickness and Monolayer Coverage, *MRS Spring Meeting*, San Francisco, USA, April 2012.

Chandorkar Mukul

IEEE Energy Conversion Congress and Exposition, September 15-20, 2012, Raleigh, USA.

“Industrial Medium-voltage Drives, talk at *Cree Semiconductor*, Durham, North Carolina, USA.

Patil M. B.

Participated in *EDUCON 2013*, an *IEEE Global Conference*, Berlin, Germany on Engineering Education held during March 13-15, 2013

Khaparde, S.A.,

Participated in *UCAIUG meeting* at USA in October 2012.

Participated in *IEC TC 118 meeting* at Paris in November 2012.

Rajbabu, V.

Participated in *IEEE 7th Sensor Array and Multichannel Signal Processing Workshop (SAM)*, June 2012, New Jersey, USA.

Kotwal, K., and Chaudhuri, S.

“A Bayesian Approach to Visualization-oriented Hyperspectral Image Fusion, *Information Fusion*.

Belur Madhu

“Uncontrollable dissipative systems: Observability and embeddability, accepted for publication in the *International Journal of Control*.

“Nyquist plots, finite gain/phase margins and dissipativity, accepted for publication in *Systems & Control Letters*, 2013.

Tripathi Jai Narayan, Mukherjee, J., Apte Prakash R., Nagpal Raj Kumar, and Malik Rakesh

“Selection and Placement of Decoupling Capacitors in High Speed Systems, Accepted for publication in *IEEE Electromagnetic Compatibility Magazine*.

Soman, S.A.

“On the wave propagation of disturbances in homogeneous electromechanical systems, *Journal of vibration and acoustics*, 2013.

“Studying Electromechanical Wave Propagation and Transport Delays in Power Systems, *IJEPS*, 2013.

“Power System Oscillation Modes Identifications: Guidelines for applying TLS-ESPRIT Method, *IJEPS*, 2013.

Conference/Symposia/Workshops/Seminars (Coordinated/ Chaired by Faculty)

Manjunath, D.

Workshop on Probability in Engineering Systems, IIT Bombay March 2013.

JTG Summer School on Communications, Networking and Signal Processing, May 2012.

Chaired the ACM MobiHoc Conference at Bangalore, during July 29 - August 1, 2012.

Ramgopal Rao, V.

INUP Hands-on Training,; 8th Hands-on Training, April 9-13, 2012,; 9th Hands-on Training, April 23-27, 2012,; 11th Hands-on Training, October 8-12, 2012,; 12th Hands-on Training, October 29-November 2, 2012,;

13th Hands-on Training, November 26-30, 2012,; 14th Hands-on Training, December 18-20, 2012,; 15th Hands-on Training, January 28 - February 1, 2013,; 16th Hands-on Training, February 25 - March 1, 2013,; 17th Hands-on Training, March 18-22, 2013.

Kumar Animesh

Coordinated TV White Space and Cognitive Radios Workshop, Department of Electrical Engineering, IIT Bombay, December 16-17, 2012.

Bhaskaran Muralidharan

Coordinated MRS trilateral workshop in November 2012 as a co-organizer.

Gadre V M

Coordinated as a general chair in CM MobiHoc Conference in Bangalore, during July 29-August 1, 2012.

Kumar Girish

Coordinated workshop on Cell Phone Radiations Hazards and Solutions at IIT Bombay, Mumbai on July 9, 2012.

Invited Lectures

Borkar V. S.

Delivered an Invited lecture on Distributed computation of Perron-Frobenius eigenvectors and applications, Department of Electrical Engineering, IIT Madras, September 3, 2012.

Delivered an Invited lecture on How to win friends and influence people on the web, University Day, NMIMS, Mumbai, January 12, 2013.

Delivered an Invited lecture on How to win friends and influence people on a social network, STTP on Advanced optimization Techniques and their Applications in Engineering Research, and Introduction to optimization theory, STTP on Advanced Optimization Techniques and their Applications in Engineering Research, Punjab University, Chandigarh, January 21, 2013.

Delivered an Invited lecture on Risk-sensitive control and the Donsker-Varadhan functional, Indian Statistical Institute, New Delhi, April 24, 2013.

Bhaskaran Muralidharan

Delivered an Invited lecture on Thermoelectrics in ARCI, IITM research park, Chennai.

Chakrabarti Subhananda

Delivered an Invited lecture on In(Ga)As/GaAs Quantum Dot Infrared Photodetectors based Focal Plane Imaging Arrays, IGCAR, at Kalpakkam, on April 12, 2013, and at an *Indo-Taiwan workshop*, JNCASR, Bangalore, November 26-27, 2012.

Delivered an Invited lecture on In(Ga)As/GaAs quantum dot infrared photodetectors and thermal imagers, at JNCASR, Bangalore, on May 24, 2012, and at the Dept. of Electrical Engineering, IIT Delhi, New Delhi, on May 23, 2012.

Delivered an Invited lecture on Molecular Beam Epitaxial Growth, fabrication and characterization of quaternary capped InAs/GaAs Quantum Dot Infrared Photodetectors and Arrays at the Department of Electronic Science, Calcutta University, on May 17, 2012.

Delivered an Invited lecture on Molecular Beam Epitaxial Growth, fabrication and characterization of quaternary capped InAs/GaAs Quantum Dot Infrared Photodetectors, at S.N. Bose Center for Advanced Research, Calcutta, on May 16, 2012, and at IISER, Calcutta, on May 14, 2012.

Karandikar Abhay

Delivered a lecture titled Next Generation Wireless Networks: Research Challenges and Opportunities, NASI-Reliance Industries Platinum Jubilee award Lecture, *82nd Annual Congress of NASI*, December 1, 2012.

Delivered a lecture titled Building Eco-system for Smart Phones in India-Key Challenges, *3rd CAREL Workshop*, Office of PSA to Government of India, Delhi, October 22, 2012.

Delivered a lecture titled Building Next Generation Large-Scale Mobile Backhaul Network, *Indo-Japan 60th Anniversary Workshop on Large Scale Networks*, Chennai, August 7, 2012

Delivered a lecture titled Next Generation Wireless Networks: Tele-traffic and QoS Aspects, *4th Indo-German Frontiers of Engineering Symposium*, Merseburg, Germany, June 13-16, 2012.

Narsimhan, K.L.

“SEMI on Thin Film PV Technology Cells to Systems at BIEC, Bangalore, 2012.

“Solar Photovoltaic, *ICSEP 2012* at KIIT Bhubaneswar.

Lecture Workshop on “Photophysics of Molecular Materials for Electronic and Energy Applications” at M.S. University, Baroda, from October 3-5, 2012.

Maryam S. B.

“Energy-Efficient Current-Mode Signaling Scheme for Long On-Chip Interconnects, *SMDP workshop*, Jadavpur University, Kolkata, March 2013.

“Review of Research Activities in Device-Circuit Co-Design, IIT-Bombay, November 2012.

“In-situ soil moisture measurement and WSN, Nano Phase II project, Lonavla, November 2012.

“LDMOS Device Optimization, Maxim technology day, September 2012, Maxim Integrated Circuits, Bangalore, India.

Duttgupta, S.P.

“MEMS TCAD for micro-energy devices, VNIT, Nagpur, August 31, 2012.

Bhaskaran Muralidharan

Lecture on Thermoelectrics and spin thermoelectrics, in National Institute of materials science (NIMS), Tsukuba, Japan in January 2013.

Awards & Distinctions

Some of the distinguished and the most recent awards bestowed on the faculty members of the department are listed below.

Prof. Vivek Borkar, Prof. S. Chaudhari, Prof. V. R. Rao are recipients of Shanti Swaroop Bhatnagar Prize,

Prof. Vivek Borkar, Prof. S. Chaudhari, Prof. U. B. Desai are recipients of J. C. Bose Fellowship.

Shojaei Maryam

First place award in the Design Contest in 2013.

Project guide award for the first place in Design Contest in International Conference on VLSI Design, India, 2013.

Project guide and co-recipient of the first place award all over India in *Cadence Design Contest*, India, 2012.

Rao, V.R.

ISA Technovation Award for Most Promising Startup 2012 in 2013.

Lifetime Achievement Award in 2013, IIT Bombay.

Chandorkar, A.N.

Life Time Achievement Award, International Conference on VLSI Design in 2013, VLSI Society of India.

Vasi, J.M.

Recipient of the Awards for Excellence in Research 2012-13.

Kumar Animesh

Recipient of the Best Student Paper Award in 2012, SPCOM

Chandorkar, A.

Recipient of Member, IEEE, (USA) in 2012, IEEE.

Soman, S.A.

Recipient of the IIT Bombay Industrial Impact Award in 2012, IIT Bombay.

Fernandes, B.G.

Recipient of the Best Poster Award in 2012, IEEE, PVSC-2012 conference, USA.

Borkar, V.S.

M. S. Huzurbazar Memorial Lecture, Bombay Mathematical Colloquium, 2012

IBM SUR Award

Elected Fellow of the Third World Academy of Sciences.

Elected Fellow of the American Math. Society.

Karandikar Abhay

NASI - Reliance Industries Platinum Jubilee Award in 2012, National Academy of Sciences, India

Finalist (one of the three) for Best Paper award in IEEE LCN 2012.

Board Member, Board of Directors, Technology Incubation Center (TICE), a Section 25 company, VNIT, Nagpur, 2012.

Member, Experts Panel, Aditya Birla Private Equity Capital, 2012.

Founding Member, Executive Council, Development Organization of Standards for Telecommunications in India (DOSTI), 2012

Mukherjee Jayanta

M. S. Huzurbazar Memorial Lecture, Bombay Mathematical Colloquium. in 2012, Ruia College, Mumbai.

DST - Lockheed Martin India Innovation Growth Programme 2012.

IIT Bombay, Industrial Research and Consultancy Center, Young Investigator Award 2012.

Indian National Science Academy, Indo - Australia Early Career Researcher

Fellowship 2012-13.

Senior Member IEEE

Khaparde, S.A.

Appointed as a Board of Governors of India Smart Grid Forum in 2012.

Duttagupta, S.P.,

Best Presentation Award, Achintya Das, SP Duttagupta and MN Gandhi, TCAD and Compact Models for SiC Schottky Diode as Neutron Induced Ion Detector, in *International Conference on Electronics, Communication and Signal Processing*, Nagpur, India November, 2012.

Kulkarni, S.V.

Fellow, Indian National Academy of Engineering
Editor, IEEE Transactions on Power Delivery

Honorary Work

Borkar V. S.

Member of: Executive committee of International Society for Dynamic Games; Sectional Committee for Mathematics, INSA, and Engineering Sciences Research Committee, CSIR

Managing committee member for TIFR Centre for Applicable Mathematics and International Centre for Theoretical Sciences, TIFR.

Assessor for Australian Research Council. Refereed proposals for DST, CSIR, CEFIPRA, IUSSTF.

Gadre, V.M.

Served on editorial board of Journal 'SADHANA' of the Indian Academy of Sciences.

Member of Academic Council, IIT Indore.

TEQIP Mentor to Govt College of Engineering, Aurangabad.

Girish Kumar

Creating Awareness on Cell Phone/Tower Radiation Hazards and Solutions.

Maryam S. B.

Coordinator for invited talk by Dr. Rakesh Kumar, President, IEEE Solid-State Circuits Society, President & CEO, TCX Technology Connexions, USA, in Electrical Engineering Department, IIT-Bombay.

TPC member, Emerging Applications and Technologies sub-committee, *IEEE A-SSCC* (Sister Conference of *IEEE ISSCC*), 2012 and 2013, Japan and Singapore.

Track chair (Analog and Mixed-Signal System Design) and TPC member, ISED 2011, India.

Technical co-chair, (Signal Processing and VLSI), IEEE INDICO, 2013, India.

TPC member, Low-Power Design/Circuits and Technology Track, *IEEE International Conference on*

VLSI Design (Sister Conference of *IEEE DAC*), 2012 and 2013, India.

TPC member, Circuit and System Design, IEDEC and ISQED Conferences), 2012 and 2013, USA.

TPC member, ASQED Conference 2012 and 2013, Malaysia.

TPC member, ISVLSI Conference 2012 and 2013, Cyprus and Brazil

Faculty Members and their Specialisations

1. Arjun Arunachalam

Magnetic Resonance Imaging: Image reconstruction, Parallel Imaging, Compressed sensing, Rf antenna design.

2. Anil Kottantharayil

CMOS device physics, characterization, modelling and technology.

3. Abhay Karandikar

Communication Network, Quality of Service Guarantees in Internet, telecommunication switching, Digital communication.

4. A.M. Kulkarni

Power System Dynamics, Flexible AC Transmission Systems, HVDC Transmission Systems.

5. A. N. Chandorkar

Analog and Mixed signal VLSI Design, Ultra-Thin Gate insulators for VLSI Technologies.

6. Apurba Laha

Microelectronics, MBE growth, Oxide electronics, Si and Ge.

7. Animesh Kumar

Applied statistics, integrated circuits, signal processing sampling theory.

8. Anshuman Shukla

Multilevel converters, Modulation and control power electronic converters, Power electronics applications in power systems (FACTS, HVDC, custom power devices, etc.), Renewable energies, Energy storage, Control of electric drives, Hybrid and solid-state circuit breakers and current limiters.

9. Ashwin Tulapurkar

Physics and applications of spintronics devices, spin-injection, spin-current induced magnetization switching. High speed measurements of switching. Noise in nano-devices. Ferromagnetic resonance.

10. Ajit Kumar Verma

Reliability in Engineering Design, Software Reliability, Design and Analysis of Fault Tolerant Systems, Physics of Failures, PSA, RBI and Power System Reliability.

11. B. M. Arora

Optoelectronic materials and devices III-IV compound semiconductors solar cells.

12. Bikash Kumar Dey

Error correcting codes, wireless communication, signal processing.

13. B. G. Fernandes

Power electronic interface for non-conventional energy sources, Electrical machine design and control.

14. Bipin Rajendran

Nanoscale science and technology, Biomimetic engineering & computation, Novel materials & devices for memory/logic applications, Three-dimensional & heterogeneous integration, Sensing & analytics for urban challenges.

15. Bhaskaran Muralidharan

Computational nanoelectronics, spintronics, nano scale energy conversion.

16. Debraj Chakraborty

Optimal Control, Differential Games, Nonlinear Theory, Control of Biological Systems and Diseases.

17. D. Manjunath

Computer and Communication Network Protocols, Systems and Algorithms Performance Modeling Queueing Theory and Simulation, Stochastic Systems.

18. Dipankar Saha

Microelectronics, New Device Physics, Semiconductor Spintronics, Spin injection, transport and detection in III-V systems, Device Reliability.

19. Dinesh K. Sharma

MOS device modeling, VLSI design and technology. Microelectronics- technology and Device characterisation; and mixed signal design.

20. Gaurav Kasbekar

Modeling, design and analysis of wireless networks, Game theoretic and economic aspects of spectrum allocation, Cognitive radio networks, Lifetime and coverage problems in wireless sensor networks.

21. Girish Kumar

Microstrip antennas and arrays, Broadband antennas Microwave integrated circuits; EMI/EMC; RF Circuits.

22. Harish K. Pillai

Control theory; Behavioural theory of Systems
Multidimensional systems; optimal control; Coding
theory; Optimization techniques.

23. H. Narayanan

Building large scale circuit simulators, Combinatorial
optimization including submodular function theory,
Large scale system partitioning.

24. Jayanta Mukherjee

RF VLSI Design, Testing, Noise Modeling, Analog VLSI

25. Joseph John

Electronic Circuits, Optical Fiber Communications,
Electronic Systems and instrumentation.

26. Kishore Chatterjee

Utility friendly converter topologies, Power Factor
Correction techniques, STATCOM, Switched Mode
Rectifiers, Electronic Ballast, Control of Electric Drives

27. Maryam Shojaei Baghini

Technology-aware design, integrated circuit and
system design with emerging devices, Integrated
power management for SOC applications, Analog/
Mixed-signal. IC design for different applications,
Circuit and system modeling, Circuit design
optimization, Analog/Mixed-signal/RF EDA (CAD
tools, theory and implementation), Circuit and system
design with organic thin film components, RF/
Microwave integrated circuit design, VLSI design and
embedded systems.

28. Madhu N. Belur

Systems & Control theory, Behavioral theory of
Systems and Control, Optimal control, Numerical
aspects, Hybrid systems

29. Mukul C. Chandorkar

Electrical drives, Power electronic converters and
control, Power system applications of power
electronics, and electrical power quality for industrial
and commercial installations, DSP applications in
power electronics and power systems.

30. Madhav P. Desai

VLSI design and design automation, Graph theory and
combinatorics Circuits and systems

31. Mahesh B. Patil

Semiconductor device modelling for circuit simulation
Semiconductor device simulation, Mixed-mode circuit
Simulation.

32. Preeti S. Rao

Speech and Audio Signal Processing, Digital Signal
Processing, Coding of speech at low bit- rates.

33. Prasanna Chaporkar

Information theory, Stochastic control, Optimal
decision issues

34. Pradeep R. Nair

Nanoscale devices for energy and healthcare
applications, Semiconductor device physics and
reliability, MEMS

35. Prem C. Pandey

Speech & Signal Processing, Biomedical Signal
Processing and Instrumentation, Instrumentation,
Embedded Electronic System Design

36. P. R. Apte

MicroElectroMechanical Systems(MEMS), Quality
and Reliability, Taguchi and TRIZ Methodologies.

37. R. K. Shevgaonkar

Fiber Optic Communication; Photonics; Non-linear
fibre optics; Antennas;
Image Processing; Radio Astronomy; Communication

38. Saravanan Vijayakumaran

Digital Communications, Computer Networks, Parallel
Simulation Algorithms.

39. Subhananda Chakrabarti

Microelectronics, Growth, fabrication and
characterization of III-VI semiconductor devices

40. Subhasis Chaudhuri

Multimedia, Computer Vision, Image Processing,
Pattern Recognition, Biomedical Signal Processing

41. Siddhartha P. Duttagupta

Microelectronics

42. Shalabh Gupta

High speed analog/RF IC design, optical fiber
communications, ultra-high-speed data conversion
using photonics, smart antenna systems, biomedical
electronics and biophotonics.

43. Swaroop Ganguly

Physics and technology of novel nanoscale devices
for information-processing and energy-harvesting.

44. S. A. Khaparde

Deregulation in Power Industry: optimal bidding,
congestion management, Object Oriented Power
System Analysis, Controlled series compensation
using SSSC, Harmonic Distortion in Distribution
systems, Design and Operation of small tidal
powerplant, Modelling and Design of transformer

45. S.V. Kulkarni

Transformer Design and Analysis, Electromagnetic and
Coupled Field Computations, Efficient Finite Element
Method Computations, Power Engineering:

Distribution Automation and Distributed Generation, High Voltage Insulation Design

46. Saurabh Lodha

CMOS process integration and device physics, Materials and processes for advanced CMOS devices, Metal-semiconductor interfaces Molecular devices

47. Souvik Mahapatra

Flash EEPROMs, SONOS, Nanoparticle storage, NBTI and Hot carrier degradation in MOSFETs, High-k gate dielectrics

48. S.N. Merchant

Signal Processing, Adaptive Signal Processing

49. Sachin Patkar

Combinatorial optimization, Algorithms Design and Analysis, Graph Theory, Geometric Design and Graphics

50. Sibi Raj B. Pillai

Fundamental Limits of Communication Systems Information Theory and its applications, Sensing, Stochastic Modeling, Allocation Problems, Interference Channels Relaying and Broadcasting

51. S. A. Soman

Power System Analysis, Restructuring of Power Systems, Power System Protection, Optimization, Object Oriented Design, Computational Methods

52. S. D. Agashe

Control theory, Network theory, Speech analysis and Synthesis.

53. Uday B. Desai

Signal Processing, Wireless Communication (Multiuser Detection), Adaptive Signal Processing, Image and Video Processing Wavelets, Biomedical Signal and Image Processing, Artificial Neural Networks

54. Udayan Ganguly

Flash Memory dielectric and structure optimization for traditional scaling, Non-traditional Flash Memory scaling with molecules (e.g. fullerenes, nanotubes), Future FlashMemory replacements.

55. Vivek Agarwal

Power Conversion, Power quality issues, Non-conventional energy, Intelligent control of power electronic systems, Design of electronic systems, Electromagnetic Interference and compatibility (EMI/ EMC)

56. Vivek S. Borkar

Stochastic Control, Learning Control Theory, Random Processes.

57. V. M. Gadre

Communications and signal processing with emphasis on multiresolution and wave based methods.

58. V. Rajbabu

Statistical and digital signal processing, Signal processing system design, Particle filter applications, and Target tracking systems.

59. V. Ramgopal Rao

Nanoelectronics, Circuit and System Considerations with Emerging CMOS Technologies (Multigate MOSFETs, Single Halo MOSFETs etc.), Technology and Characterization of Sub 100 nm CMOS devices, CMOS Reliability Characterization (plasma damage, radiation, hot-carrier), Bio-MEMS

60. Virendra Singh

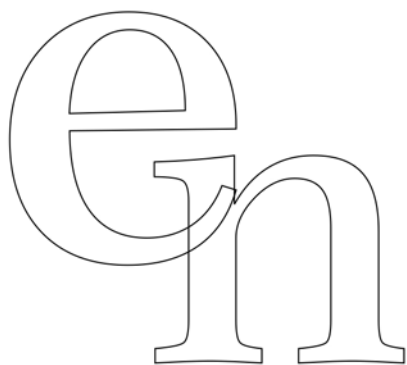
Computer Architecture, High Performance Computing, Robust System Design, Fault Tolerant Computing, Testing, Formal Verification, Self-Healing System Design, Design for Testability, SoC/NOC Design and Test, Reconfigurable System Design Hardware Accelerators, Trusted Computing.

61. Vasi J. M.

Silicon photovoltaic devices, Nanocrystal based solar cells, Reliability of solar modules

62. V. R. Sule

Cryptography: Cryptographic Algorithms Elliptical curve based schemes, Algebraic cryptanalysis of block and stream ciphers satisfiability methods, Boolean equations and analysis. Control Theory: Feedback system design, Computational Methods for dynamic systems.



Energy Science & Engineering

Introduction

The Department of Energy Science and Engineering is a young department started in 2007. Prior to this, it existed as an interdisciplinary programme for over 25 years. The department aims to provide manpower and research inputs that are critical for the growth of India's energy sector and also endeavours to provide innovative energy technologies and systems to mitigate the global problem of climate change. Currently, the department offers an integrated B.Tech/M.Tech. (dual degree) programme and an integrated M.Sc./Ph.D. (dual degree) programme, in addition to the conventional M.Tech. (Energy Systems Engineering) and Ph.D. programmes. There are at present 17 core faculty members and 30 associated faculty members from across the institute.

Academic Programmes

The different programmes are aligned with the rapidly increasing needs of the nation's energy sector and directed at providing human resources to address and contribute towards the same. The high-quality training provided in the department hones the student skills in understanding the science and technology of energy systems, thus creating innovators, scientists, and engineers who can contribute meaningfully to the needs of the nation - adding to more than 500 alumni who currently occupy various positions in industry and research institutions.

The interdisciplinary nature of the course brings together faculty members and students with diverse backgrounds and interests in engineering (Energy, Mechanical, Electrical, Civil, Materials, etc.) and science (Physics, Chemistry, Maths, etc.). In the course of their pursuits for a degree, students are exposed to core areas of energy management including energy auditing, energy systems modeling and analysis and non-conventional energy sources, to name a few. In addition, students take elective courses in their areas of specialization. The department also interacts with the industry (consultancy, sponsored projects), research institutions (seminars, workshops), and policy makers (seminars, workshops) for developing

and promoting clean and efficient energy technologies in the country. The programme is well recognized by the industry with fellowships and sponsorships from various organizations, viz., Forbes Marshall, ONGC, Cummins, and MNRE.

In 2012, 29 students were admitted to M.Tech. programme, 14 students to Ph.D. programme, 11 students to M.Sc.-Ph.D. (dual degree) programme, and 31 students were admitted to B.Tech.-M.Tech. (dual degree) programme.

Degrees Awarded

Dual Degree	
(B.Tech./MTech.)	: 1 st batch graduated in 2013
M.Tech.	: 27
M.Sc.	: 1
Ph.D.	: 3

Minor Courses :

- Energy Resource, Environment, and Economics
- Energy Management
- Introduction to Renewable Energy
- Hydrogen Energy
- Wind Energy Conversion
- Introduction to Solar Photovoltaics
- Advanced Solar Technology
- Conservation of Energy in Buildings

Scholarships

MERC : 2
NCPRE : 2

R&D Activities

Sponsored Research Projects

Total number	: 55
New	: 2
Ongoing	: 46
Completed	: 7

List of sponsored research projects

Project Title	Sponsoring Agency	Status (New/ Ongoing/Completed)
Industry Affiliate Program	Industry Consortium	Ongoing
Simulation Centre for Power Electronics and Power Systems	Department of Information and Technology	Ongoing (Shared)
Analysis of Hybrid Storage Solar PV Systems	Department of Science and Technology	Ongoing (Shared)
Energy Management System for Asian Railways	UIC-Asia and RDSO	Ongoing(Shared)
Principal Consultant for 125 MW Mahagenco Solar PV Power Plant	TUV, SUD South Asia	Ongoing(Shared)
Power Quality and Control in Microgrids	NCPRE	Ongoing(Shared)
Peer-to-Peer Control of Distributed Energy Resources for improving Voltage and Frequency Profile in MicroGrids	Department of Science and Technology	Ongoing
Investigation of Dynamic Stability Phenomena in Microgrid during Islanding and Re-Synchronizing	IRCC, IIT Bombay	Ongoing
“Synthesis and Electrochemical Characterization of Nanomaterial-based Architectures for Electrocatalysis”	Department of Science and Technology	Ongoing
“Development of Efficient and Cost-Effective Electrocatalysts for Oxygen Reduction Reaction (ORR) in Low Temperature Fuel Cells”	Department of Science and Technology	Completed
“Development of electrocatalysts for low temperature fuel cells”	IRCC	Completed
“Wastewater, minimization in batch plants through on-site treatment, reuse and recycle processes”	Indo-South African joint project Department of Science and Technology	Completed(Shared)
“Dynamic Data Driven Model Based Predictive Control of Nuclear Steam Generator”	Board of Research in Nuclear Sciences (BRNS)	Completed(Shared)
“Development of a Megawatt-scale Solar Thermal Power Testing, Simulation and Research Facility”	Ministry of New and Renewable Energy (MNRE)	Ongoing(Shared)
“Nanoscale fabrication of aligned nanoarchitected copper current collectors covered with metal phosphides as anode for next generation Lithium-ion battery applications”	Department of Science and Technology, India Nano-mission	Ongoing
“Low Cost integrated solar energy and storage systems: An access initiative”	MAGEEP-University of Washington in St. Louis, USA	Ongoing
“Bio inspired nano materials as anode and cathode for new generation lithium-ion battery applications”	DST-RFBR, Indo-Russia Collaborative project	Ongoing

Project Title	Sponsoring Agency	Status (New/ Ongoing/Completed)
“Development of Solid State Nanocrystalline Semiconductor Sensitized Solar Cells by Inverted Morphology”	Defense Research & Development Organization	Ongoing(Shared)
“Development of Semiconductor Sensitized Solar Cell”	NCPRE-MNRE	Ongoing(Shared)
“Development of Low cost nanomaterials for lithium-ion battery electrodes for solar energy Storage”	National Centre of Solar Photovoltaic Research and Education-Ministry of New Renewable Energy	Ongoing
“Development of Low cost Li-V-O based cathode and Metal alloys anode for solar energy storage battery”	Solar Energy Research Institute for India and the United States (SERIUS), DST-DOE, USA	Ongoing
“Development of low cost cathode materials for Li-ion batteries”	Renault-Nissan Research centre, Chennai, India	Completed
“Stability and Performance of Photovoltaics - An India-UK multi-institute project leading by DESE”	Department of Science and Technology and Research Councils UK	Ongoing
“Characterization of solar cells and material by active infrared thermography”	IRCC, IIT Bombay	Ongoing
“Development of a Megawatt-scale National Solar Thermal Power Testing, Simulation and Research Facility”	Ministry of New and Renewable Energy (MNRE)	Ongoing
“Saltation of solid particles in pneumatic transport systems”	Department of Science and Technology	Ongoing
“Reliability Assessment of the Passive systems and its integration into PSA”	Atomic Energy Regulatory Board	New
“Development of optimization-based tomographic code for three-dimensional reconstruction of plasma characteristics of Aditya Tokamak and SST-1”	Board of Research in Fusion Science & Technology	Ongoing(Shared)
“Development and Integration of Biomass and Concentrating Photovoltaic System for Rural and Urban Energy Bridge: BioCPV”	Department of Science and Technology	Ongoing
“Solar Thermal Simulator Enhancement”	Fichtner	Ongoing
“US-India Consortium for Solar Energy Research Institute for India and the United States (SERIUS)”	Indo-US Science & Technology Forum, New Delhi	Ongoing(Shared)
“Silicon Solar Cell Efficiency Improvement by Minimizing the Impact of Transition Metals	McDonnell Academy, St. Louis, USA.	Ongoing (Shared)
“Dissemination of Solar PV Laboratory training Kit in 165 Educational Institute”	Ministry of New And Renewable Energy	Ongoing

Project Title	Sponsoring Agency	Status (New/ Ongoing/Completed)
“Study and Development of grid interactive PV Systems”	Ministry of New And Renewable Energy	Ongoing
“Advanced Materials and Nano-Textures for High Efficiency Thin Film Silicon Solar Cells”	Ministry of New And Renewable Energy	Ongoing
“Kerf-less Crystalline Si Solar Cells using HWCVD Epitaxy”	Applied Materials Inc.	Ongoing
“Development of Solid State Nanocrystalline Semiconductor Sensitized Solar Cells by Inverted Morphology”	Defence Research & Development Organisation	Ongoing
“Development of Transparent Conducting Oxides”	NCPRE-MNRE	Ongoing(Shared)
“Stability and Performance of Photovoltaic (STAPP)”	Department of Science and Technology	Ongoing
“Improved efficiency c-Si Cells-Fabrication and characterization with industry collaboration”	Department of Science and Technology	Ongoing
“Drop dynamics in complex flow fields”	Indira Gandhi Centre for Atomic Research	Ongoing
“Low temperature ALD of SiN and SiO ₂ using novel nitrogen, oxygen and silicon precursors.”	Applied Materials Inc.	Completed
“Deposition of Multilayer Quantum Well Structures of Metal Chalcogenides by ALD.”	Board of Research in Nuclear Sciences (BRNS)	Ongoing
“Nanoscale fabrication of aligned nanoarchitected copper current collectors covered with metal phosphides as anode for next generation Lithium-ion battery applications”	Department of Science and Technology	Ongoing
“DST / Direct Regeneration of the Ultra Thin Semiconductor Absorber Layer by Electronic Conductors for Solid State Semiconductor Sensitized Solar Cells”	Department of Science and Technology	Ongoing
“Energy End-Use Efficiency: Industrial”	International Institute for Applied Systems Analysis.	Ongoing
“National Centre for Photovoltaic Research and Education (NCPRE)”	Ministry of New And Renewable Energy	Ongoing
“Design and Development of Vacuum Pyrolysis Plant to Process Various Agricultural and Agro-Industrial Biomass to Demonstrate Its Technical and Economical Feasibility”	Ministry of New And Renewable Energy	Ongoing
“Studies on Underground Coal Gasification for Indian Coals-II”	Oil & Natural Gas Commission, Ahmedabad	Ongoing

Project Title	Sponsoring Agency	Status (New/ Ongoing/Completed)
“Linear and Nonlinear Optical Properties of Semiconductor Clusters- Women Scientist Scheme (WOS)”	Department of Science and Technology	Completed
“Enhancing the performance of Cuprite as a solar cell absorber material”	IRCC, IIT Bombay	Ongoing
“Material characterization using solution of inverse heat conduction problem”	IRCC, IIT Bombay	Ongoing
“Development of electrofabrication facility and expertise for templated and nanoporous-scaffold-supported metastable multicomponent nanomaterials for automobile hydrogen storage applications”	IRCC, IIT Bombay	New

Extension Activities

The “Energy Day 2013” was celebrated on March 9, 2013. It brought together an intermingling of ideas from industry and academic world to foster sustainable development which is the benchmark of growth. More than 80 delegates from different industries and organizations attended the presentations of the students, amongst various other activities.

On March 10, 2013, the department celebrated “Helios 2013”, a student technical festival, which is indeed a one-of-a-kind platform for students to rub shoulders with academia, entrepreneurs, industry bigwigs and policy makers from the fields of energy and sustainability.

The following CEP courses were also conducted:

Banerjee, R., “Energy Management” at IIT Bombay from November 26-30, 2012.

Doolla, S., “Off-Grid Solar Components and Systems” at IIT Bombay from October 10-12, 2012.

Visitors to the Department

Dr. Anil K. Rajvanshi, Director, Nimbkar Agricultural Research Institute (NARI), Phaltan, Maharashtra, delivered a lecture on “Rocket Science for Rural Development”, April 4, 2012.

Prof. Amit Kumar, Department of Mechanical Engineering at the University of Alberta in Edmonton, Alberta, Canada, delivered a lecture on “At what Scale a Bio-refinery can be Development?” August 1, 2012.

Prof. Prabir Barooah, Assistant Professor, Department of Mechanical and Aerospace Engineering, University of Florida, USA, delivered a lecture on “Making buildings smarter through control so that they are energy efficient and grid-friendly”, October 20, 2012.

Dr. Rakesh Kumar Maurya, Ph.D. Scholar, Department of Mechanical Engineering, IIT Kanpur, delivered a lecture on “Homogeneous Charge Compression Ignition (HCCI): Alternative Engine Combustion Mode”, November 1, 2012.

Prof. Ralph Gottschalg, Professor of Applied Photovoltaics, Loughborough University, delivered a lecture on “How to Achieve Low Cost Photovoltaics?” November 22, 2012.

Prof. Ned Djilali, Department of Mechanical Engineering, Institute for Integrated Energy Systems, University of Victoria, Victoria, Canada, delivered a lecture on “Experimental and Computational Methods for Multiscale Transport Phenomena in PEM Fuel Cells”, January 9, 2013.

Prof. S. P. Sukhatme, Professor, Department of Mechanical Engineering, IIT Bombay, delivered a lecture on “Can India's Future Needs of Electricity Be Met By Renewable Energy Sources?” January 23 - 24, 2013.

Dr. Preetam Kumar Singh, Post-Doctoral Fellow in Professor John B. Goodenough's Laboratory, University of Texas at Austin, USA, delivered a lecture on “Materials for Alternative Energy”, February 27, 2013.

Conferences/Symposia/Workshops/ Seminars (participated/Papers Presented)

Dhariwal, J. and Banerjee, R.

“Life Cycle Energy Analysis of a Reference Building”, *2nd National Conference of IPPSA-India on Simulation of Buildings for Energy Efficiency and Better Built Environment*, December 21-22, 2012, at Malaviya National Institute of Technology, Jaipur.

Sahu, A. K., Saini, R.K., and Bose, M.

“Conjugate Conduction Convection and Surface Radiation in the Annulus of Two Concentric Vertical Cylinders”, *HKICEAS-2012*, December 14-16, 2012, Hong Kong.

Kumar Nunna, H.S.V.S., and Doolla, S.

“An Intelligent Energy Management Framework to incorporate Demand Response and Storage in Microgrids”, *IEEE INDICON 2012*, Kochi, Kerala, December 7-9, 2012.

Aneena, F., Kumar Nunna, H.S.V.S., and Doolla, S.

“Distribution System Restoration - A Multi Agent Approach”, *IEEE INDICON 2012*, Kochi, Kerala, December 7-9, 2012.

Saklani, A. M., Kumar Nunna, H. S. V. S., and Doolla, S.

“Intelligent Demand Response Approach in Smart Distribution Systems: A Review”, *IEEE INDICON 2012*, Kochi, Kerala, December 7-9, 2012

Magare, D., Sastry, O.S., Gupta, R., Kumar, A. and Sinha, A.

“Data Logging Strategy of Photovoltaic (PV) Module Test beds”, *27th European Photovoltaic Solar Energy Conference*, Frankfurt, Germany, September 24-28, 2012.

Somasundaran, P., Sinha, A. and Gupta, R.

“Simulation and Characterization of Spatial Variation of Shunts in Industrial Solar Cells by PSpice and Dark Lock-in Infrared Thermography”, *27th European Photovoltaic Solar Energy Conference*, Frankfurt, Germany, September 24-28, 2012.

Sinha, A., Sastry, O.S., Singh, Y.K., Kumar, M. and Gupta, R.

“Performance of Champions Module for PV Lighting Systems in India”, *27th European Photovoltaic Solar Energy Conference*, Frankfurt, Germany, September 24-28, 2012.

Shendage, D. J., Kedare, S. B., and Bapat S. L.

Motoring test of a Stirling cycle engine system while acting as a cooler, *Indian Journal of Cryogenics, (Special issue on Proceedings (Part - B) of 23rd National Symposium on Cryogenics-NSC -23)*, Rourkela, India, September 28-30, 2012.

Neergat, M.

“Electrocatalysis of oxygen reduction reaction in acidic media”, *Workshop*, September 2012, SSCU, IISc, Bangalore.

Kumar, N., Singh, S., and Doshi, J.B.

“Nodal integral method for navier-stokes equations using quadrilateral elements”, *39th National Conference on Fluid Mechanics and Fluid Power*, December 13-15, 2012, SVNIT, Surat.

Sahoo, S.S., Singh, S., and Banerjee, R.

“Thermal hydraulic simulation of absorber tubes used in linear fresnel reflector system”, *39th National Conference on Fluid Mechanics and Fluid Power*, December 13-15, 2012, SVNIT, Surat.

Kumar, N., Singh, S., and Doshi, J.B.

“Solution of Convection-diffusion Equation in Complex Geometry by Nodal Integral Method”, *14th Annual AeSI CFD Symposium*, August 10-11, 2012, Indian Institute of Science, Bangalore.

Shendage D.J., Kedare, S.B., and Bapat, S.L.

“Balancing of a Single Cylinder Beta-type Stirling Engine with Rhombic Drive Mechanism”, *World Congress on Frontiers of Mechanical, Aeronautical and Automobile Engineering (WCFMAAE-2013)*, February 2-3, 2013, IIT Delhi, New Delhi.

Tan, R.R. and Bandyopadhyay, S.

“Trigeneration System: Visualization Through Ternary Diagrams”, *4th International Conference on Chemical and Bioprocess Engineering (ICCBPE 2012)* in conjunction with *26th Symposium of Malaysian Chemical Engineers (SOMChE 2012)*, November 21-23, 2012, Kota Kinabalu, Malaysia.

Nandi, B.R., Bandyopadhyay, S., and Banerjee, R.

“Analysis of High Temperature Thermal Energy Storage for Solar Power Plant”, *3rd IEEE International Conference on Sustainable Energy Technologies (ICSET 2012)*, September 24-27, 2012, Kathmandu, Nepal.

Magare, D., Sastry, O.S., Gupta, R., Kumar, A., and Sinha, A.

“Data Logging Strategy of Photovoltaic (PV) Module Test beds”, *27th European Photovoltaic Solar Energy Conference*, September 24-28, 2012, Frankfurt, Germany.

Somasundaran, P., Sinha, A., and Gupta, R.

“Simulation and Characterization of Spatial Variation of Shunts in Industrial Solar Cells by PSpice and Dark Lock-in Infrared Thermography”, *27th European Photovoltaic Solar Energy Conference*, September 24-28, 2012, Frankfurt, Germany.

Sinha, A., Sastry, O.S., Singh, Y.K., Kumar, M., and Gupta, R.

“Performance of Champions Module for PV Lighting Systems in India”, *27th European Photovoltaic Solar Energy Conference*, September 24-28, 2012, Frankfurt, Germany.

Bansal, B. and Mitra, S.

Poster presented on “Fabrication of Vertically Aligned Silicon Nanowires: Application in Lithium Ion Batteries” for *MAGEEP-4th International Symposium on Energy & Environment*, December 9-12, 2012, Oberoi Hotel Conference Hall, Mumbai.

Sen, U.K. and Mitra, S.

Poster presented on “Nano-Structured MoS₂ as High Rate Capable Anode Material for Lithium Ion Batteries” for *MAGEEP-4th International Symposium on Energy & Environment*, December 9-12, 2012, Oberoi Hotel Conference Hall, Mumbai.

Veluri, P.S. and Mitra, S.

Poster presented on “High Rate Capable Iron Oxide Nanotubes as Anode Material for Lithium Ion Batteries” for *MAGEEP-4th International Symposium on Energy & Environment*, December 9-12, 2012, Oberoi Hotel Conference Hall, Mumbai.

Pandey, A., Mitra, S., and Contractor, A.Q.

Poster presented on “Synthesis & Analysis of Nanostructured Manganese Dioxide for use in Aqueous Rechargeable Batteries” for *MAGEEP-4th International Symposium on Energy & Environment*, December 9-12, 2012, Oberoi Hotel Conference Hall, Mumbai.

Edla, R., Gangal, A.C., Manna, J., and Sharma, P.

“Catalytic effect of transition metal boride on thermal decomposition of sodium alanate”, *World Hydrogen Energy Conference*, June 3-7 2012, Toronto Canada.

Gangal, A.C., Edla, R., Manna, J., and Sharma, P.

“Effect of Mischmetal Nanoparticles on Thermal Decomposition of Ammonia Borane”, *World Hydrogen Energy Conference*, June 3-7 2012, Toronto Canada.

Kumar, N., Singh, S., and Doshi, J.B.

“A novel Nodal Integral Method based Solution for buoyancy driven Flow”, *European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2012)*, September 10-12, 2012, Vienna, Austria.

Badgujar, K.D., Singh, O.P., Singh, S., and Rewankar, S.T.

“Power Coefficient of Reactivity Determination for HTPBR and Its Application for Reactivity Initiated Transients,” *20th International Conference on Nuclear Engineering*, July 30-August 12, 2012, Anaheim, California, USA.

Conferences/Symposia/Workshops/Seminars (Coordinated/Chaired by Faculty)

Doolla, S.

Chaired session on “Impact of Electrical Engineering on Global Sustainability”, *4th Indo-German Frontiers of Engineering Symposium 2012*, June 13-16, 2012, Halle-Merseburg, Germany.

Gupta, R.

Coordinated *India-UK Workshop on Stability and Performance of Photovoltaic* at Solar Energy Centre, Gurgaon.

Mitra, S.

Organized Poster presentation session for *MAGEEP-4th International Symposium on Energy & Environment*, December 9-12, 2012, Oberoi Hotel Conference Hall, Mumbai.

Session Chair for “Materials for Energy”, *5th National Symposium for Materials Research Scholars, MR-13*, Department of Metallurgical Engineering and Materials Science, IIT Bombay, May 8-10, 2013, VMCC Conference Hall, IIT Bombay, Mumbai.

Sharma, P.

Session Organizer for the session on “Electrical Energy Storage as the backbone of Renewable energies”, *4th Indo- German Frontiers of Engineering Symposium*, June 13-16, 2012, Mersburg, Germany.

Invited Lectures

Banerjee, R.

“Energy Futures for India”, *INDIA-U.K. : Technology Foresight Workshop*, TIFAC, DST, Govt. of India, New Delhi, March 19-21, 2013.

“Energy Futures for India in the era of Climate Change”, *International Conference on Equity, Adaptation and Sustainable Development*, Tata Institute of Social Sciences (TISS), Mumbai, February 22, 2013.

“Benchmarking Energy Performance : From Best Practice to Next Practice”, HPCL, Mumbai, January 29, 2013.

Plenary Talk on “Synergising Industry-Academia Linkages in India- An Academic Perspective”, *Theme Meeting SPI-2013*, BARC, Mumbai, January 21-22, 2013.

“Invited Talk Energy Benchmarking for Non Ferrous Industry in India”, *International Conference on Energy and Environmental Issues in Non Ferrous Industries: Compilation of Benchmarks*, Kolkata, India, December 7-8, 2012.

“Role of Academic Institutes in Nuclear Science and Engineering - A Perspective”, *Indian Nuclear Society Annual Conference*, Mumbai, November 7-9, 2012.

“Solar Power in India: Technology and R&D”, *Fifth Annual Conference on Solar Power in India*, Hyatt Regency, New Delhi, June 27, 2012.

“Overview of Solar Thermal Energy for Industry in India” and “Economics of Solar Thermal Heating for Industry”, *CEP Course on Solar Thermal Process Heat Applications in Industry*, IIT Bombay, May 11, 2012.

Key Note Address “Technology Development and Innovation: Role of Universities-An Indian Perspective”, at the *International Conference on Technology & Innovation Management*, Hotel Yak and Yeti, Kathmandu, Nepal, October 10-12, 2012.

“Grid Connected Solar Power in India: Status and Prospects”, *Via Video conference to CEIC Seminar*, CMU, USA, March 27, 2013.

“Audits to Benchmarking Industrial Energy Efficiency in India-An Academic perspective”, Utrecht University, The Netherlands, May 24, 2012.

“Overview of Indias Energy Scenario”, TU Delft: Delft University of Technology, The Netherlands, May 23, 2012.

“Grid connected Solar Power in India”, TU Delft: Delft University of Technology, May 23, 2012.

Doolla, S.

“Energy Efficient Lighting”, *Continuing Education Program on Energy Management*, IIT Bombay, November 30, 2012.

“Grid Connection Issues for Distributed Generation - Review & Standards,” *IIT Bombay-Prayas Workshop on Grid Integration of Distributed Resources*, IIT Bombay, April 3, 2012.

Delivered an invited talk on “Rural versus Urban Microgrids: An Indian Perspective”, *Évora 2012 Symposium on Microgrids*, Évora, Portugal, September 2-5, 2012.

Delivered an invited talk on “Energy Management in Indian Railways,” Non Traction Energy and related CO₂ Emissions from the European Railway Sector, Paris, France, June 19, 2012.

Gupta, R.

“Thermography for Energy Applications,” *Continuing Education Programme on Energy Management*, IIT Bombay, November 26-30, 2012.

Mitra, S.

Plenary talk on “Conversion Mechanism an alternative to intercalation reaction of Lithium storage”, *5th National Symposium for Materials Research Scholars, MR-13*, VMCC, IIT Bombay, May 9, 2013.

Invited talk on “Battery Basics I & II”, *Training for Master Trainers - Workshop*, IIT Bombay, organized by NCPRE, VMCC. IIT Bombay, March 6, 2013.

Invited talk on “Lithium-ion storage- Advanced High Rate and Energy anode materials”, *37th International Conference and Exposition on Advanced Ceramics and Composites*, organized by American Ceramics Society, Hilton Daytona Beach Resort and Ocean Centre, Florida, USA, February 27, 2013.

Invited talk on “Lithium-ion Battery: Advances in New Anode and Cathode Materials”, Energy Environment and Chemical Energy Department, University of Washington at St. Louis, MO, USA, March 1, 2013.

Sharma, P.

“Education and Training on PV”, InterSolar India, Mumbai, November 6-8, 2012.

Tripathi, A.M. and Mitra, S.

Invited talk on “Mechanism for greener synthesis of SnO₂ hollow Nanosphere and its Application in Lithium-ion Battery”, *5th National Symposium for Materials Research Scholars*, May 9-10, 2013, VMCC, IIT Bombay.

Honorary Work

The faculty of the department served in various capacities as follows:

Banerjee, R.

Member of the following committees: Advisory Committee for ONGC Energy Trust for 2013; TIFAC Apex Committee for Technology Vision 2035, and as Chairman, Energy Tech. Theme; Member of Board of Governors, The University of Petroleum and Energy Studies (UPES), Dehradun.

Associate Editor of: Energy for Sustainable Development, International Journal of Sustainable Engineering and Member of Board of Editors of International Journal of Thermodynamics

Doolla, S.

Served as Member of: Executive Committee, IEEE Bombay Section; Board of Studies, Jawaharlal Nehru Technological University; DSM Consultation Committee, Maharashtra Electricity Regulatory Commission

Convener, DSM Subcommittee, Maharashtra Electricity Regulatory Commission; and Task Force on Energy Efficiency and Conservation, National Perspective Plan, Ministry of Power

Reviewed papers for: IEEE Transactions on Industrial Electronics; IEEE Transactions on Smart Grid; IET Renewable Power Generation; and IET Renewable Power Delivery

Kavaipatti, B.R.

Reviewed one Ph.D. thesis

Mitra, S.

Reviewed several research proposals for (CSIR) and DST projects

Reviewed more than 50 research (journal) papers of following journals: J. Phys. Chem. C, J. Phys. Chem. L, J. Mater. Chem. A, Nanoscale, RSC Advances, New Journal of Chemistry, Materials Letter, ACS Applied Materials, and Interfaces, Solid State Ionics, J. Electrochemical Society, J. Solid-State Electrochemistry, Nanoscience and Nanotechnology Asia, and Current Science

Naik, J.K.

Served as Member, R&D Committee for Solar Thermal Energy, MNRE, Govt. of India, and as Associate Editor, Solar Energy

Reviewer for Solar Energy, Energy for Sustainable Development and SESI Journal

Neergat, M.

Reviewed Proposals for Department of Science and Technology, India, and Czech Science Foundation

Reviewed papers for: International Journal of Hydrogen Energy, and Catalysis Science and Technology

Sarkar, S.

Reviewed several research proposals from CSIR, DST; reviewed proposal for IUNAP-IITB 2010, and reviewed papers from Elsevier

Sharma, P.

Reviewed papers for: International Journal of Hydrogen Energy; Vacuum; Surface and Interface Analysis; Material Science and Engineering; Thin Films; Materials for Renewable and Sustainable Energy; Australian Journal of Chemistry; International Journal of Energy Technology and Policy; Nanoscience and Nanotechnology Letters; International Journal of Chemical Reactor Engineering; Materials for Renewable and sustainable energy

Tatiparti, S.S.V.

Reviewed papers for: Journal of Solid State Electrochemistry; Journal of Applied Electrochemistry; Metallurgical and Materials Transactions A; Physica Scripta

Faculty Members and their Specializations

1. Santanu Bandyopadhyay

Pinch analysis and Energy integration, Modelling and analysis

2. Rangan Banerjee

Energy Efficiency, Energy Modelling, Hydrogen Energy

3. Manaswita Bose

Complex Fluid Dynamics, Flow of Granular Materials, Multiphase flows, Computational Fluid Dynamics, Molecular Dynamic Simulation of Particulate Flows and Coal Gasification and Combustion

4. Suryanarayana Doolla

Smart Grid, Micro-Grid and Distributed Generation, Power quality and communication protocols for industrial and commercial power systems

5. Anuradda Ganesh

Thermo chemical conversion of biomass, Alternate fuels in engine

6. Prakash Chandra Ghosh

Polymer Electrolyte Fuel Cell, Hydrogen generation and storage

7. Rajesh Gupta

Characterization, modeling and simulation of solar cells and modules, Performance and Reliability of Photovoltaic, Infrared Thermography

8. Balasubramaniam Kavaipatti

Materials development for artificial photosynthesis, photovoltaics, transparent conductors

9. S.B. Kedare

Concentrating Solar Collectors, Industrial thermal hybrid systems

10. Sagar Mitra

Electrochemical Energy storage, Lithium ion Batteries, Sodium- ion Batteries, Magnesium-ion battery, Nanostructured Materials, and Electrochemistry of Nanomaterials

11. J.K. Nayak

Passive solar architecture, Solar thermal

12. Manoj Neergat

Electrocatalysis, Fuel Cells, Electrochemical Energy Conversion, Microbial Fuel Cells, Shape-controlled Nanoparticles for Electrocatalysis

13. Shaibal K. Sarkar

Sensitized Solar cells, Photoelectrochemistry, Nanocrystalline Materials for Photovoltaic applications, Transparent Conducting Oxides, Atomic Layer Deposition

14. Pratibha Sharma

Hydrogen Storage, Thin films, Amorphous Semiconductors, Ion Irradiation, Chalcogenides

15. Suneet Singh

Nuclear reactor thermal hydraulics and safety, Advanced numerical methods for neutron diffusion and fluid flow, Two-phase flow modeling

16. Chetan Singh Solanki

Solar Photovoltaics, Thin film silicon solar cells, PV solar concentrators, Porous silicon, Carbon nano tubes (CNT's)

17. Sankara Sarma V Tatiparti

Hydrogen Storage, Electrofabrication of nanostructured materials, Polycrystalline nanodendritic growth

Associated Faculty**Mechanical Engineering****1. Atul Sharma**

Computational fluid flow and heat transfer

2. S. Suryanarayanan

Automatic control, Mechatronics

3. A. Sridharan

Two phase heat transfer, Experimental heat transfer

4. S.V. Prabhu

Flow metering, Gas turbine blade cooling, Two phase flow and heat transfer

5. R.P. Vedula

Convective heat transfer for external and internal flows

6. A.W. Date

Numerical fluid flow and heat transfer, Appropriate technology

7. J.B. Doshi

Nuclear reactor theory, Nuclear reactor safety, Analytical methods in engineering

8. U.N. Gaitonde

Thermodynamics, Heat transfer engineering, Power plant engineering

9. Kannan N. Iyer

Nuclear reactor safety, Thermal hydraulics, Applied numerical methods

10. M.V. Rane

Waste heat recovery systems, Refrigeration systems, Heat pumps

11. S.P. Sukhatme

Heat transfer, Energy

12. Upendra V. Bhandarkar

Low pressure plasmas, Heat transfer and Thermodynamics, Statistical mechanics

13. Bhalchandra Puranik

Gas dynamics, Shock-wave density interface interactions, Thermal hydraulics

14. S.L. Bapat

Cryogenics, Refrigeration, Airconditioning

Electrical Engineering**15. Vivek Agarwal**

Power conversion, Modelling and simulation of power electronic systems

16. M.C. Chandorkar

Electrical drives, Power electronic converters and control

17. B.G. Fernandes

Switch mode rectifiers and power supplies, Soft switching methods for SMPS

18. S.A. Khaparde

Deregulation in power industry: optimal bidding and congestion management

19. K. Chatterjee

Utility friendly converter topologies, Power factor correction techniques

20. A.M. Kulkarni

Power system dynamics, Flexible AC transmission systems

21. S.V. Kulkarni

Transformer design and analysis, Finite element method and computations

22. S.A. Soman

Power system analysis, Restructuring of power systems

Chemical Engineering

23. Chandra Venkatraman

Aerosols and climate, Air pollution, Toxicity/Risk assessment

24. Sanjay Mahajani

Underground coal gassification, Reaction engineering, Bio-fuels

25. R.K. Malik

Process modeling, Simulation, Energy Integration

Aerospace Engineering

26. K. Sudhakar

Multidisciplinary design optimization

Metallurgical Engineering and Material Science

27. Rajiv O. Dusane

Synthesis and characterization of amorphous and microcrystalline thin films

Centre for Environmental Science and Engineering

28. Virendra Sethi

Combustion aerosols, Energy and environment

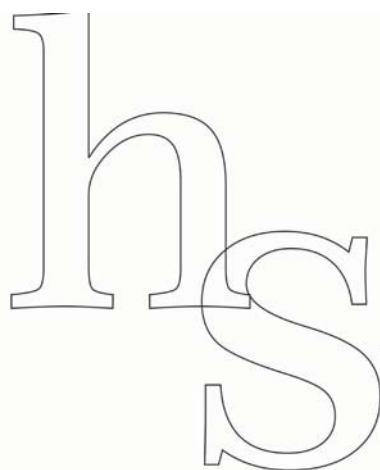
Centre for Technology Alternatives in Rural Areas

29. N.G. Shah

Post Harvest Process Engineering, Small Scale Renewable Energy Applications and Agro-based Industrial Development

30. Anand B. Rao

Energy and environment, Climate change, Carbon capture and sequestration



Humanities & Social Sciences

Introduction

The Department of Humanities and Social Sciences plays a distinctive and significant role, in IIT Bombay where the ethos of science and technology prevails, the utmost. It is believed that science and engineering are, by their very nature, humanistic and socially derived enterprises, and of late the world is vehemently looking forth for establishing a proper linkage between a technologically progressive and ethically strong society.

The commitment to impart a more holistic education distinguishes IITs from other institutions. In fulfilling this endeavor the Department of Humanities and Social Sciences of IIT Bombay plays a crucial role in fostering awareness and knowledge of the nature of human inquiry, the socio-economic human conditions, and a thoughtful application of science and technology to attain sustainable development. The department pledges itself to help the Institute to become a true world leader in teaching and research by nurturing an atmosphere of creativity, innovation and scholarship in its unending quest for excellence.

The department comprises of faculty from five disciplines, viz., Economics, English, Philosophy, Psychology, Sociology, and areas touching upon the Cell for Indian Science and Technology in Sanskrit (CISTS). It has well equipped computing facilities, which include several statistical packages. Founded in 1958, the department, has weaved the goals mentioned above into its teaching and research programmes. In recent years it has expanded and has 35 faculty members in its fold now.

Important MoUs and Collaborations

Through the Dean (R&D), the department signed an MoU with Sanskrit Library, USA for the duration of three years (2012- 2015). This MoU aims to facilitate collaboration between international scholars working in the field of Sanskrit Computational Linguistics under the banner of Sanskrit Library and IIT Bombay.

The department continued its collaboration with Faculty of Asian and Middle Eastern Studies, University of Cambridge in the course of which scholars from University of Cambridge as well as IITB visited each other during the year and developed themes of collaboration.

Visiting Professor

Prof. Peter Scharf, University of Paris, France, visited the department in the capacity of Visiting Professor during December 1, 2012 to April 30, 2013. Prof. Scharf participated in the teaching of HS 434, an undergraduate course and also delivered talks in the Institute besides working on two projects with Prof. Malhar Kulkarni.

Prof. M.S. Sriram of the Department of Theoretical Physics, University of Madras & Prof. M.D. Srinivas, Chairman, Centre for policy Studies, visited the department in the months of February - March, 2013. They also gave a few lecture in the course HS 636.

Academic Programmes

The Department participates in both the undergraduate and postgraduate teaching programmes of the Institute.

UG Programme

The guiding principles for the teaching programme at the Undergraduate level are:

- To combine technical education with general / Liberal education with a view to provide complete education.
- To sensitize students about broader economic, social and humane issues that affect the professional and personal lives of the engineering and science students.
- To prepare the students not only for a specialized job, but also cultivate good intellectual habits,

skills, and understanding that any educated person should have regardless of the kind of profession s/he undertakes.

The department endeavours for realizing these objectives by offering the following courses at the under-graduate level: One core course in Economics in the 1st semester, four introductory courses in Humanities and Social Sciences (English Literature, Philosophy, Psychology and Sociology) in the third semester, followed by a number of electives offered by the different constituent disciplines in the seventh and eighth semesters. Specialized faculty of the department is also participating in the teaching of a compulsory course on environmental studies offered for the B. Tech. students. A two-semester course in Remedial English is offered to the students of the Preparatory Course. The department also offers set of courses to be chosen by the Undergraduate Students interested in getting a Minor in Humanities and Social Sciences.

PG Programme

At the postgraduate level, the Department participates in teaching courses for M.Tech./Ph.D. students (at the Institute level) and offers full-fledged M.Phil. & Ph.D. programmes at the department level.

Participation in M.Tech. Programme

The department offers a large number of electives for M.Tech. students. It also offers communication skills as a compulsory course for both M.Tech. and Ph.D. students

M.Phil Programme in Planning and Development

A four-semester interdisciplinary M.Phil. programme with specialization in Planning and Development was launched in July 1993. The programme with a theoretical-practical thrust provides the students with a holistic understanding of socio-economic reality and the role of technology. It also acquaints them with the various stages and levels of expertise involved in the formulation and implementation of development policies that can bring about a sustainable, stable, and desirable development. With such training that includes coursework, field visit and dissertation work, it is expected that the students completing this programme will become personnel with the requisite competence to contribute in the national, state and regional planning and developmental processes. There is a paucity of such personnel in India at present and I.I.T. Bombay is contributing towards in meeting this requirement.

There are 33 students pursuing the M.Phil. Programme presently. It is worthy to note that most of the students in the earlier batches who have completed their studies and obtained M.Phil. Degree from this Institute have got placements in the Universities and in reputed and

established commercial units and non-governmental organizations (NGOs). Also, many of them have successfully pursued Ph.D. programme in the Institute and elsewhere.

Ph.D. Programme

The Ph.D. programme offered by the department is generally discipline oriented and runs in five disciplines and areas related to the Cell for Indian Science and Technology in Sanskrit. There is also ample provision to do research in interdisciplinary areas.

In the year under review, nine students of this department will be awarded Ph.D. degree. Since the inception of the Ph.D. programme in the department, 166 students have already obtained their Ph.D. degree from the Department and are well-placed in institutions like Reserve Bank of India, I.I.M. Calcutta, Bombay University, Central University, Hyderabad, and other IITs. They have made remarkable achievements as excellent academicians and professionals in their respective fields of specializations. There are 24 regular, five external, three self-financing, one Institute staff, and one project staff candidates, who are currently enrolled in the Ph.D. programme.

Degrees Awarded

M.Phil.	:	10
Ph.D.	:	9

R & D Activities

Details about Sponsored projects and Consultancy jobs undertaken by the faculty of the department during the year 2012-2013, are given below :

Sponsored Research Projects	:	
New	:	7
Ongoing	:	15
Faculty Involved	:	7

List of Sponsored Research Projects (Ongoing)

Title of the project	Sponsor
Indian Language Corpora Initiative- II Development of Lexically and Syntactically tagged Corpus of Sanskrit Conceptualizing Corruption: Corruptibility of the Self Behavioural, neural and cognitive studies of auditory, speech and phonological processing in developmental dyslexia and intervention for remedial measures Setting up a project cell for preparation of green national accounting frame work. Workshop & conference on Indian Mathematics (National Centre for Mathematics) Developing automated text-image alignment of Sanskrit Manuscripts Integrated Impact Assessment Study for Mithi River The Varied Paradigms of Creativity Contemporary Indian Philosophy Indian Microfinance Sector in Capital Markets- Perils and Prospects Towards a critical edition of the Kasikavrtti	Department of Electronics and Information Technology, Government of India. University of Paris, France and Sanskrit Library, USA. Indian Council of Philosophical Research Council of Scientific and Industrial Research Ministry of Statistics and Programme Implementation NCM / TIFR Project Sanskrit Library Mithi River Development and Protection Authority IRCC and 09MHRD001 NPTEL National Stock Exchange Student Research British Academy, UK
Title of the project	Sponsor
Solid Waste Management in Mumbai: An Alternative Paradigm To Investigate role of Impulsivity, Reward & Loss Sensitivity in Decisions Making during Gambling Task: An Emperical Study, Industrial Research Consultancy Centre, Indian Institute of Technology Bombay, 2011-12 Neural Correlates of Implementation Intention Across Age, Industrial Research Consultancy Centre, Indian Institute of Technology Bombay, 2011-12 Identification of casual underpinning of aggressive inclination among the Kashmiri Youth, Department of Jammu & Kashmir Affairs, Ministry of Home Affairs	CLEAN-Sweep Forum, Mumbai IRCC, IIT Bombay IRCC, IIT Bombay Government of India, New Delhi

Consultancy Project

Haripriya, G.S.

Climate Financing in different states of India, Funding Agency: DFID (jointly carried out with IFMR) JobNo DRD/HS/HG-1/12-13.

Development policy loan to support green sustainable development, Funding Agency - World Bank Job No DRD/HS/HG-2/12-13.

Extension Activities

Gupta, M.

External Member Academic Council, IIT Indore.

External Member Senate, VNIT Nagpur

Member Advisory committee on Psychological Research, Indian Railways

Haripriya, G.S.

Policy and Technical Expert committee on the WAVES project of the World Bank Secretary General, Urban Biodiversity Network.

Adjunct Professor, IIM Kozhikode, from January to April 2013. Taught the course on Environmental Management

UGC-DSA Visiting Fellow to the Department of Business Management, University of Calcutta under ageis of the DSA Phase I Programme in Environmental Management (2011-16); during March 18-26, 2013

Panda, R. K.

Project on Contemporary Issues in Philosophy of Mind & Cognition (Both in web & video courses), NPTEL, IIT Madras, MHRD, Government of India.

Talwar, Neelima

Project on Understanding Creativity and Creative Writing: A Video-course, National Programme on Technology Enhanced Learning (NPTEL Phase 2)

Kulkarni, Malhar

The course, Introduction to Paninian grammar was proposed and accepted by the Senate, IITB.

Visitors to the Departments

Prof. Paul Kiparsky, Stanford University, USA, participated in a workshop and delivered a lecture on Minimum Description Length as the basis of Panini's grammar in December 2012.

Prof. Hans Hock, University of Illinois, USA, delivered a lecture on Finally! Utterance-finality and finite verbs in SOV languages.

Prof. Frederick Smith, University of Iowa, USA, delivered a lecture on Deity and spirit possession in South Asia.

Dr. Eivind Kahrs, University of Cambridge, UK, visited the department in April 2012 and collaborated with Prof. Kulkarni on their joint project.

Dr. Sudeshna Guha, University of Cambridge, delivered a lecture on Historicising Civilisational Heritage: Archaeology in Constructions of 'Ancient India.

Prof. Timothy Bewes, Department of English, Brown University, delivered a talk on Against Exemplarity: V.S. Naipaul, W.G. Sebald and the Novel on January 9, 2013.

Dr. Mridula Nath Chakraborty, Postdoctoral Research Fellow, Writing and Society Research Centre at the University of Western Sydney, Australia, gave a talk on Revolutionary Reprise: Some Notes from Egypt circa 1956 in Waguih Ghali's novel Beer in the Snooker Club (1964) on February 13, 2013.

Conferences/Symposia/Workshops/Seminars (participated/Papers Presented)

Chakraborty, Paulomi

Presented a paper "Partition, Representation, Erasure: Satyajit Ray's Mahanagar," Disnarration: 'The Road Not Taken,' held during March 1-2, 2013, at Department of Humanities and Social Sciences, IIT Bombay, Mumbai.

"Contours of English (Literary) Studies: Perspectives from the field of Partition Studies," Unveiling a Secret Agreement: Contours of English Studies, held during November 19-21, 2012, at Department of English Literature, English and Foreign Language University, Hyderabad.

Deb, K.

Presented a paper entitled, "Challenges facing Sociology in present Times" in *International Conference entitled: Sociology Matters: Challenges and Possibilities of Social Science Knowledge in Contemporary India*, organised by Center for Study of Social Systems, Jawaharlal Nehru University, New Delhi during December 18-20, 2012.

Singh, R. M., and Gupta, M.

"Knowledge Management in Teams: Conceptual Integration and Development of a Scale". Paper Presented at the *2013 SIBR Conference (Kuala Lumpur) on Interdisciplinary Business and Economics Research*, February 15-16, 2013, Kuala Lumpur.

Bhagel D, Parthasarathy D and Gupta M.

“Understanding Innovation Within Globalization: Study of Small Scale Cosmetic Industry in Mumbai.” Paper presented at the *International Conference held on January 22-24, 2013 on Technology, Innovation & Social Change*, Mumbai,.

Akhuly, A and Gupta M.

“Role of Intuition in Personnel Selection”. Poster presented at the *33rd Annual Conference of the Society for Judgement & Decision Making*, November 16-18, 2012, at Minneapolis,

Ganguli S, Kulkarni M, and Gupta M.

“Predicting Academic Performance”. Paper presented at the *2012 International Symposium on Education & Psychology*, during March 30 – April 1, 2012 in Hong Kong,

George, Siby K.

Affected Subject and the Case of Individuating Pain’. *International Conference on Problems of the Self: Debates in Consciousness, Subjectivity and Otherness*, held from January 23-25, 2013, at the Centre for Philosophy, Jawaharlal Nehru University, New Delhi.

Haripriya, G.S.

Presented a paper on How green is our Growth Analysis for Indian States at the *International Society for Ecological Economics*, during June 16-18, 2012, at Rio de Janeiro, Brazil.

Presented a paper on Mumbai Declaration at the Convention on Biodiversity *Conference of Parties XI* at Hyderabad.

Invited speakers in the session on Achieving environmental sustainability, 4th *OECD World Forum* “Measuring Well-Being for Development and Policy Making”, October 18-20, 2012.

Invited expert member of the group on Conceptual framework for Intergovernmental Panel on Biodiversity and Environmental Strategies, Held during October 29-30, 2012 at UNESCO Headquarters, Paris.

Invited speaker at the *TEEB scoping workshop* organised by ICIMOD during December 13-14, 2012.

Jung, P.G.

Presented a paper Autonomy and Genuine Choice, *International Conference on Ethics in Human Research*, November 2012.

Presented a paper The Burden of Certainty, *International Conference on Transdisciplinary Inquiry into Acquisition of Knowledge*, in January 2013 at the Department of English, CHM College, Mumbai.

Khan A.

Participated in Neural Synchrony Workshop, held during May 9-10, 2012 at University of Jyväskylä, Finland,

Lund Eye Tracking Academy (LETA) from September 19- 21, 2012 at Lund University, Sweden.

Kulkarni, Malhar

Presented a paper entitled, Complementary growth of Science of Language and Philosophy of Language in India, held during May 23-26, 2012 at the Institute of Philosophy, Russian Academy of Sciences, Moscow, Russia,

Presented a paper entitled, Svarita: an Empirical study view with Leena Hunnargikar, at *2nd World Veda Conference*, held during November 5-6, 2012 at Maharshi Sandipani Rashtriya Veda Vidya Pratishthan, Ujjain.

Presented a paper entitled, Semantic Processing of Compounds in Indian Languages, *COLING*, IIT Bombay, during December 8-15, 2012, at IIT Bombay, Mumbai.

Invited to present a paper in the proceedings of the conference on The quotations and re-use of texts in Sanskrit Shastra, held during December 21-22, 2012 at the Institute of Oriental Studies, Rome.

Narayanan, K., and Santosh Kumar Sahu

Presented a paper CO2 Emission from Fossil Fuel Consumption and Technology Intensity: A Study of Indian Manufacturing Industries in the *VIIth Annual International Conference of Knowledge Forum* during November 31- December 2, 2012 at Symbiosis International University, Pune, India,

Presented a paper, Technology Sourcing, Foreign Equity Participation and Energy Intensity in Indian Manufacturing at AIB 2012 Annual Meeting, Washington, DC, USA.

Narayanan, K., and Ronny Thomas

Presented a paper, Productivity Heterogeneity and Exports: A Study of Indian Manufacturing Industries, at the *VIIth Annual International Conference on Technology Intensity and Global Competitiveness* held at Symbiosis International University, November 30 - December 2, 2012, Pune, India.

Presented a paper, Productivity Heterogeneity and Firm Level Exports: Case of Indian Manufacturing Industry, at the *11th Annual GEP Postgraduate Conference* held at Leverhulme Centre for Research on Globalisation and Economic Policy (GEP), University of Nottingham, United Kingdom, April 26-27, 2012

Narayanan, K., and Vidisha Vyas

“Mergers and Acquisitions, Technological Efforts and Exports: A Study of Indian Pharmaceutical Sector in India, in the *VIIth Annual International Conference on Technology Intensity and Global Competitiveness* held at Symbiosis International University, Pune, India, November 30 - December 2, 2012,

Narayanan, K.

Visit to IDC Herzilia, Israel: *MAGEEP workshop* in June 2012.

Visit to Kathmandu, Nepal: Delivered the Keynote address at the annual *South Asian Economics Students' Meet* in December 2012.

Kulkarni, Mrinmoyi

Presented a paper on Impact of Socio-economic Status on Health: The Role of Psychological Characteristics and Health Behaviors, July 2012, at the *International Congress of Psychology*, Cape-Town, South Africa.

Panda, Ratikanta

Participated and presented a paper entitled Indian Culture: A Gandhian Perspective in the *International conference on Gandhirama 2012*, which was held at Jawaharlal Nehru University, during August 17-22, 2012 in New Delhi.

Hemant Kumar Chouhan, D. Parthasarathy, and Sarmistha Pattanaik

Presented a paper Urban Ecosystem Vulnerability and CRZ Violations: Fishing Communities and their sustainability implications, *3rd International conference of Urban Biodiversity and Design* held during October 8-12, 2012, at Indian Institute of Technology, Bombay.

Parthasarathy, D.

Presented a paper Faith, Ritual, Labour: Translocal Religion Before, Between, and Beyond Politics, *International Workshop and Public Symposium on Global Prayers: Redemption and Liberation in the City* held during September 26-28, 2012, at Goethe Institute, Mumbai in association with Global Prayers Project, Berlin.

Presented a paper Voyeur, Pimp, or Customer? The Perils and Pleasures of Ethnography in Asian Cities, *Doing Asian cities: A Workshop on Urban Aspirations* held during June 5-6, 2012, at National University of Singapore; jointly organized by Max Planck Institute for the Study of Religious and Ethnic Diversity and Asia Research Institute, National University of Singapore.

Purang, Pooja and Shrivastava, A.

Presented a paper Justice perceptions of performance appraisal mechanisms and its effects: A study of Indian banks. in *30th International Congress of Psychology*,

held during July 22- 27, 2012, at Cape Town, South Africa.

Pal, Rama

Participated in the *Silver Jubilee International Conference at IGIDR*. December 1-3, 2012. Mumbai.

Ramanathan, A.

Presented a paper titled Theoretical Underpinnings of Trade Liberalisation and Environment the *International Conference organized by Eurasia Business and Economic Society[EBES]* in November 1-3, 2013.

Ramasubramanian, K.

Presented a paper on Glimpses of Mathematics in India. The *12th International Conference on Mathematical Education* held between July 5-15, 2012 at Seoul, Korea.

Delivered a lecture on Planetary Models in India Exchange of Astronomical Ideas, held on March 28, 2013 at Institute for the History of Natural Sciences, Chinese Academy of Sciences, Beijing, China.

Sarma, V., Singh, S. and Damani, O.P.

Presented a paper on “Noun Group and Verb Group Identification for Hindi” at *COLING 2012* held at IIT Bombay, December 8-15, 2012.

Sarma, V., and Pitale Sarma, V.

Presented a paper on “Acquisition of Number and Gender: A Comparison of Marathi and Konkani” at the *4th UK Cognitive Linguistics Conference* held at King's College London, July 10-12, 2012.

Sebastian, C. D.

Presented a paper Virtue Ethics of Buddhism: An Asian Contribution to the World Culture in *International Conference on Asian Studies*, Negobo, Sri Lanka, on July 26-27, 2012, organized by International Centre for Research and Development, Colombo.

Presented a paper Two Identity Narratives of Classical India: The Buddhist Challenge to the Varna Vyavastha in the International Symposium on Languages of Identity, University of Cologne, Germany, on November 16, 2012 organized by *Society of Intercultural Philosophy, Germany*.

Bairty, T. S. R.

Gave a talk titled Identities and responded to four research student presentations at the *Workshop on Marginalisation and Resistance* organized by Tata Institute of Social Sciences, Tuljapur, February 2-5, 2013.

Bhat, P.R

Presented a paper on Foundation of Medical Ethics in *National Seminar on Bio-Ethical Issues Concerning the Problems in Medicine* organized by Department of

Philosophy, Sri Satya Sai College for Women, Bhubaneswar, September 30 October 1, 2012.

Presented a paper on Advaita: A Critical Look at Mahadevan in the ICPR sponsored *National Seminar on The Philosophy of Professor T. M. P. Mahadevan*, March 26-28, 2013, organized by the Department of Philosophy, Madras University, Chennai.

Bhattacharyya, Surajit, Bagchi S, and Narayanan K. Presented a paper on, Anti-dumping: A New Protectionist Measure in Foreign Trade, presented at the *49th Annual Conference of The Indian Econometric Society (TIES)*, January 9-11, 2013.

George, Siby K.

“Stranger Even to Myself: On the Self in Intense Bodily Pain, *National Conference on Enigma of Pain*, held from March 7- 9, 2013, at the Department of HSS, IIT Bombay, in collaboration with Balvant Parekh Centre for General Semantics and Other Human Sciences, Baroda.

“Gandhi and the Development Discourse Today Seminar on Reformulating Mahatma Gandhi’s Philosophy: Nonviolence, Modernity and Postcoloniality, held on August 25, 2012, at Gandhian Studies Centre, Chandibai Himathmal Mansukhani College, Ulhasnagar, Thane.

Haripriya, G.S.

Invited speaker on Wealth Accounting at the *Joint World Bank Madras School of Economics Workshop on Diagnostic Tools and Instruments* for Assessing Environmental Challenges, December 19-20, 2012, Chennai.

Valedictory Speaker in the *National Seminar on Benchmarking Environmental Initiatives* held on March 26, 2013, University of Kolkatta.

Jung, P.G.

Delivered a talk titled Demands of Sense and Truth in Research, *Workshop on Philosophy of Research Methods*, Department of Humanities and Social Sciences, National Institute of Technology, Silchar, July 2012.

Delivered a talk titled Being, Knowing and Doing- The cardinal verbs and Korzybski, *Advanced Workshop on General Semantics*, Balvant Parekh Centre for General Semantics and Other Human Sciences, Varodara, January 2013

Kulkarni, Malhar

“Wordnet and Lexicography, in a two day National Conference on Vedic literature and Lexicography organized by Deccan College Post Graduate Research Institute, Pune, March 7-9, 2013.

“Current trends in Sanskrit Poetics, CASS, University of Pune, March 15, 2013.

“Various projects in the field of Sanskrit Grammar, *National Seminar on Current trends in Sanskrit Grammar*, organized by Rashtriya Sanskrit Sansthan, on December 20, 2012 in Mumbai.

“Dependency Parsing: A Paninian overview at a *National Workshop* held between April 11-18, 2012 at Manipal University.

“Some issues in Part of Speech Tagging in Marathi at a *National Workshop on POS tagging*, on July 21-22, 2012 at IIIT Hyderabad.

“POS tagging of Marathi, *National Workshop on POS tagging*, between January 9-11, 2013, at JNU.

Narayanan, K. and Santosh Kumar Sahu

Presented a paper on, Determinants of Energy Intensity in Indian Manufacturing Industries: A Dynamic Panel Data Analysis, in the *49th Annual Conference of The Indian Econometrics Society*, during January 9-11, 2013, at the Department of Statistics, Patna University, Patna, Bihar, India.

Presented a paper on, Energy Consumption Response to Climate Change: Options for India, *National Seminar on Institution, Structure and Organization in Globalizing India with Special Focus on Science and Technology Economy and Society* at IIT Bombay, India.

Narayanan, K. and Singh, A.P.

Presented a paper on, Determinants of Agricultural Land Expansion: Evidence from Indian States, in the *49th Annual Conference of The Indian Econometrics Society*, during January 9-11, 2013, at the Department of Statistics, Patna University, Patna, Bihar, India.

Narayanan, K., Sagnik Bagchi and Bhattacharyya Surajit

Presented a paper on, Anti-dumping: A New Protectionist Measure in Foreign Trade, in the *49th Annual Conference of The Indian Econometrics Society*, during January 9-11, 2013, at the Department of Statistics, Patna University, Patna, Bihar, India.

Narayanan, K., and Vidhisha Vyas

Presented a paper on, *Trends in Mergers and Acquisitions in Indian Manufacturing* at the All India Economics Conference on Economic Challenges: Global and National Perspectives organized by SSSIHL, Prasanthi Nilayam.

Nath Rajakishore

Presented a paper on The Metaphysical Analysis of Mind in the Physical World in the symposium on Philosophy & Analysis in the 25th Annual Conference of the All Odisha Philosophy Association organized

by Department of Philosophy, Dharmasala Mahavidyalya, Dharmasala, Odisha, January 25-26, 2013.

Parthasarathy, D., and Hemant Kumar Chouhan

Presented a paper CRZ Rules, urbanization and livelihoods in the margins in globalizing Mumbai: Impact on the Fishing Community, *National Seminar on Development, Identity and Politics: Identities of the Marginalised in Contemporary India* held during March 1-2, 2013, at Department of Sociology, University of Mumbai.

Presented a paper Coastal Eco-systems, Vulnerability, and Sustainability: Social Science Perspectives *International Workshop on Coastal River Zone Management, Regulations and Development* held during January 10-11, 2013, at IIT Bombay; jointly organized by National Environmental Engineering Research Institute and Indian Institute of Technology, Bombay.

Panda, R. K.

“Being in Divine Dialogue: Integrity and Responsibility in the Bhagavat Gita Moral Philosophy in Srimad Bhagavat Git, held at M. P. C. College, Baripada, Orissa from March 31-April 1, 2013.

Panda, Ratikanta

Presented a paper entitled, ‘Ultimate Reality: A Critical Study in Radhakrishnan’ in a *National Workshop*, held at SS College, Shahjahanpur, U.P., during March 24-25, 2012.

Ramasubramanian, K.

Delivered the Keynote Address on Scientific elements in Sanskrit Literature *International Seminar on Sanskrit Literature and Progress of Universe*, held between November 16-18, 2012 at Iswar Saran Degree College, Allahabad.

Delivered a talk on On the origins of Infinite Series: An episode in the Historiography of Mathematics *82nd Annual Session of National Academy of Sciences India*, held between November 29-December 1, 2012 at BHU, Varanasi.

Gave the Keynote Address in the inaugural session on The craze for Westernization and Indigenous paradigm Research Methodology in Social Sciences Emerging Research Trends, held between December 3-23, 2012 at the Department of Sociology, University of Allahabad, Allahabad.

Delivered a series of lectures on Mathematics in India: Ancient and Classical Period ATM Workshop on Development of Mathematics in India, held between February 6-12, 2013 at IIT Bombay, Mumbai.

Delivered a talk on Indian Planetary Models *Workshop on Promoting History of Science in India*, held between March 16-17, 2013 at IIT Gandhinagar, Ahmedabad, Gujarat.

Sebastian, C. D.

Presented a paper The Philosophy ‘Salad Bowl’: A note on K. Satchidanandan Murty’s The Indian Spirit, in the *Conference on the Philosophy of K. Satchidanandan Murty*, University of Madras, Chennai, on January 28-30, 2013, organized by Centre for Studies in Civilizations, New Delhi, and Department of Philosophy, University of Madras.

Papers Presented by Students

Thoudam, Natasa

Presented a paper “Gendered Everyday Violence: ‘Complaint’ and ‘The Wrong Person,’ and ‘Guilt’ and ‘My Sister-in-law,’” *17th Annual Cultural Studies Workshop* of Centre for Study of Social Sciences, Calcutta, held during January 25-29, 2013, at Santiniketan, India.

Presented a paper (in absentia) “Indianism in English,” *The 10th Asia TEFL International Conference*, held during October 4-6, 2012, at Gurgaon, India.

**Conferences/Symposia/Workshops/
Seminars (Coordinated/Chaired by
Faculty)**

Haripriya G.S.

Organized International Conference on Urban Biodiversity and Climate Change Mitigation and Adaptation.

Kulkarni, Malhar

Chaired 5th International Sanskrit Computational Linguistics Symposium, January 4-6, 2013. (ii) Co-Organiser: COLING

Organized workshop on Issues in Paninian Gramamar, December 18-20, 2012.

Shastri, Sudha

Organised a refereed conference on Disnarration in IIT Bombay, from March 1-2, 2013. Professor Jasbir Jain, Honorary Director of the Institute for Research in Interdisciplinary Studies (IRIS), Jaipur, and Prof Supriya Chaudhuri, Professor of English and Co-ordinator of the Centre of Advanced Study at the Department of English, Jadavpur University, Kolkata.

Bairy, T. S. R. and Prof. Sharmila S.

Organised a Colloquium on Middle Class on April 30, 2012 and May 1, 2013 at IIT Bombay.

Chakraborty Paulomi

Chaired the Panel discussion on Gender and Science,” held during April 3, 2013, at Department of Humanities and Social Sciences, IIT Bombay.

Khan,A.

Conducted a Workshop on Training Course in Research Methodology on Computer Applications in Social Science Research, AMU Aligarh, Uttar Pradesh & jointly organized by ICSSR New Delhi (India) between March 20-25, 2012.

Kulkarni, Malhar

Chaired workshop - Phonology of Sanskrit, November 12-13, 2012

Chaired workshop - Spoken tutorial, July 28, 2012.

Sirola, Vikram Singh

Presented a paper on A Tightrope Walker: K. Satchidanandan Murty on Religiosity, *National Seminar on Professor K.S. Murthy*, Department of Philosophy, University of Madras, January 28-30, 2013.

Formulated and presented a Course on Environmental Ethics in Course Design Workshop under the auspices of Indian Council of Philosophical Research to introduce Philosophy to professional institutions of India, February 13-15, 2013, ICPR Academic Centre Lucknow.

Jung, Golay P

Organized an International Seminar on the theme “Enigma of Pain,” in collaboration with Balvant Parekh Centre for General Semantics and Other Human Sciences, Varodara, from March 7-9, 2013.

Organized a Symposium led by Professor Dan Zahavi and Professor Sikka Sonia on the theme Interrogating the Notion of the Self, in collaboration with Indian Council of Philosophical Research, January 16, 2013.

Organized a Departmental talk by Dr. Bruce Kodish titled Exponential Humanity: Challenges to Sanity and Survival in the 21st Century, January 11, 2013

Invited Lectures**Kulkarni, Malhar**

“Textual Problems in Kasika at University of Cambridge, UK, June 20, 2012.

Parthasarathy, D.

“Between and Beyond Translocal and Transnational: Rural-Urban, Space-Scale, Caste-Class, at the Centre for Urban Studies, University of Amsterdam on October 18, 2012.

Ramasubramanian, K.

“Astronomical exchanges between India and China Institute for the History of Natural Sciences, Chinese Academy of Sciences, Beijing, China, July 5, 2012.

Chakraborty, Paulomi

“Women and Displacement: 2 Lectures, Rethinking Partition Studies: Exploring Refugees in Heterotopic Borderlands, Biopolitics, and Gender Displacement in Partition Narratives: A Workshop. Smt. Chandibai Himathmal Mansukhani College, Thane. 30 and 31 May, 30-31, 2012.

Deb, K.

Invited by Prof. Parasuraman, Director, TISS, Mumbai to be a speaker for the panel discussion on the book written by Gopal Guru and Sundar Sarukkai (2012) *The Cracked Mirror: An Indian Debate on Experience and Theory* held on August 10, 2012 at TISS, Mumbai.

Invited as key resource person at the interdisciplinary, UGC funded Refresher Course on a theme entitled, Dynamics of Development in the Globalising South; a Spatio-social Perspective, organised by the Academic Staff College, in collaboration with the Department of Geography, University of Mumbai, during February 4-23, 2013. Gave lecture entitled: Impact of globalisation on metropolitan cities in India.

Jung, P.G.

“What Empiricism Really Means, at S.N.D.T. University, Pune Centre, September 2012.

Khan,A.

“Behavioral, neural and cognitive studies of auditory, speech and phonological processing in developmental dyslexia, Neuroscience Research Translation to care and cure, Department of Life Sciences, Sophia College, Mumbai, November 23- 24, 2012.

“Police Investigating Style, Interrogation and Eyewitness Testimony : Neuroscientific Analysis, Short term course, “Social Sciences & Information Technology” organized by International Centre, University of Pune in collaboration with University Grant Commission, March 18 - March 23, 2013.

Kulkarni, Malhar

“Vakyapadiya, Paribhasendusekhara and Paramalaghumanjusa, Department of Sanskrit, University of Mumbai, July 3, 2012.

“Introduction to Sanskrit Computational Linguistics, Department of Sanskrit, University of Mumbai, July 4, 2012.

“Sharada Script, AlkeshModi Institute of Numismatics, University of Mumbai on September 3, 2012.

“Dependency Parsing: A Paninian overview at a National Workshop at Manipal University, April 11-18, 2012.

“Problems of Sanskrit usage and solutions at the National Sanskrit Book fare, Ujjain, February 23-24, 2013.

“Current Trends in Indological studies, H.P.T.College, Nasik, March 2, 2013.

“How to prepare a critical edition, “Importance of a critical edition and “Deciphering the dates in the manuscripts, at TRIBIL, Nasik, January 9, 2013.

Ramanathan, A.

Inaugural Talk, Econometric Methods and Computer Applications organized by Department of Econometrics, Madras University, January 31, 2013.

Keynote Address, Workshop on Economics, Ethics and Enterprise organized by School of Management Studies, National Institute of Technology, Calicut, February 12, 2013.

Validatory Address for the Short Term Training Programme on Research Methodology conducted by LBS School of Technology, Trivandrum, March 8, 2013.

Ramasubramanian, K.

“Paradigm Shift of Values in Modern Society Jagat Taran Girls’ Degree College, Allahabad, December 3, 2012.

“Mandukya-karika of Gaudapada Department of Philosophy, University of Madras, Chennai, March 20, 2013.

“Scientific aspects in Sanskrit Literature, National Sanskrit Bookfare, Ujjain, February 23-24, 2013.

Significant Awards/Distinctions

Haripriya, G.S.

Member, Expert committee on Access to Benefit Sharing, National Biodiversity Authority India.

Member of the expert committee constituted by the Prime Minister on developing a framework for the green national accounts for India.

Khan, A.

International Fellowship for Young Biomedical Scientist by Indian Council of Medical Research India in 2011-12.

Kulkarni, Malhar

Nominated as a Member of the Committee to Review the recommendations of the 1st Sanskrit Commission, by Ministry of HRD.

Nominated as a Member of PAC for LDC-IL, CIIL, Mysore, July 30, 2012.

Narayanan, K.

Referee: NASI Young Scopus Social Sciences Award.

Nath, Rajakishore

Received Young Philosopher Award 2012 instituted by Indian Council of Philosophical Research, Ministry of HRD, Government of India, New Delhi.

Parthasarathy, D.

Elected Board Member, Commission on Legal Pluralism, International Union of Ethnological and Anthropological Sciences, 2013-15.

Ramasubramanian, K.

EC Member, in the capacity of Assessor, International Union for History and Philosophy of Science (DHST/ IUHPS).

Sebastian, C.D.

Editor, Journal of Sacred Scriptures (ISSN 0974-0090)

Honorary Work

Bhattacharyya, S.

Reviewer, Journal of Business Research (*Elsevier Publication*),

Reviewer, South Asian Journal of Global Business Research (*Emerald Publication*)

Deb, K.

Invited as Subject expert by Ravenshaw University for a four-day Seminar on Curricular Reforms in Higher Education from June 30-July 3, 2012. Helped in framing and revising the undergraduate and postgraduate syllabi of Ravenshaw University.

Invited as resource person by the Department of Sociology, Tezpur University for guidance in formulating their 5 years integrated MA program on December 7-9, 2012.

Invited as an Expert for recruitment of teaching faculty in Sociology of Ravenshaw University, Cuttack. The interviews were held on April 5-6, 2013.

George, Siby K.

Reviewed papers for the Journal of Indian Council of Philosophical Research (JICPR), and Sophia: International Journal for Philosophy of Religion, Metaphysical Theology and Ethics, Springer.

Jung, P.G.

Reviewed Course Contents for Philosophy Courses formulated for Professional Institutes In India by ICPR, Academic Centre, Indian Council of Philosophical Research, Lucknow, 2013.

Khan, A.

Reviewer of projects of Croatian Science Foundation, Croatia

Reviewer of Journal of Child and Family Studies

Reviewer of Journal of Psychological Studies

Reviewer of International Journal of Social Sciences, 2010

Reviewer of Journal of Psychology and Counselling, USA

Kulkarni, Malhar

Member, Regulating Council of the Bhandarkar Oriental Research Institute, Pune.

Member, Examination Council, Vedashastrottejaka Sabha, Pune.

Member, Steering Committee, International Sanskrit Computational Linguistics Symposium.

Member, Expert Committee for evolving Script Grammar for Sanskrit, Ministry of MCIT, Government of India.

Evaluator, Spoken Sanskrit Tutorial project, under the Ministry of HRD, Govt. of India at IITB.

Member, Board of Studies, Somaiya College, Vidyavihar since 2012.

Nominated Senate Member till December 2013.

Seminar Coordinator, Since January 2012

Member of DPC, Since May 2011.

Kulkarni, Mrinmoyi

Reviewed papers for Indian Anthropologist

Reviewed papers for International Journal of Environmental Research and Public Health

Reviewed papers for Population Studies

Reviewed papers for Psychological Studies

Nath, Rajakishore

Reviewed article for *Philosophy Study* and *Philosophical Papers & Reviews*

Parthasarathy, D.

Reviewed papers for Asian Perspectives, Natural Hazards, Singapore Journal of Tropical Geography, and Annals of the Association of American Geographers. Reviewed Research Proposals for Austrian Climate Research Program.

Reviewed abstracts for FICCI-UNEP Indian Life Cycle Assessment and Management Conference (2012 and 2013).

Reviewed book proposal for ARI-Springer Asia Series, Routledge, Springer USA, and Taylor and Francis.

Reviewed research carried out by Mumbai Fellows, Urban Aspirations in Asia Project, (Tata Institute of Social Sciences, New York University, and Max Planck

Institute for religious and ethnic Diversity, Gottingen). Reviewed proposals as a member of the Research Fellowship Evaluation Committee, Village Dynamics in South Asia project, International Crops Research Institute for the Semi-Arid Tropics, Hyderabad.

Padhi, Puja

panelist for technical session, at Indian Institute of Capital Markets, Navi Mumbai - 400614 for XI Capital Markets Conference held during December 18-19, 2012. Reviewed six papers for the above conference.

Pal, Rama

Reviewed a paper for Ashima Goyal (ed.) 'Handbook of the Dynamic Indian Economy' [OUP]. August 2012.

Ramanathan, A.

Guest Professor at Indian Institute of Technology-Gandhinagar for two years since December 2012.

Ramasubramanian, K.

Reviewing following papers: Reviewed papers for Indian Journal for History of Science: Reviewed papers for Ganita Bharati: Reviewed papers for Conference on International Vedic Workshop, January 2014

Sebastian, C.D.

Reviewed the Manuscripts of the Book for Oxford University Press.

Faculty Members and their Specialisations

Economics**1. A. Ramanathan**

Managerial Economics, Applied Econometrics, Monetary Economics.

2. P.L. Trivedi

Open Economy Macroeconomics, International Trade and Finance, Indian Economy, Environmental Economics.

3. K. Narayanan

Industrial Economics, Multinationals and Technology Transfer, Industry-Environment Linkages, International Trade, and Socio Economic Impacts of Climate Change.

4. Haripriya G.S.

Development economics, environmental economics, climate change, Green Accounting

5. Puja Padhi

Financial Economics, Monetary Economics

6. Surajit Bhattacharyya

Macro Economics, Industrial Economics, and Corporate Investment

7. Rama Pal

Applied Econometrics, Development Economics, Health Economics.

English

1. M.S. Malshe

Modern Critical Theory, Aesthetics, Linguistics and English Language Teaching.

2. Neelima Talwar

Creativity and Creative Writing discourses, Science as a Cultural Construct in Literary/Performative Genres with special focus on Science-Drama.

3. Sudha Shastri

Novel, Victorian Studies, Postmodern Literature and Intertextual theory

4. Vaijyanthi Sarma

Syntactic theory, First language acquisition, Linguistic deficits, Language processing, Conservation of endangered languages (especially Dravidian minority languages)

5. Sharmila

Women's Studies, Autobiography Studies, "Crisis" in English Studies, African American Writing

6. Paulomi Chakraborty

Partition Literature, South Asian Fiction in English, Women's Studies

Philosophy

1. P.R. Bhat

Philosophy of Language, Contemporary Western Philosophy, Meta-Ethics.

2. C.D. Sebastian

Indian Philosophy

3. Vikram Singh Sirola

Analytic Philosophy, Contemporary Western Philosophy

4. Ranjan K. Panda

Philosophy of Mind, Analytic Philosophy

5. Ratikanta Panda

Analytic Philosophy, Philosophy of Language and Contemporary Indian Philosophy

6. Siby K. George

Twentieth Century Continental Philosophy

7. Rajakishore Nath

Philosophy of Artificial Intelligence, Philosophy of Mind, Cognitive Science

8. Jung P.G.

Wittgenstein, Alfred Korzybski, Philosophy and Popular Culture, Contemporary Western Philosophy, Moral Philosophy.

Psychology

1. Meenakshi Gupta

Social Psychology, Organizational Behaviour, Human Resource Development

2. T. Bhattacharya

Health and Clinical Psychology, Psychosomatic disorders, Stress & Coping, subjective well-being, ergonomics, cross-cultural personality

3. Pooja Purang

Organizational Psychology, Organizational Behavior, Human resource management, personality.

4. Azizuddin Khan

Cognitive Psychology, Clinical Psychology, Neuro Psychology, Ergonomics, Event Related Potential

5. Mrinmoyi Kulkarni

Social Psychology, Fertility, Health Behaviours, Role of Psychology in Development

Sociology

1. Subuddhi K.

Technology and Development; Political Sociology; Environmental Sociology; Rural Sociology; International and Global Sociology.

2. R. Robinson

Sociology of religion, kinship and family; Indian society

3. D. Parthasarathy

Development Studies, Law and Governance, Urban Studies, Vulnerability and Adaptation to Climate Change, Women and Gender Studies, Research Ethics

4. Kushal Deb

Urban Sociology, Ethnicity and Multiculturalism Sociological Theory, Sociology of Development.

5. Sarmistha Pattanaik

Political ecology, environmental politics with a focus on social inequality and natural resource conflicts, marginalization, environmental and indigenous social movements, sustainable development and climate change ethics.

6. Ramesh Bairy

Social Stratification; Contemporary Caste; Religious Institution

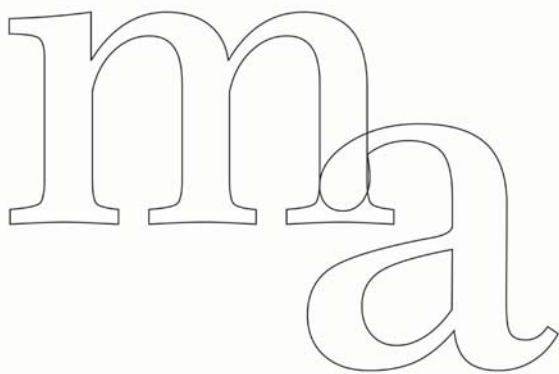
Cell for Indian Science and Technology in Sanskrit (CISTS):

1. Malhar, Kulkarni

Sanskrit language, Paninian Grammar, Philosophy of language, Aesthetics in Sanskrit Texts

2. K. Ramasubramanian

Indian Mathematics and Astronomy, Metaphysics and Advaita Vedanta Non-linear Dynamics and Chaos



Mathematics

Introduction

The Department of Mathematics conducts basic, applied and interdisciplinary research in varied areas of Mathematics, including Algebra & Number Theory, Analysis, Geometry and Topology, Combinatorics and Theoretical Computer Science, Partial Differential Equations & Numerical Analysis, and Probability & Statistics. The current faculty strength is 41. The new faculty members who joined the department during 2012-2013 are: Prof. Ananthnarayan Hariharan, Prof. Rekha Santhanam, and Prof. Srikanth Srinivasan.

The year witnessed excellent contributions and achievements of faculty and students in research; interaction with industry and noted national and international institutes, universities and organisations; and extended educational activities beyond the departmental academic programmes.

Academic Programs

Student Intake:

Ph.D	: 08
M.Sc. (MA)	: 27
M.Sc. (ASI)	: 30

Degree Awarded:

Ph.D.	: 04
M.Sc.(MA)	: 26
M.Sc. (ASI)	: 28

The department is involved in teaching the Mathematics-related courses in the B.Tech. Programme of the institute. In addition, the department offers two distinct Master's programme: M.Sc. (Mathematics) and M.Sc. (Applied Statistics and Informatics). Moreover, the department has a vibrant research programme leading to Ph.D. degree.

R & D Activities

Sponsored Projects	: 10
New	: 2
Ongoing	: 8
Faculty involved	: 11

Continuing with its tradition, the department has further augmented its basic research, focusing in contemporary areas of fundamental, developmental and strategic importance as well as applied and interdisciplinary research. It is also engaged in a productive collaboration with industries and reputed R&D departments. The collaborating R&D institutions/organisations include:

Indian Institutions: Tata Institute of Fundamental Research (TIFR), Indian Institute of Science (IISc), Indian Statistical Institute (ISI), Institute of Mathematical Sciences (IMSc).

Foreign Universities: Brunei University (U.K), Florida Technical University (USA), Colorado School of Mines (US), Aberystwyth University (UK), Humboldt University (Germany), CNRS-IML, Marseille (France), Institut National des Sciences Appliquées, Toulouse (France), Univ. St-Etienne (France), l'Université Pierre et Marie Curie, Paris (France), Technical University of Denmark, Vilnius University, Lithuania, Emory University, US, French Naval Academy, Universität Bielefeld, Germany, University of Twente, Netherlands.

Nodal Organizations: CSIR, DAE, DBT, DST.

Sponsored Research Projects

S. No.	Project Title	Sponsoring Agency	Status
1	National Programme on Differential Equations: Theory, Computation and Applications (NPDE-TCA)	DST	Ongoing
2	Numerical Treatment of Integral Operators with Non-Smooth Kernels	Indo-French Centre for Promotion of Advanced Research	Ongoing
3	PracTutor	Empower IT solutions	Ongoing
4	Robust parameter designs for quality and safety critical processes	DST	Ongoing
5	Linear error correcting codes and higher dimensional algebraic varieties	IRCC, IIT Bombay	New
6	Algebraic varieties over finite fields and linear error correcting codes	DST-RFBR (Indo-Russian Project)	New
7	INSPIRE Faculty Award Research grant	DST	Ongoing
8	Characteristic fast marching method for fronts propagating in an inhomogeneous moving fluid	DST	Ongoing
9	Discontinuous Galerkin Method for Nonlinear Acoustics	Indo-French Centre for Promotion of Advanced Research	Ongoing
11	Identifying the most successful combination dose in a phase I/II clinical trial	IRCC	Ongoing
12	Liftings of operator tuples and structure theory of operator Algebras	IRCC	Ongoing

Consultancy Projects

S. No.	Project Title	Sponsoring Agency	Status
1	Statistical Analysis of the data related to scholastic skills obtained using a questionnaire administered after showing animation films to school kids in Mumbai and New Delhi	Worldkids Foundation, Mumbai	Complete

Extension Activities

Workshops and conferences were organized/coordinated by the faculty of the department as follows:

Baskar, S.

Advanced Level Workshop on Recent Developments in Numerical Methods for Evolution Equations, March 2013.

Nataraj, N.

Advanced Level Training Programme of National Programme for Differential Equations, June 2012.

Advanced Level Workshop on Non-standard Finite Element Methods, February 2013.

Rana, I. K.

Math for ECM, CEP short course, April 2012.

8th Professional Development and Technology Orientation for math teachers, CEP short course, July 2012.

TIME Primary Conference for Math Teachers, December 2012.

Ranjan, A.

MPLW Dynamical Systems, April 2012.

Shastri, A. R.

Annual Foundation School II of Advanced Instructional School, held at Pune University, June 2012.

Visitors to the Department

Ahues, Mario, Universite' Jean Monnet, Saint Etienne, France, January 18-February 3, 2013.

Brenner, Susanne, Louisiana State University, February 2013.

Bruen, Aiden, Department of Mathematics, University of Calgary, Canada. Delivered a lecture on Blocking Sets, Configurations and Perspective Sets, October 2012.

Carstensen, Carsten, Humboldt University, February to March 2013.

D'Cruz, Clare, Chennai Mathematical Institute. Delivered a lecture on Castelnuovo Mumford regularity of powers, sum and radical of ideals, April 2012.

Das, Soumya, School of Mathematics, TIFR. Delivered a lecture on Fourier coefficients of Siegel modular forms, September 2012.

Dutta, Amartya, Indian Statistical Institute, Kolkata. Delivered a lecture on The Kuttakadhyayah of Brahmagupta: Emergence of Algebra in Ancient India, February 2013.

Exner, George, Bucknell University, USA. Delivered two lectures on n -contractivity and k -hyponormality: Some measure considerations, November 2012.

Gohm, Rolf, Aberysthwyth University. Delivered a lecture on Non-commutative Markov Chains and Multi-analytic Operators, August 2012.

Grammont, Laurence, Universite' Jean Monnet, Saint Etienne, France. Delivered a lecture on Improvement over the Galerkin and the iterated Galerkin methods for nonlinear integral equations, January 18 - February 3, 2013.

Griewank, Andreas, Department of Mathematics, Humboldt University. Delivered a lecture on From linear to piecewise linear modelling and back, March 2013.

Janwa, Heeralal, University of Puerto Rico, San Juan, Puerto Rico (USA), December 21-28, 2012. Delivered a lecture on On the Main Conjecture on APN Functionson December 27, 2012.

Laishram, Shanta, Indian Statistical Institute, Delhi. Delivered a lecture on Grimm's Conjecture and smooth numbers, March 2013.

Lukacova-Medvidova, Maria, Institut fur Mathematik, Universität Mainz. Germany, March 15-28, 2013. Delivered a lecture on Mathematical Fluid Dynamics: Example and Challenges on March 26, 2013,

Madiman, Mokshay, Yale University, New Haven, USA. Delivered a lecture on An entropy-based sumset calculus for discrete and continuous settings, August 13, 2012.

Mittal, Rajat, Institute for Quantum Computing, University of Waterloo. Delivered a lecture on Helping quantum computers classically, March 2013.

Ram Murty, M., Queens University, Kingston, Canada. Delivered a lecture on The Legacy of Srinivasa Ramanujan, January 3, 2013.

Sreekantan, Ramesh, ISI Bangalore. Delivered a lecture on Circular units and a generalization, September 10, 2012.

Sung, Li-Yeng, Louisiana State University, USA. February 2013.

Venketasubramanian, C. G., Université de Versailles St-Quentin en Yvelines. Delivered a lecture on Representations of $GL(n)$ distinguished by $GL(n-1)$, December 2012.

Viennot, Xavier G., LaBRI, Université Bordeaux 1, Talence, France. Gave A Short Course on Combinatorics and Physics: The Cellular Ansatz, January 3-February 20, 2013.

Wen Ching Winnie Li, The Pennsylvania State University, USA and the National Center for Theoretical Sciences, Taiwan, July 28-31, 2012.

Wilson, Richard, California Institute of Technology (Caltech), USA. Delivered a lecture on A lemma on polynomials modulo p^m and applications to coding theory, December 26, 2012.

Conference/ Workshops/ Seminars (Participated/ Paper Presented)

Anandavardhanan, U.K.

INSPIRE Science Internship Camp, G N Khalsa College, Mumbai, November 16-20, 2012.

“Mod p representations of $GL(2, \mathbb{Q}_p)$ ”, *Automorphic Forms, Galois Representations and L-functions (Indo-French Centre for Promotion of Advanced Research)*, held at IISER Pune, September 03-07, 2012.

“Mod p representations of $GL(2, \mathbb{Q}_p)$ ”, *The Legacy of Srinivasa Ramanujan*, held at University of Delhi, December 17-22, 2012.

Bhaskara, A., Desai, D. and Srinivasan, S.

“Optimal Hitting Sets for Combinatorial Shapes”, *16th. International Workshop on Randomization and Computation (RANDOM '2012)*, 2012.

Baskar, S.

Two lectures on “Numerical Methods for Heat and Wave Equations”, *PG Level Training Program on Differential Equations*, held at IIT Delhi, May 14-June 2, 2012.

Dani, S.G.

“Almora Mathematical Surveys”, *Interface between Hyperbolic Geometry and Diophantine Approximation*, held at Kumaun University, Almora, October 3-6, 2012.

“Geometry in the Sulvasutras”, *Workshop on Promoting History of Science in India*, held at the IIT Gandhinagar, March 16-17, 2013.

“Trigonometry in Ancient and Medieval India”, Conference on *Frontiers of Mathematics and Recent Developments*, held at Rani Channamma University, Belgavi, March 26-27, 2013.

“Studying Values of Binary Quadratic Forms Through Dynamics”, *3rd Indo-Brazilian Symposium in Mathematics*, IMPA, Rio de Janeiro, August 13-17, 2012.

“Role of Mathematical Societies in the Early Development of Mathematics in India”, *International Seminar on History of Mathematics*, held at Ramjas College, Delhi, November 19-20, 2012.

“Katyayana Sulvasutra - Some Observations”, *International Conference on History and Development of Mathematical Sciences*, held at Maharshi Dayanand University, Rohtak, November 21-24, 2012.

“Lattice Subgroup Actions and Diophantine Approximation with Binary Quadratic Forms”, *ICTS Discussion meeting on Recent Trends in Ergodic Theory and Dynamical Systems*, held at Maharaja Sayajirao University of Baroda, Vadodara, December 26-29, 2012.

Dey, S.

Recent advances in Operator Theory and Operator Algebras, held at ISI Bangalore, December 31, 2012-January 11, 2013.

“Repeated interaction model for a Quantum system with a subprocess”, *15th Workshop on Non-Commutative Harmonic Analysis*, held at Bdlewo, Poland, September 23-29, 2012.

Ghorpade, S. R.

“Splitting subspaces, Singer cycles and linear recurrences”, *Séminaire de Théorie des Nombres*, Institut de Mathématiques de Bordeaux, Université Bordeaux 1, Talence, France, May 11, 2012.

“Affine Grassmann codes and their automorphisms”, *Séminaire Arithmétique et Théorie de l'Information*, Institut de Mathématiques de Luminy, Marseille, France, May 24, 2012.

“Arithmetic progressions in a unique factorization domain”, *Séminaire de Théorie des Nombres*, Institut de Mathématiques de Toulouse, Université de Toulouse Le Mirail, Toulouse, France, May 29, 2012.

“Splitting subspace conjecture”, *Kolloquium*, Christian-Alberts Universität Kiel, Kiel, Germany, June 1, 2012.

“Linear Codes related to Grassmann Varieties and their automorphisms”, *Coding Theory Colloquium*, Technical University of Denmark, Lyngby, Denmark, June 7, 2012.

“Introduction to affine Grassmann codes”, *Sophus Lie Seminar*, Universitetet i Tromsø, Tromsø, Norway, June 20, 2012.

“Grassmann varieties, codes and combinatorics”, *Colloquium talk*, University of Puerto Rico, San Juan, Puerto Rico, June 29, 2012.

Limaye, B.V.

“Well-conditioned basis of a spectral subspace”, *National Seminar on Current Research and Developments in Mathematics and Computing (CDRMMC-2012)*, held at Alia University, Kolkata, October 3, 2012.

“Stokes theorem for intervals, rectangles and cuboids”, *National Symposium on Mathematical Methods and Applications (NSMMA-2012)*, held at Indian Institute of Technology Madras, Chennai, December 22, 2012.

“Conditioning of a Basis”, *International Conference on Numerical Linear Algebra and its Applications (NLAA 2013)*, held at Indian Institute of Technology Guwahati, Guwahati, January 16, 2013.

Mukhopadhyay, S.

“Effect of Model Misspecification on Designs for GLMs”, *International Conference on Statistics and Informatics in Agricultural Research*, December 18-20, 2012.

Eighth International Triennial Calcutta Symposium on Probability & Statistics, December 27-30, 2012.

Nataraj, N.

A series of lectures on Numerical Analysis in *UG level Training Programme of National Programme of Differential Equations- Theory, Computation and Application (NPDE)*, held at Bhubhaneshwar, May 2012.

A series of lectures on *Finite Element Methods in Advanced Training Programme of NPDE*, held at IIT Bombay, June 2012.

Puthenpurakal, T.J.

“Bockstein cohomology of associated graded rings”, *27th Annual Conference of the Ramanujan Mathematical Society*, held at New Delhi, October 20-23, 2012.

“On the intersection of Annihilator of the Valabrega-Valla module”, *National Conference on Topics in Commutative Algebra*, held at Institute of Science, Mumbai, January 24-25, 2013.

Raghunathan, R.

“Factorisation in a Class of L-functions”, *Indo-French Conference on Automorphic forms, Galois representations and L-functions*, held at IISER, Pune, September 3-7, 2012.

“On the Global Exterior Square L-function of Jacquet and Shalika”, *The Legacy of Srinivasa Ramanujan - An international conference*, held at University of Delhi, December 17-22, 2012.

Rana, I.K.

“Enabling Mathematics Learning through Technology”, *RFIME*, New Delhi, July 2-3, 2012.

2nd national Multi-Conference on Contemporary Global Trends in Technology and Management, LNCT Indore, August 2012.

British Council's Global Policy Dialogue on Science and Mathematics, Education in Schools: The way forward, held at New Delhi, January 9-10, 2013.

17th Asia Technology Conference in Mathematics, Bangkok, December 2012.

Sabnis, S.V.

“Multistate Coherent Systems”, *Workshop on Reliability Theory and Survival Analysis*, held at IIT Kanpur, December 3-5, 2012.

“Analyzing the Effects of Metal Derived Products on Survival and Hatching of Zebrafish Embryos using Generalized Estimating Equation (GEE) Methodology” in “Statistics in Action”, *Workshop on Applied Statistics for Statisticians and Users of Statistics in Biological and Social Sciences*, March 7-10, 2013.

“Estimation of Parameters of a Mixture Distribution Function Using Quantile Functions”, *International Conference on Frontiers of Statistics and its Applications (CONFROST-2012)*, Department of Statistics, Pondicherry University, December 21-23, 2012.

Participated in a panel discussion on Statistical Capacity building in South Asia, *International Indian Statistical Association Annual Conference*, Chennai, January 2-5, 2013.

Sane, S.S.

Conference on Algebra and Discrete Mathematics at Kattappana, Kerala, November 2012.

Conference on Mathematics and its Applications: A special talk on Mathematics and Computer Science, Wadia College, Pune, November 2012.

Symposium in Combinatorics at the *Ramanujan Mathematical Society Annual Meeting*, Shiv Nadar University, New Delhi, October 2012.

Recent Trends in Discrete Mathematics, School of Mathematics, Tata Institute of Fundamental Research, December 17-20, 2012.

Santhanam, R.

“Equivariant Baratt-Priddy-Quillen Theorem”, *RMS Conference, Topology Symposium*, October 2012.

Srinivasan, S.

“Certifying Polynomials for $AC^0[\text{parity}]$, with applications”, *Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2012)*, December 2012.

Suresh Kumar, K.

“Controlled Stochastic Processes: Theory and Applications”, *India-UK scientific seminar*, held at Department of Mathematical Sciences, University of Liverpool, UK, March 25-27, 2013.

Verma, J.K.

“Newton Polytopes and Polynomial Equations”, *ATM Workshop and Conference and Complex Analysis and Related Topics*, held at Central University of Rajasthan, March 15-20, 2013.

“Linear Diophantine Equations and Stanley’s Solution of Anand-Dumir-Gupta Conjecture”, *Conference on Commutative Algebra*, held at Institute of Science, January 25, 2013.

“Linear Diophantine Equations”, *Ramanujan Memorial Award Lecture at the 78th Annual Conference of Indian Mathematical Society*, held at BHU, Varanasi, January 22-25, 2013.

“Resolution of Singularities and Integral Closure of Ideals”, *27th Annual Meeting of the Ramanujan*, held at Mathematical Society, New Delhi, October 20-23, 2012.

“Local Cohomology of Bigraded Rees Algebras and Normal Hilbert Polynomials”, *Vietnam-France Joint Congress in Mathematics*, Hue City, Vietnam, August 20-24, 2012.

“Products of complete ideals and a theorem of Rees about normal Hilbert polynomials”, *III Indo-Brazil Symposium in Mathematics*, IMPA, Rio de Janeiro, Brazil, August 13-17, 2012.

“Local Cohomology of bigraded Rees algebras”, *34th Japan Commutative Algebra Symposium*, Hayama (Japan), November 22-26, 2012.

“Fundamental Theorem of Algebra”, *Institute Colloquium at LNM-IIT Jaipur*, April 17, 2012.

Invited Lectures**Anandavardhanan, U.K.**

“On ranking and rating, Outreach Programme for Higher Secondary School Teachers & Students” at

Kerala School of Mathematics, Calicut, September 30-1 October 02, 2012.

“Fibonacci primes, Outreach Programme for Higher Secondary School Teachers & Students” at Kerala School of Mathematics, Calicut, September 30-October 20, 2012.

Invited talk on Automorphic forms on adèle groups, *School on Modular Forms*, held at Kerala School of Mathematics, Calicut, October 3-19, 2012.

Three invited lectures on Herzig’s classification of supersingular representations of $GL(n)$ *Hilbert Modular Forms and Varieties*, Kerala School of Mathematics, Calicut, January 21-31, 2013.

“Mod p representations of $GL(2, \mathbb{Q}_p)$, Automorphic forms, Galois representations and L-functions”, Indo-French Centre for Promotion of Advanced Research, IISER Pune, September 3-7, 2012.

“Mod p representations of $GL(2, \mathbb{Q}_p)$ ”, The Legacy of Srinivasa Ramanujan, University of Delhi, December 17-22, 2012.

Dani, S.G.

Prof. S.V. Keshava Hegde Memorial Endowment Lecture on The Story of Development of Mathematics in India at University of Mysore, March 9, 2013.

Prof. S.V. Keshava Hegde Memorial Endowment Lecture on Diophantine approximation - via arithmetic, geometry and dynamics at University of Mysore, March 9, 2013.

Three lectures on Interface between Hyperbolic Geometry and Diophantine Approximation, *ICTS Workshop on Groups, Geometry and Dynamics*, held at Kumaun University, Almora, December 3-12, 2012.

Three lectures on An introduction to flows on homogeneous spaces, *ICTS Workshop on Recent Trends in Ergodic Theory and Dynamical Systems*, held at Maharaja Sayajirao University of Baroda, Vadodara, December 18-24, 2012.

Four lectures on Continued Fractions and the Geodesic Flow, *Indo-French workshop on Dynamics and Number Theory*, held at Kerala School of Mathematics, Kozhikode, February 4-8, 2013.

Dey, S.

Invited talk on Characteristic function for liftings, *Operator Algebras in Non-equilibrium Statistical Mechanics* held at the Bambolim Beach Resort, Goa, December 17-21, 2012.

Invited talk on Generalized Repeated Interaction Model and Transfer Functions, *International Workshop on*

Operator Theory and Applications (IWOTA), held at University of New South Wales, Sydney, Australia, July 16-20, 2012.

Invited lecture on Outgoing Cuntz Scattering System for a Coisometric Lifting, *Quantum Probabilities and Related Fields (QP33)*, held at the CIRM in Luminy, France, October 1-5, 2012.

Ghorpade, S.R.

“An introduction to the theory of equations”, *DST-INSPIRE Science Camp* held at Govt. College for Men, Kadapa, Andhra Pradesh, July 17, 2012.

Two lectures on Partitions of numbers, a theorem of Euler, and a formula of Ramanujan, *DST-INSPIRE Science Camp* held at Maharaja Krishnakumarsinhji Bhavnagar University, Bhavnagar, Gujarat, July 21-22, 2012.

“Development of the theory of equations”, *DST-INSPIRE Science Camp* held at Smt. Kasturbai Walchand College, Sangli, Maharashtra, August 4, 2012.

“Perfect numbers”, *DST-INSPIRE Science Camp* held at Loyola Degree College, Pulivendula, Andhra Pradesh, August 25, 2012.

“Real analysis” at Loyola Degree College, Pulivendula, Andhra Pradesh, August 25, 2012.

“Counting points of varieties over finite fields: A meeting ground for algebra, analysis, geometry, topology, and number theory”, *Institute Award Lecture Series*, Indian Institute of Technology Bombay, Mumbai, August 29, 2012.

“Euler, Ramanujan, and the theory of partitions”, *DST-INSPIRE Science Camp*, held at Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, October 12, 2012.

“Decimal expansions and continued fraction expansions”, Dept of Mathematics, Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, October 12, 2012.

“Partitions of integers and an astonishing formula of Ramanujan”, Shivaji University, Kolhapur, December 22, 2012.

Four invited lectures on Topics in elementary number theory, *UGC Refresher Course in Mathematics/Statistics*, held at Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, September 10-11, 2012.

Two invited lectures on Automorphisms of Grassmann varieties, *Workshop and Conference on Groups and*

Geometries, held at Indian Statistical Institute, Bangalore, December 10-11, 2012.

Four invited lectures on Betti numbers of Stanley-Reisner rings and generalized Hamming weights of codes and matroids, *Workshop on Syzygies and Free Resolutions*, held at Chennai Mathematical Institute, Siruseri, December 19-20, 2012.

Two invited lectures on Linear feedback shift registers and their generalizations, *National Workshop on Computer Applications based on Modern Algebra*, held at Manipal Institute of Technology, Manipal, January 4-5, 2013.

An invited talk on Determinantal Varieties: Glimpses of Abhyankar’s Work and Some Recent Developments, *National Conference on Topics in Commutative Algebra*, held at Institute of Science, Mumbai, January 24, 2013.

An invited talk (Prof. N.E. Joshi Memorial Lecture) on Matrices, polynomials, and linear recurrences over finite fields, *Annual Conference of the Marathwada Mathematical Society* (and the *National Conference on Recent Developments in Mathematics and Statistics*), held at T. C. College, Baramati, February 16, 2013.

Invited talk on Two Miracles About 1-jets of Determinantal Varieties, *Conference on Algebra and Algebraic Geometry in honor of Shreeram Abhyankar’s 82nd birthday*, held at Purdue University, West Lafayette, USA, July 5-8, 2012.

Hariharan, Ananthnarayan

“Real Numbers and the L.U.B. Axiom” at K.T.H.M. College, Nasik, October 2012.

“Tales of a Local Algebraist” at IISER Pune, November 2012.

Invited talk in Connected Sums of Gorenstein Rings, *Conference on Topics in Commutative Algebra* held at Institute of Science, Mumbai.

“Associated Graded Rings and Connected Sums” at Purdue University, USA, July 2012.

Joshi, R.R.

Invited lecture on My Contributions in Scientific Evaluation and Statistical Validation of Yagya-based Inhalation Therapy, *National Workshops at Bhabha Atomic Research Centre*, Mumbai, August, 2012.

Two invited lectures on My Contributions in Innovations in Ancient Sciences at *DIYA Workshop* at CLRI Chennai and Indira Gandhi Atomic Research Centre, Kalpakkam, April, 2012.

Invited talk on An Indian Tradition to Establish Symbiosis Between Man and Nature, *International Conference on Mind, Nature and Technology*, held at Indus Business Academy, Bangalore, February 2013.

Limaye, B.V.

“Reduction of some infinite-rank problems” to matrix problems, Indian Statistical Institute, Kolkata, October 4, 2013.

“Conditioning of a basis of a spectral subspace”, Tata Institute of Fundamental Research - Centre for Applicable Mathematics, Bangalore, February 18, 2013.

“On condition numbers of a basis”, Indian Institute of Science, Bangalore, February 19, 2013.

“Sensitivity of computations involving a basis”, Universite’ Jean Monnet, Saint Etienne, France, June 3, 2013.

Nataraj, N.

An invited talk in *Workshop on elliptic and parabolic PDEs and related topics: Theory and Numerical Methods*, held at IIT Gandhinagar, August 2012.

An invited talk in *DAAD Network Workshop on Modeling, Computing and Optimization*, held at IIT Madras, September, 2012.

An invited talk in *Symposium on PDE, Annual Conference of the Ramanujan Mathematical Society (RMS)*, held at Delhi, October, 2012.

Invited speaker in *International Workshop and Tutorial on Computational Mathematics-Advances in Computational PDEs*, held at Department of Computational Science and Engineering, Yonsei University, South Korea, March 2013.

“Finite element methods for fourth order elliptic problems”, Humboldt University, Berlin, July 2012.

Raghunathan, R.

Two lectures in the workshop on *Hilbert Modular Forms and Varieties*, held at Kerala School of Mathematics, Calicut, January 21-31, 2013

Rana, I. K.

“Infinity and beyond infinity”, *Professional Development for Teachers* at Sanskriti school, Delhi, February 2013.

“Why do we need “limits?””, *Professional Development for Teachers* at Sanskriti school, Delhi, February 2013.

“Mathematics in Engineering” at G.H. Patil College of Engineering, Vallabh Vidya Nagar, Anand, November 2, 2012.

Ranjan, A.

Two lectures on Hopf Rinow Theorem *ATM Workshop in Riemannian Geometry* held at TIFR-CAM Bangalore, July 2012.

Sabnis, S. V.

Two hours talk on Applications of Probability and Statistics in Electronics and Communication Engineering at Dr. Daulatrao Aher Engineering College, Karad, on April 6, 2013.

Sane, S. S.

Gave six lectures for students in the pre-departure camp for preparation to the International Mathematical Olympiad, July 2012.

Mentoring Lecture at the DST Inspire program, University of Baroda, July 2012.

Mentoring and Inaugural Lecture at Mathematics Program, Jidnyasa Trust, Thane, August 2012.

Mentoring and Inaugural Lecture at Mathematics Program, Saad Foundation

Mentoring Lecture at the DST Inspire program, Pharmacy Institute College, NMIMS, Vile-Parle, October 2012.

Mentoring and Inaugural Lecture at a two day conference at Jhunjhunwala College, Ghatkopar, Mumbai, December 2012.

Invited Speaker, Mathematics Department, Shivaji University, Kolhapur, November 2012.

Six lectures in *AIS Program in Combinatorics*, held at The Harish Chandra Research Institute, June 2012.

Three lectures on Cayley Graphs, *Workshop on Ramanujan Graphs and Expander Graphs at Mathematics Department*, held at Pune University, February 2013.

Sharma, V. D.

“Quasilinear hyperbolic equations”, BITS Pilani, April 2012.

Invited lecture on “Elementary waves of the Riemann problem”, *Ramanujan Mathematical Society Conference*, New Delhi, October 2012.

Invited lecture on “Weakly nonlinear waves” and Chaired one Technical Session for invited lectures at *Indo-German Conference*, held at IWAR Tech. Univ. Darmstadt, Germany, September 2012.

Shastri, A. R.

Six lectures and conducted equal number of tutorial sessions in *Workshop on Geometric Methods in Complex Analysis*, held at IISC Bangalore, April 2012.

Nine hours lectures in Algebraic Topology and several hours of tutorials in *Annual Foundation School II of Advanced Instructional School*, held at Pune University, June 4-30, 2012.

Invited talk on An alternative proof of classical regular homotopy theorem *Symposium in Topology at Ramanujam Mathematical Society's Annual Meeting Conference*, Dehli.

Invited talk on A new proof of Brouwer's Invariance of Domain, *Symposium on Topology at Indian Math Society Meeting*, held at BHU, January 22-25, 2013.

Shorey, T. N.

"abc Conjecture", A VSRP lecture at TIFR in July 2012.

Verma, J. K.

"Constructible Regular Polygons" at JECRC University, Jaipur, March 14, 2013.

"Four Problems of Euclidean Geometry", *Inspire Science Camp* at Sarvajanic College of Science, Surat, November 30, 2012.

Twelve lectures on "Zariski-Lipman Theory of complete ideals", Vietnam Institute of Advanced Studies in Mathematics, September 3-21, 2012.

Four lectures on "Cyclic and abelian extensions", *Annual Foundation School III*, HRI, Allahabad, July 23-31, 2012.

Four lectures on "Linear Transformations", *Instructional school for college teachers*, at SGGI Institute of Engineering and Technology, Nanded, May 25-26, 2012.

Six lectures on "Cohen-Macaulay Rings", *AIS in commutative algebra*, IIT Madras, May 13-19, 2012.

Six lectures on "Zariski's Theory of complete ideals", Vietnam Institute of advanced Mathematics, August 2012.

Delivered a Ramanujan Memorial Award Lecture at the 78th Annual Conference of Indian Mathematical Society

Significant Awards and Distinctions

Ghorpade, S.R.

"Visiting Professor", Université de Toulouse Le Mirail, Toulouse, France, May 2012.

"IIT Bombay Research Paper Award for the year 2011" (for the paper "Étale cohomology, Lefschetz theorems and number of points of singular varieties over finite fields" with G. Lachaud in *Moscow Math. J.* 2 (2002), 589-631), September 5, 2012.

"Prof. N. E. Joshi Memorial Lecture Award", Marathwada Mathematical Society, February 16, 2013.

Nataraj, N.

"IIT Bombay Excellence in Teaching Award".

Rana, I.K.

"Aryabhata Award" for 2012, by the All India Ramanujan Maths Club, for contributions to math education.

Sane, S.S.

Observer nominated by the NBHM for the Indian Mathematical Olympiad Team performance at the 53rd International Mathematical Olympiad at Mar del Plata, Argentina, July, 2012

Sharma, V.D.

Sectional President for 82nd Annual Session of NASI held at BHU, December 2012.

"Member of the Sectional Committee I" (Mathematical Sciences: Applied Mathematics, Pure Mathematics and Statistics) for INSA (Indian National Science Academy), New Delhi for a term of three years beginning January, 2013-2015 to assess nominations received for INSA Fellow and INSA Young Scientists.

Nominated as a member of the Fellowship Committee to scrutinize the nominations for the Fellowship of the National Academy of Sciences, India (NASI) for the year 2012.

Srinivasan S.

Honorable Mention for the ACM India Doctoral Dissertation Award.

Verma, J.K.

Elected "Fellow of Indian National Science Academy", New Delhi.

Honorary Work

The faculty of the department served in various capacities as follows:

Ananthnarayan, H.

Resource Person for two lectures on "Linear Algebra" at *Confluence*, a programme for U.G. Students at St. Joseph's College, Bangalore, December 2012.

Refereed papers for Illinois Journal of Mathematics, and Journal of Pure and Applied Algebra.

Dani, S. G.

Member of National Board for Higher Mathematics, President of Indian Society for History of Mathematics.

Member of the Editorial Board of: Journal of Theoretical Probability, Monatshefte fuer Mathematik, and Proceedings of the Indian Academy of Sciences (Math. Sci.); as Editor of Ganita Bharati Bulletin of the Indian Society for History of Mathematics.

Member of: Governing body of C.R. Rao Advanced Institute for Mathematics, Statistics and Computer Science, Hyderabad; Governing body of Indian Institute of Science Education and Research (IISER), Thiruvananthapuram; and the Academic Council of the Chennai Mathematical Society, Chennai.

Served on the organizing committee of the Indo-French workshop on *Dynamics and Number Theory*, held at the Kerala School of Mathematics, Kozhikode, February 2013.

Ghorpade, S. R.

Member, Editorial Board, *International Journal of Information and Coding Theory*; Advisory Editor, Course Material in Algebra, Indira Gandhi National Open University, Delhi.

Expert Member, Board of Studies in Mathematics and the Faculty of Science, *The M.S. University of Baroda*, Vadodara, Gujarat, 2011-2013; Member, Membership Scrutiny Committee, National Academy of Sciences India, April 2012; Member, Selection Committee for Mathematics Faculty, BITS Pilani (April 2012 and October 2012), University of Allahabad (November 2012), University of Mumbai (December 2012), and IIT Gandhinagar (January 2012); as Referee for Finite Fields and Their Applications (Elsevier); Referee for a postdoctoral fellowship of the National Board for Higher Mathematics, Govt. of India.

Joshi, R. R.

Referee (External Examiner) of Ph.D. thesis in University of Poona; Reviewer for some international journals in Bioinformatics; Statistics expert for review of projects submitted to DST and DBT.

Chairperson, Board of Studies in Bioinformatics, University of Poona, Pune; Member, BoS in Bioinformatics/Computational Biology, Central University of Pondichery.

Limaye, B.V.

Examiner of a doctoral thesis at Cochin University of Science and Technology, Cochin.

Mukhopadhyay S.

Reviewer for Journal of Applied Statistics, Communications in Statistics, Simulations and Computations, Journal of Statistical Theory and Practice, Psychological Methods.

Reviewer for BRNS, DAE funded project proposals.

Nataraj, N.

Thesis Examiner of Ph.D. students from Anna University and IIT Kanpur; Associate Editor, International Journal of Numerical Analysis and Modelling, Series B.; One of the panelists at the Round table: Role of Mathematics in Emerging Economies in the 6th European Congress of Mathematics, Krakow, Poland, July 2012.

Puthenpurakal, T.J.

Reviewer for Math Reviews and Zentralblatt Math; Refereed papers for Journal of Algebra, Proceedings of the Indian Acad. Sci, Indian Journal of Pure and Applied Mathematics.

Rana, I. K.

Editor, electronic journal eJMT

Raghunathan, R.

Reviewer for Mathscinet
Referee for several journals and conference proceedings

Sabnis, S. V.

Refereed one research article for one International journal.

Sane, S. S.

Served as Selection Committee Member, Computer Science Department, IIT, Indore, May, 2012; R.C. Bose Institute of Cryptography, Indian Statistical Institute, Kolkata, November, 2013; Member, Academic Council, IGIDR (Indira Gandhi Institute of Development Research), Mumbai; National Coordinator, Mathematics Olympiad Program; Selection Committee Member for the MSc, MPhil and PhD degree selection interviews at the IGIDR (Indira Gandhi Institute of Development Research), Mumbai; Convener, Western Zone, Library Committee, National Board for Higher Mathematics; Member of the Board of Studies, Goa University.

Reviewer for Zentralblatt fur Mathematic, Paper Reviews:7, Book Review:1; Associate Editor of the Indian Journal of Pure and Applied Mathematics (from January, 2013); Refereed journal articles: Designs, Codes and Cryptography, Journal of Combinatorial Designs, Discrete Mathematics, Indian Journal of Pure and Applied Mathematics; Refereed two PhD theses (Kalyani University and Kerala University).

Sharma, V. D.

Reviewed papers for Math Reviews (USA) and Zentralblatt MATH (Germany). Served as Member of the selection committees for faculty recruitment at IIT Indore; Defence Inst. of Armament Tech. (Pune), JNU (New Delhi), Univ of Allahabad and Institute of Chem Technology, Mumbai; Member of the committee for the award of Post Doc. Fellowship (CSIR) and the DST-Inspire program at Baroda Univ.; Evaluated Ph.D.

Thesis at Pune University, TIFR Bangalore Centre, BARC (Mumbai), Thaper Univ. Patiala.

Verma, J. K.

Served as Member, Academic Council of Chennai Mathematical Institute (2011); Member, Board of Studies of Central University of Rajasthan, Kishangarh, Rajasthan (2012); Member, Board of Studies of Kumaun University, Almora (Uttarakhand) 2011); Secretary, Apex Committee of the National Centre for Mathematics, a joint centre of IIT Bombay and TIFR, 2010.

Faculty Members and their Specializations

1. Anandavardhanan, U.K.

Number Theory

2. Athavale, Ameer

Functional Analysis

3. Baskar, S.

Hyperbolic Conservation Laws: Theory, Numeric and Applications

4. Das, Ashish

Design of Experiments

5. Dey, Santanu

Operator Algebras

6. Garge, Shripad M.

Number Theory, Linear Algebraic Groups

7. Ghorpade, Sudhir R.

Algebraic Geometry, Combinatorics, Coding Theory

8. Hariharan, Ananthnarayan

Algebra

9. Joshi, Kapil D.

Topology, Discrete Mathematics

10. Joshi, Rajani R.

Computational Biology, Biostatistics and Bioinformatics

11. Kaipa, Krishna (till July 9, 2012)

Complex Analysis

12. Keshari, Manoj Kumar

Commutative Algebra (Projective modules)

13. Kulkarni, Rekha P.

Numerical Functional Analysis, Spline Theory

14. Kulkarni, Ravi S.

Differential Geometry

15. Mahajan, Swapneel

Geometry and Topology

16. Mukhopadhyay, Siuli

Statistics

17. Nataraj, Neela

Finite Element Methods

18. Niranjana, Balachandran

Combinatorics

19. Pani, Amiya K.

Numerical Analysis, Partial Differential Equations, Industrial Mathematics

20. Puthenpurakal, Tony J.

Commutative Algebra

21. Raghunathan, Ravi

Automorphic forms, Number Theory

22. Raman, Preeti

Number Theory

23. Rana, Inder K.

Harmonic Analysis, Mathematics Education

24. Ranjan, Akhil

Differential Geometry

25. Sabnis, Sanjeev V.

Reliability Theory, Industrial Statistics

26. Santhanam, Rekha

Algebraic Topology

27. Sharma, Vishnu D. (Institute Chair Professor)

Quasilinear Hyperbolic Systems of PDEs/ Nonlinear Waves

28. Shastri, Anant R.

Algebraic Geometry, Algebraic Topology

29. Sista, Sivaji Ganesh

Partial Differential Equations

30. Sivasubramanian, S.

Combinatorics

31. Srinivasan, Srikanth

Theoretical Computer Science,

32. Srinivasan, Gopal K.

Partial Differential Equations

33. Srinivasan, Murali K.

Combinatorics

34. Subramanyam, A.

Statistical Inference, Geostatistics

35. Suresh kumar, K.

Stochastic Differential Game Theory, Mathematical Finance.

36. Vellaisamy, P.

Statistics and Probability

37. Verma, Jugal K.

Commutative Algebra

Emeritus Fellow

38. Limaye, Balmohan V.

Numerical Functional Analysis, Linear Algebra

Visiting Professor

39. Sane, Sharad S.

Combinatorics and Design Theory

Distinguished Visiting Professor

40. Raghunathan, M.S.

Lie Groups

41. Dani , Shrikrishna G.

Ergodic Theory and Lie Groups

42. Shorey, Tarlok Nath

Theory of Numbers

Professor Emeritus

43. Pai, Devidas V.

Functional Analysis, Approximation Theory, Set-valued Analysis

me Mechanical Engineering

Introduction

The Department has seen growth in all directions new courses, new projects, new initiatives, project mode of research, honours and awards to faculty, academic events like conferences, seminars, invited lectures, CEPs, publications in the form of books, chapters in books, journals and conference proceedings. The current faculty member strength of the department is 48 and a few new faculty member have joined in the last year. Several eminent persons visited the Department, Research in Thermal & Fluids Engineering, Design Engineering and Manufacturing Engineering has led to a number of patents being filed and a number of technologies licensed for commercial exploitation. One Hundred Articles in Journals and 40 in Conference Proceedings were published, in addition to Four books and one chapter in books, during the last year.

Academic Programmes

Degrees Awarded

B.Tech.	: 77
M.Tech.	: 75
Ph.D.	: 10
Dual Degree	: 42

At the M.Tech. Level, there are four specialisations, viz., Thermal and Fluids Engineering, Design Engineering, Manufacturing Engineering, and Nuclear Engineering, and at the Dual-Degree level, there are three specializations viz., Computer-Aided, Design and Automation, Computer-Integrated Manufacturing, and Thermal and Fluids Engineering.

R & D Activities

Research & Development was undertaken in the form of sponsored and consultancy projects. Nine new sponsored projects were initiated, ten completed and 32 are ongoing. The main thrust areas continue to be Thermal & Fluids Engineering, Design Engineering and Manufacturing Engineering, and about 20 faculty were involved. A total of 51 sponsored, seven consultancy projects were done and nine patents were filed.

Sponsored Research Projects:

Sponsored Research Projects	: 52
New	: 9
Ongoing	: 33
Completed	: 10

Sr. No.	Title	Sponsorer	Status
1	Re-condensation studies of Boil Off from a Liquid Helium Cryostat using a GM type Pulse Tube Cryocooler	Board of Research in Nuclear Sciences (BRNS), DAE	New
2	Ignition delay studies of fuels using a shock tube	ISRO	New
3	Heat transfer study of gas flow in micro-channel	DST	New
4	Optimization of Radiation Transport Containers under Impact Loading	BRNS	New
5	High Strain Rate Deformation of Aerospace Al Alloys: Experimental Studies and Development of Constitutive Relationships	ISRO	New
6	Heat transfer investigations for impinging pre-mixed flame jets	ARDB	New
7	Energy Efficiency in Buildings using DOAS and MCHX	Indo-US Science & Technology Forum	New
8	Solar Heated Thermophillic Septic Tank	Asian Institute of Technology, Bangkok	New
9	Experimental study of flow dynamics and turbulent entrainment of jets/plumes in stratified environment	DST	New
10	Particle Image Velocimetry based Measurements around Multiple Bodies in Row and V-Configurations	Naval Research Board	Ongoing
11	Study of Blood Flow in Microchannels	IRCC Award Project	Ongoing
12	Development of 15 K Three Stage High Frequency Pulse Tube Cryocooler	DST	Ongoing
13	Design, Simulation and Testing of Micro Heat Exchanger for JT Cryocooler	DAE, Board of Research in Nuclear Sciences (BRNS)	Ongoing
14	Investigation on Sorption Compressor based J-T Cryocooler	BARC	Ongoing
15	Development of Free Displacer Stirling Power Generator	LPSC (ISRO)	Ongoing
16	Development of a Prototype Thermoacoustic prime Move	BRNS (with SVNIT Surat)	Ongoing
17	Demonstration and assessment of economic viability of new energy efficient and less polluting brick making technology (vertical shaft brick kiln)	Rajiv Gandhi Science and Technology Mission (Govt. of Maharashtra).	Ongoing
18	Development of a Direct Simulation Monte Carlo (DSMC) code for high Knudsen number flows	ISRO	Ongoing
19	Investigation of ratcheting and fatigue crack growth behavior of carbon steel pipes and stainless steel pipes	BRNS	Ongoing

Sr. No.	Title	Sponsorer	Status
20	An experimental and theoretical investigation on pulsed current gas metal arc welding process with short circuit metal transfer for joining of similar and dissimilar materials	DRDO	Ongoing
21	Numerical prediction of temperature field and residual stresses in laser deposited FGMS	DRDO	Ongoing
22	Identification of welding parameters for target weld attributes using process simulation models and optimization algorithms	DST-DAAD	Ongoing
23	Very High Strain Rate Mechanical Behavior of Metals and Alloys	DRDO	Ongoing
24	Fatigue and Fracture in Nanocrystalline Thin Films for MEMS	DST	Ongoing
25	Thermo-mechanical failure in CT tubes under severe accident conditions	AERB	Ongoing
26	Web CNC Internet Based Virtual CNC laboratory	MHRD	Ongoing
27	Experimental and numerical investigations on open pool fires	BARC	Ongoing
28	Influence of stiffness of the system and heat input waveform on transient CHF in horizontal channels under LPLF	AERB	Ongoing
29	Design, Development And Testing of Novel Vortex Flowmeters	DST	Ongoing
30	Analysis of Containment Spray System Nozzle characterization and Spray effect on Containment environment post accident conditions	NPCIL	Ongoing
31	Development of a Direct Simulation Monte Carlo (DSMC) code for high-speed high Knudsen number flows	ISRO	Ongoing
32	Development of a pilot-scale free-piston driven shock tube for high temperature gas dynamic studies	IITB-IRCC	Ongoing
33	Solar Plastic Tubular Air Heater, SPTAH	DST	Ongoing
34	Condenser Heat Recovery based Desalination system	Rajiv Gandhi Science and Technology Commission	Ongoing
35	Network Enabled Online Casting Simulation System (E-Foundry)	NIC, DIT, New Delhi	Ongoing
36	Network Enabled Medical Diagnosis and Education in Skeletal Imaging using X-Rays	NIC, DIT, New Delhi	Ongoing

Sr. No.	Title	Sponsorer	Status
37	A Level Set Based Cartesian Grid Method for Moving Boundary Computations and its Application to Bio-Fluid Simulation of Fish-Like Locomotion	DST	Ongoing
38	Engineered Surfaces on Pyrolytic Carbon for Biomedical Applications	CSIR	Ongoing
39	Multiscale Modeling of Composites	Monash University	Ongoing
40	HCCI mode of operation to reduce emissions in internal combustion engines: Experimental and numerical investigation	DST	Ongoing
41	Study of Gas Turbine Combustion and Emission Reduction Technologies using Advanced Models	ARDB	Ongoing
42	Finite Element Investigation of Three Dimensional Crack Tip Fields and Constraint Effects in Bulk Metallic Glasses.	IRCC, IIT Bombay	Ongoing
43	Investigation of rarefied gas flow through closed ducts as applied to outer space vehicles and microchannels	ISRO	Completed
44	Prediction of f and Nu during Laminar-to-Turbulent Transition Using a Low Turbulence Reynolds number 2-Equation Model of Turbulence: Case of Fully-Developed Flow in a Tube Containing A Twisted Tape	In-house Research	Completed
45	Liquid Desiccant based Solar Multi-Utility Head Pump	MNRE	Completed
46	Numerical Investigation of 3-D Unsteady Fluid Flow and Conjugate Heat Transfer Characteristics in a Wavy Channel based PCHE Mode	BRFST	Completed
47	Computational Modeling and Simulation of Film-Condensation	AFRL, USA	Completed
48	Level Set Method Based 3D Transient Simulation of Steam Water Stratified Developing Flow and Conjugate Heat Transfer in a Horizontal Pipe with a Nuclear Fuel Simulator Rod	BRNS	Completed
49	Numerical Investigation of Fluid Flow and Heat Transfer Characteristics in Wavy Channels	IIT Bombay	Completed
50	Flexible Reconfigurable Fiber Laser Systems for Micro-scale Materials Processing	DST	Completed
51	Study and Development of Technology for Nano-Polishing of Single Crystal Semi-Spherical Cavity and Fabrication of Micrometallic Fluidic Structures	BARC	Completed
52	Process Development and Modeling of Novel EDM Variants for Micromachining	DST	Completed

Consultancy Projects

Consultancy Projects	:	7
Faculty Involved	:	9

Agrawal, Amit

One consultancy project (from Tata Chemicals Ltd.)

Date, P. P.

Load calculation for forming of sheet metal part, Prabha Engineering

Measures for Achieving Near-Zero Discharge from the Proposed Additional Lines for Cold Rolling of Aluminum Foils at the Hindalco, Mouda Site, Hindalco Industries

Techno-Economic Feasibility Assessment, Traco Cables

Strain distribution based failure prediction and intelligent process specifications, Volkswagen AG, Germany

Singh, Ramesh K.

Design of 1500 cuft Ethylene Sterilizer funded by Pest Control India (Rs.12 lakhs)
Design of Fall Arrester.

Patents

Atrey Milind Diwakar, Walimbe Nihar Shripad and Narayankhedkar, Kishan Gunderao

“Single-stage closed cycle Joule-Thomson cryocooler and mixed gas refrigerant therefor”, Application No 884/MUM/2012 Filed on March 28, 2012.

Marathe Parag and Date, P. P.

“Method to determine critical strain non-uniformity index indicating failure in forming of sheet metal product”, Patent no. 3143/MUM/2012, October 30, 2012.

Rane M.V., Mehta, J.R.

Evacuated Glass Tube Solar Thermal Collector, PCT application, #PCT/IN2012/000427, Mech World Eco, June 15, 2012.

Rane, M.V., Nair, K.G.

Deposit Forming Fin and Tube Heat Exchanger, 3062MUM2012, Mech World Eco, October 18, 2012

Guha, A.

Indian Patent Application No 1319/MUM/2012 on “Surgical Rod Cutter” filed.
(Inventors: Prof. Anirban Guha, Prof. Ramesh Singh, LohitDhamija, Ganesh Soni)

Shah Darshan, Karade V., Ghyar Rupesh, Shetty Vijay and Ravi B.

“Modular Knee Joint Implant for Anthropometric Anatomical Variation”, filed in India, 2575/MUM/2012, September 5, 2012.

Karade V., Tapadia Raghuvveer, Shetty Vijay and Ravi B.

“Modular Femoral Patient Specific Jig for Total Knee Arthroplasty”, filed in India, 2574/MUM/2012, September 5, 2012.

Extension Activities

This year, faculty members attended several Conferences at national & international levels, and also organized events at both national and international levels, all of which were well received by the participants. Faculty members of the department delivered invited talks on a variety of topics. Thirteen programmes were organized during the year.

Bhandarkar, U.V.

Two week ISTE Workshop for College Teachers on Engineering Thermodynamics under the MHRD National Mission on Education through ICT, December 11-21, 2012.

Bhattacharya, A.

Co-organized institute-level workshop on “High Performance Computing on CDAC clusters”, October 2012.

Gaitonde U.N.

One-week ISTE Workshop for Coordinators for a course on Engineering Thermodynamics, under the MHRD National Mission on Education through ICT (Convenor: U.N. Gaitonde, Associates: U. V. Bhandarkar, B. P. Puranik), November 21-23, 2012.

Two-week ISTE Workshop for College Teachers on Engineering Thermodynamics, under the MHRD National Mission on Education through ICT (Convenor: U.N. Gaitonde, Associates: U. V. Bhandarkar, B. P. Puranik), December 11-21, 2012.

Jonalagadda, K.N.

Presented two papers at the International Conference and Exposition of Society for Experimental Mechanics in June 2012

Manik, D. N.

Three-day CEP program on Vibro-acoustics at IIT Bombay, October 3-5, 2012.

Five-day QIP program on control systems at IIT Bombay, December 3-7, 2012

Puranik, B. P.

Conducted an E-Outreach Course (National Mission on Education through Information and Communication Technology, MHRD) on “Computational Fluid Dynamics”, June 12-22, 2012.

Conducted an E-Outreach Course (National Mission on Education through Information and Communication Technology, MHRD) on “Engineering Thermodynamics”, December 11-21, 2012

Sharma, Atul

Two week ISTE Workshop for College Teachers on “Computational Fluid Dynamics” under the *MHRD National Mission on Education through ICT (Co-Instructor: Prof. Bhalchandra Puranik)*, June 12-22, 2012.

Subash Babu A.

Delivered a series of Lectures for the CEP on “Project Management” organized for the officers of Department of Atomic Energy during March 18 to 23, 2013.

Visitors to the Department

Dr. Anindya Chatterjee, BARC, delivered a lecture on “Turbo Expander for helium liquefies”.

Shri Trilok Singh, BARC, delivered a lecture on “Helium Liquefaction programme at BARC”.

Dr. Christoph Eberl, Group Leader, Karlsruhe Institute of Technology, delivered a lecture on “Fatigue in micro- and nano-structured small volumes and metal thin films”.

Conferences/Symposia/Workshops/ Seminars (participated/Papers Presented)**Venugopal, A., Agrawal, A., and Prabhu, S.V.**

“Installation effects on the performance of vortex flowmeter with piezo-sensor”, presented at *Towards Smarter and Greener Flow Measurement and Control, FCRI Global Conference and Exhibition*, Flow Control Research Institute, Palakkad, January 18-20, 2012.

Badgujar A. D., and Atrey M. D.

Presented a paper “Experimental Investigation of pressure drop in pulse tube Cryocooler”, *Twenty Four National Symposium on Cryogenics*, held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad .

Markan A., Dash A., and Atrey M. D.

Presented a paper *StirlingGUIDE* Graphical user Interface for Design Education of Stirling type

Machines , *Twenty Four National Symposium on Cryogenics* , held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad.

Jagan Mohan S, and Atrey M. D.

Presented a paper “Development of Inline High Frequency Miniature Pulse Tube Cryocooler for 80 K Applications”, *Twenty Four National Symposium on Cryogenics* , held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad.

Shaikh Abdul Mateen A. G., Srivastava A., and Atrey M. D.

Presented a paper “Numerical Simulation for Prediction of Thermal History in Cryoprobe Assisted Biological Tissue Freezing”, *Twenty Four National Symposium on Cryogenics* , held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad.

Goyal Mukesh, and Atrey M. D.

Presented a paper “Effects of Axial Heat Conduction, Property variation and parasitic heat in-leak on Performance of compact plate-fin Heat Exchangers”, *Twenty Four National Symposium on Cryogenics* , held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad.

Ardhapurkar P. M., Sridharan Arunkumar, and Atrey M. D.

Presented a paper “Prediction of Temperature Distribution in heat Exchanger for Mixed Refrigerant Joule-Thomson Cryocooler”, *Twenty Four National Symposium on Cryogenics*, held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad.

Gavasane Ritu, Ardhapurkar P. M., and Atrey M. D.

Presented a paper “Prediction of Thermo-Physical Properties of Argon at Cryogenic Conditions using Modified Benedict-WEBB RUBIN Equation of state”, *Twenty Four National Symposium on Cryogenics* , held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad.

Mehta R. N., Bapat S. L., and Atrey M. D.

Presented a paper “Development of a Four-Cell Sorption Based Compressor”, *Twenty Four National Symposium on Cryogenics* , held during January 21-24, 2013, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad.

Bhardwaj, R

Participated in *39th National Conference on Fluid Mechanics and Fluid Power (NCFMFP)*, 2012, Surat, India.

De, Amitava

“Numerical Modeling and Experimental Measurements in Friction Stir Welding Process”, Presented at *QIP short-term course* on “Current Status and Future Challenges in Friction Stir Welding Process”, November 3, 2012, IIT Roorkee.

Sharma, G., Issac, K.K., Guha, A. and Kar, D. C.

“A Multi-point Foot Ground Interaction Model for Human Walking Simulation” presented in *Fourth International Congress on Computational Mechanics and Simulation*, on December 9-12, 2012, at Hyderabad, India.

Satpal, S., Khandare, K., Guha, A. and Banerjee, S.

“Structural Health Monitoring of Cantilever Beam Using Support Vector Machine” presented in *Fourth International Congress on Computational Mechanics and Simulation*, on December 9-12, 2012, at Hyderabad, India.

Sharma, G., Issac, K.K., Guha, A. and Kar, D. C.

“An Algorithm for Rigid Body Dynamics Problems” presented in *Fourth International Congress on Computational Mechanics and Simulation*, on December 9-12, 2012, at Hyderabad, India.

Rane, M V

Presented a paper “Technologies for Energy Saving and Environment Protection”, *VIIth Annual International Conference by Knowledge Forum*, on December 1, 2012 at SIU, Pune, India,”

Sarang R K, Rane M V

Presented a paper “Experimental Investigation for Start Up and Maximum Heat Load of Closed Loop Pulsating Heat Pipe”, *International Conference on Engineering (NUICONE 2012)*, on December 6, 2012, Nirma University, Ahmedabad, India.

Mehta J R, Rane M V

Presented a paper “*Liquid Desiccant Based Solar Air Conditioning System with Novel Evacuated Glass Tube Collector as Regenerator*” *International Conference on Engineering (NUICONE 2012)*, on December 6, 2012, at Nirma University, Ahmedabad, India.

Ravi, B.

“Casting Design and Simulation Software: 25-Year Perspective and Future”, *Proceedings of 61st Indian Foundry Congress*, January 28-30, 2013, Institute of Indian Foundrymen, Kolkata.

Sharma, A.

Presented a Paper on “Effect of Rotationally Oscillating Side Cylinders on Free Stream flow across a Stationary Cylinder”, at *39th National Conference on FMFP*, held during December 13-15, 2012, at S.V. National Institute of Technology, Surat.

Bothale A., Atrey M. D.

Presented a paper “1-D Transient Analysis of Multi-Layer Active Magnetic”, *International Cryogenic Engineering Conference- 24 & International Cryogenic Materials Conference*, during May 14 -18, 2012, at Hataka-Ku, Fukuoka 812-0032, Japan.

Shah N., Bhandarkar U., Agrawal A., Gavasane A.

“Comparison of DSMC Simulation with Experimental data of Gas flow in Microchannel”, 21st International Conference on Discrete Simulation of Fluid Dynamics, on July 23-27, 2012, at JNCASR, Bangalore, .

Bhardwaj R,

Participated in ASME 2013 Summer Bioengineering Conference, on June 26-29, 2013, at Sunriver, Oregon, WA.

Bhattacharya, A.

Participated in International Conference on *Discrete Simulation of Fluid Dynamics*, on July 23-27, 2012, at JNCASR, Bangalore.

Vankudre, H. V. and Date P. P.

“Characterization of work hardening behavior and residual ductility of prerstrained steel sheet”, *International Conference of the Deep Drawing Research Group IDDRG 2012*, on November 2012, at IIT Bombay

Singhal, M and Date, P. P.

“A New Design of Electro-Magnetic Actuator For Electro-Magnetic Deep Drawing (EMDD) of Axisymmetric Shells”, *International Conference of the Deep Drawing Research Group IDDRG 2013*, from June 2-5, 2013, ETH Zurich, Zurich, Switzerland,.

Marathe, P and Date P. P.

“On The Design Of A Multistage Process In Drawn Sheet Metal Products Using Strain Distribution Based Parameters”, *International Conference of the Deep Drawing Research Group IDDRG 2013*, June 2-5, 2013, at ETH Zurich, Zurich, Switzerland.

Mehta, M., Chatterjee, K. and De, Amitava

“Numerical Modeling and Experimental Measurement of Temperature, Torque and Traverse Force in Friction Stir Welding”, *9th International Symposium on Computer Aided Welding Engineering*, August 23 - 26, 2012, Jinan, China.

Mehta, M., De, A. and DebRoy, T.

“Probing load bearing capacity of circular and non-circular tools in friction stir welding”, *9th International Conference on Trends in Welding Research*, from June 4 - 8, 2012, Chicago, USA.

De, Amitava

“Trends in Joining of Aerospace Materials”, *4th Indo-US Frontiers of Engineering Symposium*, during

February 29 March 1, 2012, Lockheed Martin Center of Excellence, Bethesda, USA.

Prasad S.V., and Jonnalagadda K. N.

Presented a paper “Mechanical Behavior of SS 304LN at High Strain Rates in Compression”, *SEM International conference and exposition on Experimental Mechanics*, during June 12-15, 2012, at Costa Mesa, California, USA.

Rajaramn S., Jonnalagadda K. N., Ghosh P.

Presented a paper “Indentation and Dynamic Compression Experiments on Microcrystalline and Nanocrystalline Nickel”, *SEM International conference and exposition on Experimental Mechanics*, during June 12-15, 2012, at Costa Mesa, California, USA.

Joglekar D.M. , Maiti S.K. and Mitra M.

“Detection of arbitrarily oriented cracks in long shafts”, *10th World Congress on Computational Mechanics (WCCM 2012)*, during July 8-13, 2012, Sao Paulo, Brazil.

Raykar N.R., Maiti S.K. and Singh Raman R.K.

“Influence of hydrostatic stress distribution on the modeling of hydrogen assisted stress corrosion cracking”, *10th World Congress on Computational Mechanics (WCCM 2012)*, from July 8-13, 2012, Sao Paulo, Brazil.

Pathan S.S. and Manik D.N.

“Modification of flat plates to decrease radiation efficiency”, *AIA-DAGA Conference on Acoustics*, March 18-21, 2013, Merano, Italy,.

Patil V. and Manik D.N.

“Determination Of Coupling Loss Factor For Plates Coupled In Right Angle to Form Welded, Riveted And Bolted Joint”, *AIA-DAGA Conference on Acoustics*, March 18-21, 2013, Merano, Italy,.

Phatak, A.M., and Pande, S.S.

Presented a paper “Optimum part orientation in Rapid Prototyping using Genetic Algorithm”, *Proceedings of North American Manufacturing Research Conference (NAMRC 40)*, from June 4-8, 2012, Notre Dame University, Indiana, USA,.

Phatak, A.M., Pande Sushrut, and Pande, S.S.

Presented a paper “Strategies for Hollowing of parts in Rapid Prototyping” at the *4th International and 25th All India Manufacturing Technology Design and Research (AIMTDR) conference*, December 14-16, 2012, Jadavpur University, Kolkata, India.

Ravi, B.

“Casting Solidification Feed-path Computation and Industrial Application”, *Proceedings of 5th International Conference on Solidification Science and Processing*, November 19-22, 2012, Bhubaneswar.

Sutaria, M., Ravi, B.

Presented a paper “Gradient Vector Method for Computing Feed-paths and Hot-spots during Casting Solidification”, *Proceedings of 37th MATADOR Conference*, July 25- 27, 2012, Manchester, UK.

Shinde, V., Joshi, D., Ravi, B., Narasimhan, K.

“Effect of Casting Orientation, Thickness and Composition on Solidification Structure and Properties of Ductile Iron Castings”, In *Proceedings of 37th MATADOR Conference*, held during July 25- 27, 2012, at Manchester, UK.

Shah, D.S., Ghyar, R., Ravi, B., Shetty, V.

“3D Anatomical Studies of Indian Arthritic Knees: Comparison with other Ethnic Groups and Conformity of Current TKA Implants”, In *Proceedings of 6th International Conference on Bioinformatics and Biomedical Engineering*, from May 17-20, 2012, Shanghai.

**Conferences/Symposia/Workshops/
Seminars (Coordinated/Chaired by Faculty)**

Agrawal, Amit

Chaired three sessions at *Fluid Mechanics and Fluid Power Conference* in, December 2012, at NIT, Surat.

Pande, S. S.

Chaired technical session on “Advanced Machining Technology: Metal Cutting, High Speed Machining, Hot machining” at the *4th International and 25th All India Manufacturing Technology Design and Research (AIMTDR) Conference*, from December 14-16, 2012 at Jadavpur University, Kolkata, India.

Ravi, B.

Chaired a technical paper session at the *61st Indian Foundry Congress, Institute of Indian Foundrymen*, held during January 28-30, 2013 at Kolkata.

Sharma, A.

Chaired a Session on “Computational Fluid Dynamics: Fundamental and Algorithms” at *39th National Conference on FMFP*, during December 13-15, 2012, in S.V. National Institute of Technology, Surat.

Delivered an Invited Talk on “Level Set Method based Multi-Scale Simulation of Multiphase Flow” at the Board of Research in Nuclear Sciences *Theme Meeting on Multiphysics Coupling and Multiscale Modelling*, on May 8, 2012 at Bhabha Atomoc Research Center, Mumbai.

Delivered an Invited Talk on “Level Set Method based CFD Development and its Application to CFD Analysis of Multi-Phase and Moving-Body Problem” at *National Conference on Emerging Vista of Technology in 21st Century*, on May 10, 2013 at Parul Institute of Engineering and Technology, Vadodara.

Atrey, M. D.

Chairman of the session on *International Cryogenic Engineering Conference- 24 & International Cryogenic Materials Conference*, from May 14 -18, 2012 at Hataka-Ku, Fukuoka 812-0032, Japan.

Date, P. P.

Co-Organised the *International Deep Drawing Research Group Conference IDDRG2012*, in December 2012 at IIT Bombay.

Chaired a session in *International Deep Drawing Research Group Conference IDDRG2013*, in June 2013, at ETH Zurich, Switzerland.

Maiti, S. K.

Co-Chaired a Session on “Structural Health Monitoring” and presented a Keynote Paper in *10th World Congress on Computational Mechanics (WCCM 2012)*, July 8-13, 2012, Sao Paulo, Brazil.

Singh, Ramesh K.

Chaired session on “Micromanufacturing”, *ASME MSEC conference*, in June 2013 at University of Wisconsin-Madison.

Sridhara Seshadri R.

Chaired a session at *9th ASPACC combustion symposium* during May 19-22, 2013 at Gyeongju, Korea.

Invited Lectures**Agrawal, A.**

“Flow boiling in microchannel with application to electronic cooling”, *2nd National Conference on Advances in Heat Transfer and Fluid Dynamics*, Aligarh Muslim University, Aligarh, March 24, 2013.

Atrey M. D.

“MRI Cryogenics”, Medical Surgical Department, Nanavati Hospital, Parle, Mumbai, June 2012.

“Cryogenics at IIT Bombay”, Don Bosco Institute of Technology (DBIT), Kurla, Mumbai, October 2012.

“Cryogenics - Breaking the ICE,” Department of Mechanical Engineering, Dr Babasaheb Ambedkar Technological University, Lonere, October 13, 2012.

“Introduction to Cryogenics & Cryogenics in IIT Bombay”, Visvesvaraya National Institute of Technology, Nagpur, December 2012.

“Cryosurgical Ablation”, at *Twenty Four National Symposium on Cryogenics (NSC 24)*, at Institute of Management, Nirma University, Sarkhej-Gandhinagar Highway, Ahmedabad, January 2013.

“Advances in Low Temperature Refrigeration Technology at IIT Bombay”, *National Symposium on Future Trends in Refrigeration & Air Conditioning*, VVP Institute of Engineering & Technology, Solapur, February 9, 2013.

Balasubramanian, S.

“Fluid instabilities and turbulent mixing in variable density flows”, *Invited Seminar Series*, Indian Institute of Sciences, Bangalore, March 28, 2013.

Jonalagadda, K. N.

“Fracture in polycrystalline and amorphous brittle thin films”, Institute of Mathematical Sciences, January 21, 2013.

Bhardwaj R.

“CFD techniques for investigation of interfacial and biological flows”, *Short term training program (STTP)* at Rizvi College of Engineering, Mumbai, Emerging Trends In Mechanical Engineering (ETME 2012) from July 9 -13, 2012.

Invited talk on “Modelling for Component Health Monitoring based on Natural Vibrations”, in the Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, December 10, 2012.

Date, A.W.

“Turbulent Flows and Their Prediction”, Plenary Talk - *39th National Fluid Mechanics and Fluid Power conference*, at Sardar Vallabhbhai Patel National Institute of Technology (SVNIT), Surat, December 13, 2012.

“Somethings about Energy Random Reflections of a Teacher”, Inaugural Invited Talk, *RuDICON 2013*, Indian Merchant's Chamber, January 17, 2013.

Jonalagadda, K.N.

Keynote Presentation “Mechanics at the Microscale Through In Situ Experiments”, *16th International Conference on Strength of Materials*, Bangalore, India, August 16-20, 2012.

Pande, S.S.

“Internet based Collaborative Product Development”, *Alan Turing Memorial Lecture*, Computer Society of India, Indian Institute of Information Technology (IIIT), Allahabad, November 3, 2012.

Rane, M.V.

“Energy Conservation Technologies for Net Zero Energy Buildings”, *Seminar on NZEB by PACE-D USAID* at Grand Hyatt Regency New Delhi, India, May 17, 2013.

“Energy Conservation Technologies”, Don Bosco Institute of Technology, Kurla, Mumbai, India, April 4, 2013.

“Novel Energy Management”, *XV Regional Meet of S&T Councils & Departments (North East)*, Kohima, Nagaland, India, November 19, 2012

“Energy Conservation Technologies”, *Meeting of DSTs Expert Group on Patent Information Centre*, Hotel Paraag, Bangalore, June 8, 2012

“Energy Conservation”, Indian Institute of Technology Alumni Association, IIT Bombay, Mumbai, India, June 2, 2012.

“Industrial Process Heating and Cooling Options Using Low and Medium Temperature Solar Collectors”, at *Solar Thermal Process Heat for Applications in the Industry CEP* at the Department of Energy Science & Engineering, IIT Bombay, May 7, 2012.

Ravi, B.

“CAD and Simulation Technologies: Creating Industry-Ready Human Resources”, Directorate of Technical Education, Trivandrum, May 14, 2013.

“Casting Design and Simulation”, Hindustan Aeronautics Limited, Koraput, October 12, 2012.

Participated and gave an invited talk “Innovating High-Quality Low-Cost Medical Devices”, *TED MED 2013*, at Mumbai, April 21, 2013,

Participated and gave an invited talk “Casting Quality Assurance Using Computer Simulation and Experimental Validation”, *Workshop on Special Casting Processes*, Society of Defense Technologies, at Bangalore, March 9, 2013.

Participated and gave an invited talk “IT Applications and Job Opportunities in Metal Casting Sector”, *Student Forum, 61st Indian Foundry Congress*, Kolkata, January 27, 2013.

Participated and gave an invited talk “Innovative Solutions for Practical Application: Metal Casting Software and Tumour Knee Prosthesis”, *DST-JSPS Asian Academic Seminar on Manufacturing, Design and Innovation*, at IIT Bombay, December 3-8, 2012

Participated and gave an invited talk “E-Foundry: Network Enabled Online Casting Simulation”, *First Annual Workshop of National Knowledge Network*, at IIT Bombay, held on October 31, 2012.

Sharma, A.

“Fundamentals of Computational Fluid Dynamics”, VJTI, Mumbai, July 8, 2013.

Series of Lectures on Computational Fluid Dynamics, at :

- 1) Government Collage of Engineering, Karad, March 28-29, 2013.

- 2) Padmashree Dr. D.Y. Patil Institute of Engg. & Tech., Pimpri, Pune, March 22, 2013.
- 3) Smt. Kashibai Navale College of Engg., Vadgoan, Pune, March 15, 2013.
- 4) BITS Pilani K.K.Birla Goa Campus, Goa, January 2-4, 2013.
- 5) SVNIT Surat, November 6, 2012.

“Research Methodology in Computational Fluid Dynamics”. Rizvi Collage of Engineering, Mumbai, July 9, 2012.

“Computational Multi-Fluid Dynamics”, I2IT, Pune, January 25, 2012.

Singh, Ramesh K.

“Micromanufacturing for Rural Development” organized by BARC at Walchand College of Engineering, Sangli

Sridhara Seshadri, R.

Delivered a lecture on IC engines delivered at SVNIT, Surat

Subash Babu A.

Delivered key note address at the *International Conference on Productivity and Quality Management Systems (IPQMS)* at Nagpur on November 8 - 29, 2012.

Delivered the key note address at the *International Conference on Production and Logistics* at NIT, Jaipur, March 9, 2013.

“Multi criteria decision making perspectives and applications”, SOA University, Bhubaneshwar, September 27, 2012

Balasubramanian, S.

High speed LED PIV technology, Invited Technology Demonstration, ILA GmbH, Germany, May 27-28, 2013.

Maiti, S.K.

Keynote Speaker on “Structural Health Monitoring (SHM)” in *10th World Congress on Computational Mechanics (WCCM 2012)*, Sao Paulo, Brazil, July 8-13, 2012.

Presented a Colloquium talk on “Component Health Monitoring” in the School of Mechanical, Medical and Aerospace Engineering, the University of Surrey, July 16, 2012.

Presented an Invited Talk on “Component Health Monitoring” in the School of Mechanical, Aerospace and Civil Engineering, the University of Manchester, July 18, 2012.

Rane, M.V.

“Building Energy Conservation in India”, Laurence Berkley National Laboratory, Berkley, CA, USA, February 4, 2013.

Significant Awards and Distinctions

Agrawal, Amit

Invited by editor to write an article for *Frontiers in Heat and Mass Transfer* (Publisher: Global Digital Central)

Elected member of NASI, Allahabad (since 2011)

Balasubramanian, S.

Best presenter for the paper titled Experimental study of Rayleigh-Bénard convection in the presence of rotation by International Association of Computer Science and Information Technology (IACSIT), Istanbul, Turkey, March 2013

Bhandarkar U.V.

Member, American Physical Society

Maiti, S.K.

IIT Bombay Research Paper Award 2011, IIT Bombay, April 2012.

Date, A.W.

Life Time Achievement Award of IIT Bombay, April 4, 2012.

Fellow, Indian National Academy of Engineering (INAE), New Delhi.

Rane, M.V.

“Best Teacher Award for Outstanding Contribution to Teaching and Education in the Field of Engineering”, Higher Education Forum, September 2012.

Ravi, B.

Member, Under Graduate Engineering Board, All India Council for Technical Education, New Delhi, 2013

Member, Expert Committee on Orthopedic Devices, Bureau of Indian Standards, New Delhi

Member, Program Advisory Committee, Mechanical & Manufacturing Engineering & Robotics, Sciences & Engineering Research Board, Department of Science and Technology, New Delhi, 2012.

Member, Expert Committee, FAST TRACK Scheme for Young Scientist Projects, Engineering Sciences, Department of Science and Technology, New Delhi, 2012.

Vice-President, Board of Governors, Central Manufacturing Technology Institute, CSIR, Bangalore, 2012.

Sharma, A.

Treasurer, National Society for Fluid Mechanics and Fluid Power

Singh, Ramesh K.

Member, Society of Manufacturing Engineers (SME)
Member, American Society of Mechanical Engineers (ASME)

Subash Babu A

Co- Guest Editor , Special Issue on International Journal of Industrial Systems Engineering

Member of the Editorial Advisory Board of International Journal of Advanced Operations Management (Inderscience)

Member of the Editorial Advisory Board of Journal of Advances in Management Research (Emerald)

Member of the Editorial Advisory Board of International Journal of Agile Manufacturing Systems (Inderscience)

Member of the Editorial Advisory Board of International Journal of Indian Culture and Business Management (Inderscience)

Served as an international expert the performance assessment of the faculty members of the department of Industrial Engineering, King Saud University, Riyadh, Saudi Arabia in June 2012

Served as a member of the international research group of the department of Industrial Engineering , King Saud University, Riyadh, Saudi Arabia in June 2012

Tandaiya. P. U.

Young Faculty Award by IIT Bombay, in June 2012.

Honorary Work

Agrawal, A.

Reviewed papers for Journal of Fluid Mechanics, Microfluidics and Nanofluidics, International Journal of Heat and Mass Transfer, International Journal of Thermal Science, Experimental Thermal and Fluid Sciences, etc.

Atrey, M. D.

Appointed as a Senate Member, at Visvesvaraya National Institute of Technology, Nagpur, November 2012.

Appointed as a Expert Core Committee member of Fast Track Scheme for Young Scientists for the period of 2012-2015 by Science and Engineering Search Board (DST), New Delhi.

Bhardwaj R.

Reviewed papers for Langmuir, Journal of Colloidal and Interface Science, ACS Applied Materials & Interfaces, International Journal of Thermal Sciences, Journal of Computational Physics, June 2012 - May 2013.

Reviewed papers for Proceedings of National fluid mechanics and fluid power conference (FMFP), NIT Surat, India 2012.

Reviewed student grant applications for ASME IMECE conference, Houston 2012

Date, A. W.

Reviewed four papers for IJHMT , International Journal of Computational Thermal-Sc, Heat & Mass Transfer.

Reviewed three papers for the ASME-2013 Heat Transfer Conference, Minneapolis, USA.

Reviewed two Research proposals for DST, New Delhi, and two Research Proposal for Rajiv Gandhi S & T Mission, Government of Maharashtra

Gaitonde, U. N.

Reviewed two papers for 'International Journal of Heat and Mass Transfer', a journal published by Elsevier.

Reviewed four papers for the 'Solar Energy', a journal published by Elsevier.

Guha, A.

Reviewed papers for Textile Research Journal

Jonalagadda, K. N.

Reviewed Papers for Journal of Experimental Mechanics and Sadhana

Maiti, S.K.

Reviewed one paper for Journal for Experimental Engineering, May 2012

Reviewed one paper for Finite Elements in Design, November 2012.

Reviewed one paper for Journal of Intelligent Materials and Systems, November-December 2012.

Reviewed one paper for Mechanisms and Machine Theory, December 2012.

Reviewed one paper for Computers and Structures, February 2013.

Reviewed one paper for Computer Aided Design, February-March 2013.

Reviewed one paper for Journal of Sound and Vibration, March 2013.

Rane, M.V.

"Member of Buildings Sub-Committee" Reserve Bank of India

"Expert Advisory Group on Industrial and Analytical Instrumentation" DST

"Member of Expert Group on Patent Information Centre" DST

"Member of Core Group on State S&T oriented Demonstration Projects" DST

Reviewed papers for ASHRAE Research, Solar Energy, Applied Thermal Energy

S. S. Pande

Reviewer of papers for International Journal listed below

Computer Aided Design, Butterworth, UK
International Journal of Advanced Manufacturing Technology, UK

Computers in Industry, Netherlands
Journal of Engineering Manufacture, Institute of Mechanical Engineers , UK

Journal of Manufacturing Systems, SME, USA
Journal of Manufacturing Technology and Management, UK

Journal of Manufacturing Science, CIRP, USA
Applied Soft Computing, Elsevier, USA

Member of committee, India- UK (EPSRC-RCUK) Collaborative Projects, DST.

Member SERC Program Advisory Committee Department of Science and Technology (DST) till August 2012

Member Board of Examinations, Indian Institute of Industrial Engineering, India

Member, National Advisory Council, 4th International AIMTDR Conference, Kolkata

Member, Nat Advisory Council, International Conference on Innovations in Design and Manufacturing IIIT, Jabalpur

Ravi, B.

Reviewed papers for International Journal of Computer Assisted Radiology and Surgery; Rapid Prototyping Journal; and Transactions of the Indian Institute of Metals, 2012-2013.

Sharma A

Reviewed papers for Numerical Heat Transfer-A, Journal of Institutions of Engineers (India): Series C, Journal of Fluids and Structures, International Journal of Heat Mass Transfer, International Journal of Thermal Science and Theoretical and Computational Fluid Dynamics

Sridhara Seshadri, R

Reviewed papers for many International Journals.
Reviewed the thesis from IIT-Madras, NIT-Agartala, VTU-Belgaum

Reviewed a proposal submitted to Department of Energy Office (DOE) of Science, USA

Subash Babu A

Reviewed papers for International Journal of Production Research, Benchmarking - An International Journal, Journal of Manufacturing Systems,

International Journal of Production Technology and International Journal of Agile Manufacturing Systems.

Served as an expert member of the faculty selection committee at BITS Pilani, April 13 - November 26, 2012; in IIT Delhi, December 18, 2012; at NIT Raipur, March 24, 2013.

Nominated by the NPIU of MHRD as the mentor to SGSSIT (Indore) and SGGIT (Nanded); Performance Auditor to BMSCE (Bangalore) and NITK (Kuruksheetra) for the successful completion of the World Bank Sponsored TEQIP II project during 2012-2015.

Tandaiya, P. U.

Reviewed papers for International Journal of Fracture. Reviewed project proposals for Department of Science and Technology (DST), Government of India.

Faculty Members and their Specializations

1. Amit Agrawal

Microfluidics, Turbulent Flows, Bluff-body wakes

2. M.D. Atrey

Main areas of R&D activity: Cryogenics Engineering, Refrigeration and Air Conditioning, Heat Exchangers, Compressors, NMR and MRI Systems

3. U. Bhandarkar

Thermodynamics, Statistical Thermodynamics, Heat Transfer, Particle growth in combustion and plasmas, Molecular Simulation.

4. R. Bhardwaj

Computational fluid dynamics, Interfacial transport phenomena, Fluid-structure interaction, Immersed boundary method, Finite-element method

5. P.P. Date

Manufacturing Engineering, Sheet metal forming & formability

6. U.N. Gaitonde

Thermodynamics, Heat Transfer, Energy Conversion.

7. A. Guha

Kinematics, dynamics, mechanism synthesis, Design of machines with focus on textile machines., Application of machine learning (artificial neural networks, support vector machines) to industrial problems. Impact simulation with finite element analysis.

8. K.N. Jonalagadda

Experimental Solid Mechanics, MEMS

9. S.K. Maiti

Finite and Boundary Element Methods, Meshless Methods, Fracture Mechanics, Structural Health Monitoring, Stress Corrosion Cracking.

10. B.P. Puranik

Gas dynamics, Electronics Cooling, Heat Transfer Enhancement.

11. S.V. Prabhu

Fluid Mechanics and Heat Transfer

12. M.V. Rane

Energy Conservation and Alternate Energy Resources Heat Recovery and Sorption Refrigeration Systems Heat Pumps, Compact Milk Pasteurizers

13. B. Ravi

Casting Design and Simulation; Medical Device Innovation

14. Ramesh K. Singh

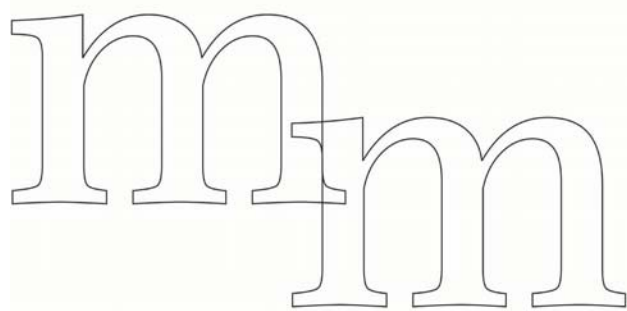
Laser Micromanufacturing, Hybrid Micromachining, Engineered and Precision Finished Surfaces, Composites, Process Modeling and Simulation

15. Sreedhara Sheshadri

Numerical simulations of reactive flows, Performance and emission characteristics of IC engines. Combustion and Emissions characteristics of Gas Turbine.

16. Subash Babu A

Design and management of enterprise solutions and decision support systems for production, project, supply chain and service sectors.



Metallurgical Engineering & Materials Science

Introduction

The Department of Metallurgical & Materials Science is one of the largest departments in the country with 32 faculty members engaged in teaching and research in almost every area of materials engineering like ferrous and non-ferrous metallurgy, physical metallurgy, structural and electronic ceramics, polymers, biomaterials, computational materials science and corrosion engineering. It is a vibrant entity performing research in all areas of materials science and engineering. The research activities range from steel making and processing on the one hand to developing materials for advanced applications in energy, medicine and optics. This has been possible mainly due to the faculty members of the department, who have diverse backgrounds. The various research activities are complemented by a combination of departmental and institutional level experimental facilities. The department has been actively pursuing computational materials science and has recently been successful in putting together a group of faculty in this area.

Academic Programmes

The department offers both undergraduate and graduate programmes which reflect the research activities of the department. An additional feature is that the students have the option to pursue 'dual degree' such as B.Tech. + M.Tech. (with specialization) and M.Tech. + Ph.D. These options facilitate the students to acquire a higher degree in a seamless mode.

Degrees Awarded

B.Tech.	:	51
Dual Degree	:	31
M.Tech.	:	43
Ph.D.	:	11

R & D Activities

With greater emphasis on sponsored research, the research output of the department has increased significantly. The number of sponsored research projects undertaken in the department has increased substantially with more faculty members involved in executing the projects. This has enabled the department to make rapid progress in building research infrastructure. The department has received substantial funding from the Department of Science and Technology (DST), under FIST scheme, to procure some state-of-the-art characterization facilities. These facilities will help not only in increasing the number of sponsored/consultancy projects undertaken in the department but will also help in adding depth to the research work being carried out. The department is also in the process of procuring a high performance cluster to augment the computational needs of the various research activities. With these developments the department is well poised to take up new challenges in most areas of materials research.

Sponsored Research Projects :

New	:	16
Ongoing	:	49
Completed	:	12
Faculty involved	:	30

The sponsored research projects are listed below :

Project Title	Sponsoring Agency	Status
Support for the Operation, Maintenance and Upgradation of the National Facility of Texture & OIM	BRNS	New
Thermohydrogen Processing of Zr and Ti-alloys	BRNS	New
Nanostructured thermoelectric materials development	DST	New
Effects of Polymer-Nanoparticle Interactions on the Electrical Conductivity of Polymer-Carbon Nanotube Multilayer Thin Film Composites	DST	New
Influence of Titania nanostructures on the performance of Dye Sensitized Solar Cells	DST	New
Fabrication of mgo-Based oxide/oxide bulk ceramic nanocomposite via solid-state precipitation.	DST	New
Study the effect of process parameters during sintering of iron ore for energy efficiency and productivity	DST	New
Fabrication and Characterization of 2D and 3D Metamaterials based Solar Concentrator	DST	New
Development of high Li-ion conducting glass ceramics for solid state battery.	DST	New
Development and study of UHF ferrite & composites for high-speed information processing system (DST-RFBR)	DST	New
Materials for energy and sensors	DST	New
Design and coordination of Dandi Salt Satyagraha Memorial	Min.of Culture	New
Microstructural Engineering in Wire Rod: Possibilities	Tata Steel	New
Studies on Evaporation Reactions from Nb and alloys in RBM and VAR	DRDO	New
Magnetic Biosensor for Medical Diagnostics	DST	New
Microstructure evolution during thermo-mechanical processing as a function of state of strain and temperature	Sandvik Materials Technology	New
Development of High Temperature Induction Furnace	TREELABS FOUNDATION	New
Direct observations on microstructural / microtextural development in Zr based alloys during annealing and irradiation.	BRNS	Ongoing
Development of a 10 W Solid Oxide Fuel Cell operational at intermediate temperatures. Phase 1: Scaling to a 100 W system	DRDO	Ongoing
Technical Consultancy on Numerical Prediction of Temperature Field and Residual Stresses in Laser Deposited FGMs	DRDO	Ongoing

Project Title	Sponsoring Agency	Status
Fabrication of dendritic magnetomers for biomedical applications	DST	Ongoing
High throughput a-Si:H based Tandem solar cells on low cost flexible substrates	DST	Ongoing
Studies on titania paste, film characteristics and design and reliability of DSSC modules	DST	Ongoing
BRNS/ Nanoengineered Alginate Carrier Glucose Sensors Using Competitive Binding Resonance Energy Transfer Assays Based on Apoenzymes	BRNS	Ongoing
Hot Corrosion behavior GTM-SU-718 and GTM-SU-263	DRDO	Ongoing
Development of Multifunctional Magnetic Nanoparticles for Cancer	DIT	Ongoing
Support for Operation and Maintenance and Upgradation of the National Facility of Texture and OIM	BRNS	Ongoing
Study of Hot-salt Stress Corrosion Cracking Behavior of Gas Turbine Materials	DRDO	Ongoing
Development and implementation of a phase field model for dry snow metamorphism.	DRDO	Ongoing
Multiwall carbon nanotubes reinforced composite fiber: Control and assessment of multiwall carbon nanotubes dispersion in semi-crystalline polymer matrix	DRDO	Ongoing
To develop HWCVD based Thin film silicon Micro-morph Solar Cells.	Applied Materials Inc.	Ongoing
Nano Structured Multifunctional Magnetic Nanoparticulates	DST	Ongoing
Plastic deformation in Zr binary alloys : Multiscale modeling and experimental validation	BRNS	Ongoing

Consultancy Projects

The department undertook 41 jobs generating Rs. 1,00,98,569/-. The total number of faculty involved was nine.

Patent

Dusane, R.O.

Method for Fabricating hydrogenated amorphous silicon thin film (a-Si:H) solar cell on Steel substrate by hot wire chemical vapour deposition technique.

Extension Activities

NPTEL Course on Computational Approach to Materials Science and Engineering (Author: Prof. P. Gururajan, Co-author: Prof. Prita Pant).

NPTEL Course on Phase Transformations and Heat Treatment

Visitors to the Department

Dr. Sumit K. Soni, Intel Corporation, USA, delivered a talk on “Stress mitigation during the lithiation of patterned amorphous Si islands for Li-ion batteries”.

Dr. Alexander Gulin, Magnitogorsk State Technical University, Russia gave a presentation on “Development and efficiency estimation of the method of continuous deformation nanostructuring of high-carbon steel wire”.

Dr. Anindarupa Chunder, IBM Almaden Research Center, delivered a talk on “An Overview for Directed Self-Assembly of Block Copolymers: Applications and challenges in materials”.

Dr. Titas Dasgupta, Institute of Materials Research, Germany, delivered a talk on “Thermoelectrics for Power Generation - Measurement, Materials and Devices”.

Prof. Subhash H Risbud, University of California, Davis, delivered a talk on “Metastable materials based on the SiO_2 - Al_2O_3 phase diagram: Opportunities for new materials research”.

Dr. Nitin Jadhav, Department of Solid Mechanics, Brown University, delivered a talk on “Tin-Whisker: Understanding the Stress, IMC and Whisker Connection”.

Dr. Pit Fee Jao, University of Florida, Gainesville, delivered a talk on Spatial Alignment and Non-Lithographic Patterning Of Electrospun Nanoporous Membranes for Tissue Scaffolds”.

Prof. Wolfgang Windl, Dept. of Materials Science and Engineering, Ohio State University, delivered a talk on “First-Principles Calculations for Real Materials from Metastable Metallic Systems to Spintronics Materials”.

Ms. Manisha Gupta, RWTH Aachen, Germany, delivered a talk on “Spun Polyesteramide Fibers for Biomedical Applications”.

Dr. Sumit K. Soni, Intel Corporation, USA, delivered a talk on “Stress mitigation during the lithiation of patterned amorphous Si islands for Li-ion batteries”.

Dr. Palani Balaya, National University of Singapore, delivered a talk on “The First Robust, High Performance Electrode Material for Sodium-ion Batteries”.

Dr. Karolina Rzepiejewska, Hysitron Nanotechnology India Pvt. Ltd delivered a talk on “In-situ SEM/TEM nanomechanical characterization: Instruments, methodology and applications”.

Conferences/Workshops (participated/ Papers Presented)

Mohit Agarwal., Pankaj Modi., Dusane, R.O.

“Influence of RF Power on Magnetron Sputtered AZO Films”, presented in *57th SSPS-DAE international conference* at IIT Bombay. *AIP Conf. Proc.* 1512.

Mohit Agarwal., Pankaj Modi., Dusane, R.O.

“Study of Electrical, Optical and Structural Properties of Al- Doped ZnO Thin Films on PEN Substrates”, presented in *ISSMD-2 international conference* at Jammu.

Alka Kumbhar, A., Shruti Thombre, V., Shruti Jain., Vibhas Singh., Ankur Kadam., Bipin Thakur., Pravin Narwankar., Dusane, R.O.

“Deposition of Conformal Silicon Nitride and Silicon Carbon Films by Hot Wire CVD on High Aspect Ratio Trenches for Semiconductor Applications”, *HWCVD-7*, Osaka, Japan, 2012.

Vibhas Singh., Sreekala, S., Shruti Jain., Joe Griffith., Bipin Thakur., Pravin Narwankar, K., Dusane, R. O.

“Investigating Hot Wire CVD to deposit High Stress Silicon Nitride for Semiconductor applications”, *HWCVD-7*, Osaka, Japan, 2012.

Mohit Agarwal., Dusane, R.O.

“Passivation Study of Multicrystalline Silicon Wafer with i-a-Si:H Layer Deposited by HWCVD,” *HWCVD-7*, Osaka, Japan, 2012

Ankur Soam., Nagsen Meshram., Mohit Agarwal., Alka Kumbhar., Dusane, R.O.

“HWCVD Boron Doped Amorphous Silicon Films for Super Capacitor Application”, *HWCVD-7*, Osaka, Japan, 2012.

Wadibhasme, N.A., Dusane, R.O.

“Growth Temperature Effect on a-Si:H Thin Films Studied by Constant Photocurrent Method”, *57th SSPS-DAE International Conference* at IIT Bombay. *AIP Conf. Proc.* 1512.

Ajay Jena., Parag Bhargava

“Effect of sintering schedule on titania particle connectivity and electron transport through titania film,” paper presented at the *Hybrid and Organic Photovoltaics Conference (HOPV) 2012*, May 6-9, 2012, Uppsala, Sweden.

Bhargava, P., Patil, S.B.

“Enhanced Deagglomeration of Coprecipitated Calcined Nano YSZ by Ethanol Treatment”, paper presented at the *International Symposium on Ceramic Materials and Components for Energy and Environmental Applications*, May 20-23, 2012, Dresden, Germany.

Ravi Prakash Singh., Pragyensh Kumar., Ajay Jena, Bhargava, P.

“Transparent Platinized Counter Electrodes for Dye Sensitized Solar Cell Fabricated by Dip Coating”, paper presented at the *International Symposium on Ceramic Materials and Components for Energy and Environmental Applications*, May 20-23, 2012, Dresden, Germany.

Ajay Jena, Bhargava, P.

“Effect of Slurry Processing Parameters and Sintering Profiles on the Titania based Photoanode and Dye Sensitized Solar Cell Characteristics”, paper presented at the *International Symposium on Ceramic Materials and Components for Energy and Environmental Applications*, May 20-23, 2012, Dresden, Germany.

Ashish Saxena., Asim Tewari., Prita Pant

“Microstructure Evolution and Deformation Mechanisms of Ti6Al4V”, *International Conference on Strength of Materials (ICSMA 16)*, IISc Bangalore.

Saransh Singh, Gururajan, M. P., Prita Pant

“Molecular Dynamics Simulations of twin-dislocation Interactions”, *Workshop on Mechanical Behaviour at Small Length Scales-IV*, IISc Bangalore.

Sahu, B. N., Sahoo, S.C., Venkataramani, N., Shiva Prasad

“Thermal Annealing Effect on Magnetic Properties of PLD zinc Ferrite Thin Films”, *International Conference on Materials Science and Technology-ICMST*, June 2012, Kerala.

Sahu, B. N., Sahoo, S.C., Venkataramani, N., Shiva Prasad, Krishnan, R.

“Grain Size Dependence of Magnetic Properties of PLD Zn Ferrite Thin fFlms”, *International Colloquium on Magnetic Films and Surface- ICMFS*, September 2012, China.

Sahu, B. N., Sahoo, S.C., Venkataramani, N., Shiva Prasad, Krishnan, R., Mikhail Kostylev., Stamps, R. L.

“Magnetic and FMR Study on $\text{CoFe}_2\text{O}_4/\text{ZnFe}_2\text{O}_4$ bilayers”, *12th Joint MMM/Intermag Conference*, January 2013, Chicago, USA

Garg, T., Kulkarni, A.R., Venkatramani, N.

“Influence of PbTiO_3 Addition of Microstructure of $(1-x)\text{Pb}(\text{Mg}_{1/3}\text{Pb}_{2/3})\text{O}_{3-x}\text{PbTiO}_3$ Ceramics”, *International Conference on Recent Trends in Applied Physics and Material Science (RAM-2013)*, February 2013.

Gururajan, M.P., Saransh Singh., Prita Pant

Keynote lecture on “Molecular Dynamics Investigation of the Effect of Defects on Mechanical Properties of Copper Nanowires”, *ICCMS 2012*, Hyderabad.

Gururajan, M.P., Nani, E S., Amol Subedhar., Chandrashekhar, E., Mira Mitra

Oral presentation on “ATG instabilities: Phase Field Modelling and its Wavelet and Spectral Implementations”, *ICCMS 2012*, Hyderabad.

Gururajan, M.P., Kedhar Bhawe., Suman Rao., Saurabh Pethe

Oral presentation on “Optimization of Positioning of Anodes for Cathodic Protection: Mathematical Modelling and its CUDA based Implementation”, *ADNAM 2013*, NIOT, Chennai.

Kulkarni, R.R., Prabhu, N., Hodgson P.D., Kashyap, B.P.

“Effects of Homogenization and Rolling on Microstructure and Tensile Properties of Mg-8.5Al-0.5Zn alloy at Elevated Temperature,” *3rd Asian Symposium on Materials and Processing, ASMP 2012*, IIT Madras, Chennai, August 30-31, 2012.

Doiphode, R., Murty, S.V.S.N., Prabhu, N., Kashyap, B.P.

“Flow Asymmetry and Anisotropy in Caliber Rolled Mg-3Al-1 Zn Alloy”, *3rd Asian Symposium on Materials and Processing, ASMP 2012*, IIT Madras, Chennai, August 30-31, 2012.

Rahul Kulkarni, Prabhu, N., Hodgson, P.D., Kashyap, B.P.

“Temperature Dependence of Flow Behaviour and Microstructural Evolution during Compression of As-cast 7.7 Al-0.5Zn-Mg Alloy”, Poster Presentation, *16th International Conference on Strength of Materials*, August 19-24, 2012, Bengaluru.

Prabhu, N., Kashyap, B.P., Hodgson, P.D., Rahul Kulkarni., Pabitra Palai, Srinivas, V.

“The Effect of Die-Shape and Die parameters in ECAP on the Microstructure and Flow Properties of some 2-phase Alloys”, Poster Presentation, *TMS (The Minerals, Metals and Materials Society)*, March 11-15, 2012, Orlando, Florida, U. S. A.

Rahul Kulkarni, Nithyanand Prabhu, Peter Hodgson, D., Bhagwati Kashyap, P.

“Phase Dissolution of - $\text{Mg}_{17}\text{Al}_{12}$ during Homogenization of as-cast AZ80 Magnesium Alloy and its Effect on Room Temperature Mechanical Properties”, Poster Presentation, *TMS (The Minerals, Metals and Materials Society)*, March 11-15, 2012, Orlando, Florida, U. S. A.

Srinu Gangolu., Gourav Rao, A., Prabhu, N., Deshmukh, V.P., Kashyap, B. P.

“Effect of Hot Rolling on Tensile Flow Properties of Aluminum - Boron Carbide Composites”, presented in *4th ICRACM conference*, Goa, February 18-21, 2013.

Srinu Gangolu, Gourav Rao, A., Prabhu, N., Deshmukh, V.P., Kashyap, B. P.

“Hot workability and Flow Characteristics of Al-5 wt% B₄C Particulate Composite”, presented in *16th ICSMA*, IISc Bangalore, August 19-24, 2012.

Mukhopadhyay, A.

Presented a paper on “Development of bulk structural oxide-oxide ceramic nanocomposites via solid-state precipitation”, (co-authors: Chopra, K., and Todd, R. I.); *Second International Conference on Advances in Materials Processing and Characterization (AMPC 2013)*, held during February 6-8, 2013, at Chennai.

Presented a paper on “*In-situ* stress measurement in thin films during processing and applications using multi beam optical stress sensor (MOSS)”, *Second International Conference on Advances in Materials Processing and Characterization (AMPC 2013)*, held during February 6-8, 2013, at Chennai.

Sahoo, S.C., Baidyanath Sahu., Bohra, M., Venkataramani, N., Shiva Prasad., Krishnan, R.

“Exchange Coupled Co-ferrite/Zn-ferrite Bilayer”, *DAE Solid State Physics Symposium 2012* IIT Bombay, December 2012.

Sumangala, T. P., Mahender, C., Venkataramani, N., Prasad, S.

“Effect of Calcination Temperature on Structural and Magnetic Properties of Nanocrystalline Magnesium Ferrite Powders”, *DAE Solid State Physics Symposium 2012*, IIT Bombay, December 2012.

Mukhopadhyay, A.

Presented a poster on “Stress Development due to SEI formation and Engineering of Graphene Layer Orientation to attain High Rate Capability in Li-ion batteries”, (co-authors: Hurt, R. H., Xiao, X., and Sheldon, B. W.); *4th Interdisciplinary Symposium on Materials Chemistry (ISMCM 2012)*, held during December 11-15, 2012, at Bhabha Atomic Research Centre (BARC), Mumbai, India.

Rahul R. Kulkarni, N. Prabhu, Peter Hodgson and B. P. Kashyap

“Effect of Mg₁₇Al₁₂ Phase Dissolution on Room Temperature Tensile Properties of As-cast AZ80 Magnesium Alloy”, *National Symposium on Advances in Materials Science and Technology (AMST 2012)*, February 3-4, 2012, University School of Sciences, Gujarat University, Ahmedabad.

R. L. Doiphode, S. V. S. Narayana Murty, N. Prabhu and B. P. Kashyap

“Effect of High Temperature Caliber Rolling of Mg-alloy AZ31 on its Microstructure and Room Temperature Tensile Properties”, Poster Presentation, *National Symposium on Advances in Materials Science and Technology (AMST 2012)*, February 3-4,

2012, University School of Sciences, Gujarat University, Ahmedabad

Srinu Gangolu, Gourav Rao, A., Prabhu, N., Deshmukh, V.P., Kashyap, V.P.

“Microstructural Evolution and High Temperature Mechanical properties of Hot Rolled Al-5% B₄C Composite”, Presented in *21th PFMA*, IIT Guwahati, Guwahati, December 10-13, 2012.

Conference/Workshop (Coordinated/Chaired by Faculty)

Bhargava, P.

Coordinating Faculty, IIT Bombay for the *11th Indo-German Winter Academy*, CMERI Durgapur, December 11-17, 2012.

Gururajan, M.P.

One-day Hands-on Workshop on Some Tools of Materials Modelling (along with Prof. Prita Pant and A S Panwar) conducted during MR-13 at Department of Metallurgical Engineering and Materials Science, IIT- Bombay.

Gururajan, M.P.

Chaired a modelling session in *MR 13*, IIT Bombay

Mukhopadhyay, A.

Convener for the *5th National Symposium for Materials Research Scholars (MR 13)* and *Workshop on Advanced Characterization Techniques and Materials Modeling*, at IIT Bombay, between May 8-10, 2013.

Prita Pant

Workshop on Communication Skills, Conducted by Ms. Jo Chaffer from British Council at IIT Bombay in March 2013.

Narasimhan, K

Convener, *International Deep Drawing Research Group, IDDRG 2012 Conference*, Incorporating National Conference on Sheet Metal Forming (SMF 2012), organised by the Sheet Metal Forming Research Association (SMFRA), IDDRG, and IIT Bombay, Mumbai, November 21-26, 2012.

Invited Talk/Lectures

Dusane, R.O.

“Materials and devices for Energy generation, storage and Sensing,” Invited Talk, *National Workshop on Nanomaterial for Energy and Sensors*, Pune, February 2013.

“Materials Research at ME&MS, IIT Bombay: Relevance to Saint Gobain,” in Pursuit of Collaboration

with Indian Academia being organized by Saint-Gobain Research, India on December 13, 2012, at Chennai.

“Silicon Nanowire Research: Challenges and Opportunities,” *National Symposium on Nanomaterials*, Sindhi Hindi College, Nagpur, March, 2013.

Parag Bhargava

“Advanced Ceramics: A class of materials in use from prehistoric times into Future”, delivered at the *CEP Programme on Advanced Ceramics-Processing & Applications (ACPA)*, September 10-14, 2012, NMRL Ambarnath .

“Fabrication of photoanode, counterelectrode and reliability of liquid electrolyte based dye sensitized solar cells”, delivered at the *Materials and Processing (MAP-2012) symposium*, October 2012, BARC, Mumbai.

“Rediscovering the spirit of engineering among students and citizens through renewed formal and non-formal education, training and entrepreneurship” delivered at the *Seventh National Frontiers of Engineering Symposium (7NatFoE) for Young Indian Engineers*, October 12-14, 2012, IIT Guwahati.

“Forming of alumina shapes and structures and their applications”, delivered at the *International Symposium on Bauxite, Alumina and Aluminium Industry of Asia Vision 2020*, Nagpur, December 3-5, 2012.

One-day Seminar on *In Pursuit of Collaboration with Indian Academia* organized by Saint-Gobain Research India on December 13, 2012.

“Dye Sensitized Solar Cells”, Delivered at the *National Workshop on Polymer Solar Cells* during April 21-22, 2012 sponsored by SERI-DST, IISER Pune.

Ashish Saxena., Asim Tewari., Prita Pant

“Microstructure Evolution and Deformation Mechanisms of Ti6Al4V”, *Advanced Materials and Processing Conference (AMPCO)*, IIT Roorkee.

Prita Pant

“Introduction to Dislocation Dynamics Simulations”, *NRC-M Summer Workshop on Mechanical Property Characterization*, IISc., Bangalore.

Bahadur, D.

“Hybrids at Nanoscale for Cancer Theranostics” at *National Conference on Recent Trends & Technology of Nanomaterials & Smart Devices (RTT-NSD-2013)* held at Solapur University, Maharashtra, India, April 18-20, 2013.

“Magnetic and Related Properties of Quantum Dots of Graphite and Tin Oxide” at an *International Conference on Nanoscale & Nanotechnology (ICONN 2013)* held at SRM university, Chennai, India, March 18-20, 2013.

“Nanohybrids in Cancer Therapy: Advantages, Limitations and Challenges” at an *Interactive Meeting and Brain Storming on Application of Nanotechnology in Cancer Diagnosis and Therapy* at AIIMS, New Delhi, March 4-5, 2013.

“Towards Understanding Unique Properties and Exploring Specific Health Care Applications of Oxide Functional Nanostructures” at *Nano India 2013*, held at Trivandrum, India, February 19-20, 2013.

“Magnetic Nanoparticles for the Biomedical Application”, at *National Conference on Challenges and Opportunities for Chemical Sciences in 21st Century* held at Karnatak State Higher Education Council, Bengaluru, India, January 8, 2013.

“Magnetic Nanoparticles for the Biomedical Application” at Faculty Development Program on Nanomaterials and Nanocomposites: Synthesis, Properties and Applications held at College of Engineering, Pune, Maharashtra, India, December 3-7, 2012.

“Cancer Theranostics through Nanotechnology” at *3rd Trilateral Workshop on Nanotechnology Applications in Energy, Water and Healthcare* held at Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India, November 19-21, 2012.

“Nanotechnology in Cancer Theranostics” at *52nd Annual Conference National Academy of Medical Sciences (India)*, with the theme of the Scientific Symposium for NAMSCON 2012 Nanomedicine: Perspective and Potential, Chennai, India, October 13-14, 2012.

“Oxide Nanocomposites for Water Remediation” at the *First International Conference on Emerging Technologies for Clean Water* held at Indian Institute of Technology Madras, Chennai, India, September 14-16, 2012.

“Electrochemical Impedance Spectroscopy in Biosensing” at *Conference on Recent Advances in Electrochemical Energy Materials and Devices*, Indian Institute of Science, Bangalore, India, July 24-26, 2012.

“Polymeric Nanohybrids for Cancer Theranostics” at *UGC-NRCM Workshop on Polymers: Structure, Properties and Applications*, Indian Institute of Science, Bangalore, India, July 18, 2012.

“Synergistic Effects of Triggered Drug Release and Hyperthermia for Cancer Therapy”, at *Joint Indo-French Meeting of the Associated International Laboratory*, Indian Institute of Science, Bangalore, India, July 2-3, 2012.

“Magnetic Nanotechnology in Cancer Theranostics”, at AICTE sponsored Staff Development Program on Recent Advances in Nanoscience and Nanotechnology (SDP-2012), Jalsaon, Maharashtra, India, June 15, 2012.

“Hyperthermia and other Stimulants for Drug Release: In Vitro and in Vivo Investigations through Nano Particulates and Hybrids”, at *9th International Conference, Scientific and Clinical Applications of Magnetic Carriers*, Minneapolis, MN, USA May 22 - 26, 2012.

B.P. Kashyap

“Thermo-Mechanical Processing for Grain Refinement and its Effect on Flow Properties” in “*3rd International Conference on Recent Advances in Material Processing Technology*”, January 7-9, 2013, Kovilpatti, Tamil Nadu, India.

“Microstructural Evolution Towards Strengthening and Deformability of IN718 Superalloy” in *International Conference and Exhibition on Pressure Vessels and Piping*, February 13-14, 2013, Mamallapuram, Tamil Nadu, India.

Raja, V.S., Rinkel Jindal., Gibson, M.A., Hutchinson, C.R.

“Corrosion Control Mechanisms in Alloys: A Study Using Al-Ni-Y Metallic Glasses”, *IWCEM-12*, October 30-November 1, 2012, Singapore.

Raja, V.S., Kale, S.S., Bakare, A.K.

“Stress Corrosion Crack Growth Behavior in AA 7075 Equivalent Alloy under Artificially Generated Crevice”, *The 16th APCCC*, October 21-24, 2012, Kaohsiung, Taiwan.

Raja, V.S.

“Materials and Corrosion Issues During Fabrication, Corrosion in Infrastructure and Chemical Industries”, *CICI-2012*, December 6-8, 2012, Vadodara.

“Corrosion Prevention Control Measures”, *4th Summer School in Tribology (SST)*, June 25-29, 2012, at IIPM, Gurgaon.

“Development and Understanding of Corrosion Resistant Materials for Naval Applications”, *National Conference on Advances in Naval Materials*, February 22-23, 2013, NIOT, Chennai.

“Development and Understanding of Corrosion Resistant Materials for Naval Applications”, *National*

Conference on Advances in Naval Materials, February 22-23, 2013, NIOT, Chennai.

“Tailoring Surfaces for Catering to Multifunctional Requirements”, *National Conference on Recent Advances in Surface Science 2013 (RASS 2013)*, February 14-15, 2013, Dindigal.

Shafaq Lone, A., Raja, V.S.

“Sulfuric Acid Corrosion: Mechanisms and Control”, *2nd International Conf. on Sulfuric Acid and Mist Elimination*, March 15-16, 2013, Mumbai.

Narasimhan, K.

“Stress Based Forming Limit Diagram During Tube Hydroforming”, January 4, 2013, DRDO, Hyderabad

“Stress Based Forming Limit Diagram During Tube Hydroforming”, *ATM 2012*, November 18-19, 2012 Jamshedpur

Prasad R.C.

“Fundamentals of Fracture and case studies during national Work on Failure Analysis Root causes and Remedies” organized by IIM Pune Chapter during January 12-13, 2013, at Nashik.

Prasad R.C., Chaudhary S.

“Environment Assisted Cracking of Steels”, presented at *NMD-ATM* held at Jamshedpur, 2012.

Significant Awards/Distinctions

Bahadur, D.

Govt. of India 7th National Research Award in Nano Science & Technology, 2013.

Parag Bhargava

Elected as Council Member of the Indian Ceramic Society (2013-2015)

Honorary Work

Dusane, R.O.

Reviewed Ph.D. thesis and DST project proposals.

Kashyap, B.P.

Reviewed papers for International Journals (i) Metallurgical and Materials Transaction A; (ii) Materials Science and Engineering A; and (iii) Journal of Biomedical Materials Research part A

Gururajan, M.P.

Reviewed submissions for Materials Science and Engineering B, Sadhana, Journal of Alloys and Compounds, and Transactions of Indian Institute of Metals.

Om Prakash

Continued to act as a Referee for the “Indian Journal of Engineering and Materials Science”.

Parag Bhargava

Served as Guest Editor of the special volume of Transactions of the Indian Ceramic Society, Vol. 71, No.4, October-December, 2012.

Faculty Members and their Specialization**1. D. Bahadur**

Magnetic materials, Electronic ceramics, Nano structured materials for magnetic, Bio and optical applications, Cancer theranostics, Water purification, nano hybrids

2. N.B. Ballal

Process analysis, iron & steel making, Process modelling, Transport phenomena, Thermodynamics.

3. S. Basu

Thermodynamics of metal refining, slag-metal interactions, continuous casting

4. P. Bhargava

Powder processing, Near net shape forming of advanced ceramics, Indentation fracture of ceramics, Gel casting, Rheology of ceramic suspensions, Fabrication and properties of ceramic foams, Synthesis of oxide nanoparticles, Consolidation of nanoparticles, Fabrication of ceramics for prosthodontic applications, Plastic forming of ceramics, Materials for dye sensitized solar cells.

5. Arup R. Bhattacharyya

Polymer blends, Carbon nano tubes/polymer composites, Polymer crystallization, Polymer processing, Nanocomposites.

6. R.O. Dusane

Thin films and devices of elemental semiconductors and their alloys, Surface nano-engineering, Photovoltaic devices, MEMS materials and technology, Devices for health care monitoring and radiation detection, Nano wires and nano layers for different applications, Energy storage and functional materials.

7. P. Gopalan

Ferroelectric materials and films, SOFC systems, Oxygen ion conductors for SOFC.

8. Dipti Gupta

Plastic/flexible electronics based on organic semiconductors, Metal oxides and graphene, key devices and solar cells, Thin film transistors, Memories, Device Physics & simulation.

9. P. Gururajan

Phase transformations, modeling of micro structural evolution, Phase field modeling materials mechanics, materials thermodynamics.

10. B.P. Kashyap

Deformation behaviour and microstructural evolution.

11. N.K. Khosla

Process Instrumentation and control, Mineral processing, Extractive metallurgy, Materials preparation and characterization.

12. A.R. Kulkarni

Ionically conducting materials, Lithium batteries, Sensors, Glass and glass ceramics, Impedance spectroscopy, Nanophosphers, Lead free piezoelectrics

13. A.S. Khanna

High temperature corrosion, High temperature coatings, Paint coatings, Rebar & concrete coatings, Oil & gas corrosion, Surface engineering.

14. S. Mallick

Dielectrics, Powder metallurgy, Dye sensitized solar cells

15. A. Mukhopadhyay

Nanomaterials for energy storage & conversion, Stress in thin films, Carbon nanotube reinforced composite, Ceramic nanocomposites.

16. K. Narasimhan

Metal forming, Mechanical behavior, Simulation and validation.

17. Prita Pant

Mechanical behavior of thin films, Dislocation dynamics simulation, Shape memory materials, Nanoindentation, Twinning.

18. S. Panwar

Computational materials science, Molecular Simulations, Soft nano- structure materials.

19. S. Parida

Electrochemical nanostructuring, Nanoporous materials, Functional application of nano materials, Corrosion.

20. N. Prabhu

Physical metallurgy, Phase transformations, Electron microscopy, Structure-property relationships.

21. Om Prakash

Electronic ceramics and nano powders: Design, processing and characterization.

22. M.J.N.V. Prasad

Electrodeposition, Nanocrystalline and amorphous materials, Medical implants, Indentation, Fatigue, creep and Superplasticity, Microstructural investigation.

23. R.C. Prasad

Fatigue, Fracture, Fractography and failure analysis, Environment assisted cracking, Composites, NDE Heat treatment, Fracture mechanics and integrity assessment.

24. T.R.S. Prasanna

Materials for energy generation and storage, Oxide ion and cation solid electrolytes

25. V.S. Raja

Corrosion, Structure property correlation on corrosion, Failure analysis, Protective coatings, Metallurgy of corrosion.

26. I. Samajdar

Thermomechanical processing, Texture analysis Microscopy

27. S. Saxena

Computational materials science, Ab-initio calculations

28. Shobha Shukla

Nanophotonics, Nanomaterials, Metamaterials, Plasmonics, Photonic crystals.

29. R.S. Srinivasa

Nanostructured materials, Thin films.

30. N. Venkataramani

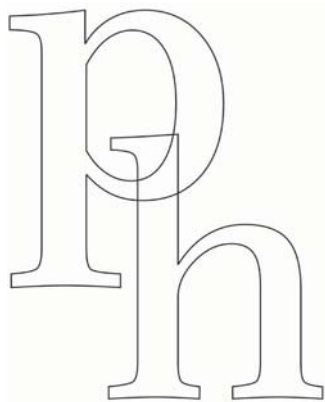
Magnetic materials, thin films, structure property correlations in nanocrystalline systems, magneto electric composites

31. N.N.Viswanathan

Transport phenomena, Modelling of materials processing, Iron and steel making.

32. S. Vitta

Nanomaterials, Magnetic and electrical properties of metals, Alloys & oxides, Thermoelectric materials.



Physics

Introduction

The Department of Physics offers a four-year B. Tech. programme in Engineering Physics and a two-year post B.Sc. programme leading to Masters degree in Physics. Keeping in line with the national science initiative on nanomaterials and nanotechnology, the department started a five-year dual degree programme leading to B.Tech. and M.Tech. degree in Engineering Physics with specialization in nanotechnology and nanomaterials. To strengthen our scientific manpower, the department had also started a post B.Sc. dual degree programme leading to a Master of Science degree in Physics as well as a Ph.D. This programme is expected to attract young and motivated college students. The department along with the department of Metallurgical Engineering and Material Science has started a dual degree programme of M.Sc. in Physics and M.Tech. in Material Science. It is a first interdisciplinary programme in which two departments of the institute are jointly running a programme. The Department also organizes a single day research symposium, managed by the research scholars of the department. Eminent physicists from TIFR, BARC, Mumbai, gave insight on exciting developments in the field of statistical physics, novel materials and high energy physics. At present the department has 31 permanent faculty members, two faculty members on reappointment, two Emeritus scientists, one contract professor and four Adjunct faculty members.

During 2012-13, one new faculty member, Dr. Dinesh Kabra (from the Optoelectronics group of University of Cambridge, UK), joined the department.

MOUs and collaborations:

An MoU was signed with the Department of Physics, Osaka University, Japan. This MoU enables exchange of up to three graduate/undergraduate students and one faculty member between the two departments for work on research projects of mutual interest.

Prof. D. Kabra of the department had signed a Materials Transfer Agreement (MTA) with Cambridge; Display Technology Pvt Ltd, U.K.. Under this MTA the Cambridge; Display Technology Pvt Ltd will send

their proprietary organic semiconducting materials which are not available in public domain to use for optoelectronic devices.

Major activities proposed:

The department has received a FIST proposal worth Rs. 3.5 crores to start research in ultrafast spectroscopy and electrical transport in milli Kelvin temperatures. To enhance our capabilities to produce samples which cannot be produced anywhere in the country we have obtained the required funding from FIST to buy a high temperature high pressure furnace. The department has also proposed a high resolution X-ray system to further characterize the samples that the faculty members are making. Over the last decade, it has become increasingly important for the department to have a device fabrication facility alongside more traditional material preparation and characterization. Indeed, this is now true for any place in the world with a strong programme in experimental physics. An university R&D level cleanroom is an essential facility not only for semiconductor physicists who work with quantum dots, point contacts, nanowires, Quantum hall physics etc, but also for people working with particle detectors, plasmonic devices, microfluidics, soft matter and lab-on-a-chip type of medical diagnostic tools etc. Apart from research activity, we also keenly feel the need to impart some hands on training to our MTech students on basic optical lithography. Our ability to attract young experimentalists (as potential faculty members) also depends crucially on the infrastructure for doing experiments that we can provide at the departmental level.

Infrastructural development

The department hosts the Central facility for Hall effect measurements on highly conducting to highly resistive materials.

Academic Programmes

The department, in all its academic programmes, offers a wide range of courses (from Bio Physics to

Theoretical Physics) thereby helping the students to find their aptitude. All the programmes run by the department are highly successful and attract the best students from all over the country. In addition, the department has a vibrant research program comparable to the best in the world. Annually, the department offers admissions to about 35 students in B. Tech. (Engineering Physics) programme, 10 dual degree B.Tech.-M.Tech. and 40 students for Masters Degree. In the dual degree M.Sc. Ph.D., programme, admission is offered to about ten students, who are paid stipend from first semester onwards. There are about 100 Ph.D. students and Post-doctoral fellows pursuing research in various areas in the department.

Student Intake

B. Tech (Engineering Physics)	: 30
B.Tech+M. Tech (Dual degree)	: 12
M.Sc.	: 27
M.Sc + PhD (Dual degree programme)	: 8
M.Sc. + M. Tech (Dual degree)	
Jointly with Materials Science and Metallurgy	: 8
Ph.D	: 3

Degrees awarded

B. Tech (Engineering Physics)	: 22
B.Tech+M. Tech (Dual degree)	: 8
M.Sc.	: 35
M.Sc + PhD (Dual degree programme)	: 3
Ph.D	: 10

Scholarships

The department offers a stipend of Rs. 6000/- to M.Sc.-Ph.D. Dual Degree students right from the beginning. The research scholars are paid a stipend of Rs. 16000/- for the first two years which is then increased to Rs. 18000/- if they show sufficient progress in their research work.

Sponsored Projects initiated in 2012-13

Project Title	Agency Name	Status
“Workshop on Grid & Cloud Computing to be held during April 1-3, 2012 at IIT Bombay	Board of research in nuclear sciences	Ongoing
“Multicaloric effects in certain systems with magnet structural transitions	Board of research in nuclear sciences	Ongoing
“Search for novel multi-functional materials from Heusler family	Council of Scientific and Industrial Research	Ongoing
“Some studies in spin-dependent scattering processes at high energies	Department of Science & Technology	Ongoing

Student exchange programmes

The Institute has memorandum of understanding with NUS Singapore, ETH Zurich and Monash Academy Australia. The students from these institutions often come to the department. In their feedback they have often praised the rigor and depth of the courses at IIT Bombay. It also helps them to interact with the students who are best in the nation.

Mr. Konstantin Behringer of Technical University of Munich, Germany spent a semester as an exchange student.

R&D Activities

Following are the main areas of R&D activity at the department:

- Experimental Condensed Matter Physics and Material Science
- Photonics
- Experimental Nuclear Physics
- Theoretical Condensed Matter Physics
- Statistical Physics and Non Linear Dynamics
- Theoretical High Energy Physics

Sponsored Research Projects

Sponsored Research Projects

New	: 11
Ongoing	: 35
Completed	: 8

Project Title	Agency Name	Status
“FIST program- Physics Dept SERC	Department of Science & Technology	Ongoing
“Development and study of UHF ferrite & composites for high-speed information processing system (DST-RFBR)	Department of Science & Technology	Ongoing
“New Generation of Molecular Nanomagnet	Department of Science & Technology	Ongoing
“Nonlinear analysis of the ion transport through a single channel in the lipidic membrane.	Department of Science & Technology	Ongoing
“GCET-2013	Government of Goa	Ongoing
“Investigation on novel multi functional materials from the full Heusler family	Indian Space Research Organisation	Ongoing
“Workshop on High Energy Physics	Multiple institute workshop	Ongoing
“A new route to ultra-high quality hole based nanoelectronic Devices.	Ministry of Science & Technology (DST)	Ongoing
Sponsored Projects initiated before 2010-11		
“High density tape cast ferrite thick films for microwave applications	Defence Research & Development Organisation	Ongoing
“Enhancement of Regional World wide Computing Grid (WLCG)	Department of Science & Technology	Ongoing
“Microwave Losses in ferrite thin films for meta-materials	Department of Science & Technology	Ongoing
“Raman spectroscopy studies of TiO ₂ thin films and nano tubes/rods prepared by laser ablation	Department of Science & Technology	Ongoing
“Low cost computing access device	Internally funded by MHRD project	Ongoing
“Electronics design using DSP, FPGA, CPLD and Micro controllers through simulation and direct access of the hardware	Ministry of Human Resource Development	Ongoing
“Proposal for 10Mbps dedicated leased line to IIT Bombay for ALICE WORK	Tata Institute of Fundamental Research	Ongoing
Magnetism in low-dimension and/or frustrated magnetic systems	University Grant Commission	Ongoing
“Magnetism in low-dimensional strongly correlated spin systems probed using NMR/NQR spectroscopy	Department of Science & Technology	Ongoing
“Synchronization of coupled nonlinear oscillators: Simulations and Experiments	Department of Science & Technology	Ongoing

Project Title	Agency Name	Status
“Exotic magnetic and electronic properties in novel 4d and 5d transition metal oxides	Department of Science & Technology	Ongoing
“Nano structured Ni based full Heusler alloys for magnetic refrigeration applications	Department of Science & Technology	Ongoing
“Localized surface plasmon resonanace (LSPR) based optoelectronic biosensors.	Naval Materials Research Laboratory	Ongoing
“Systematic studies on Localized Surface Plasmon Resonance (LSPR) based biosensor using ATR technique and its potential for DNA/antibody detection	Naval Materials Research Laboratory	Ongoing
“An accelerator school at IIT Bombay	Tata Institute of Fundamental Research	Ongoing
“Structurally Engineered Magnetic Nanoparticles: Gram Scale Synthesis Characterization and Surface Functionalization Leading to Colloidal suspensions	Council of Scientific and Industrial Research	Ongoing
“Functional polymeric semiconductor and metallic nanostructures for nano-photonics	Department of Science & Technology	Ongoing
“Role of surface and organic matrix on the vibrational and electronic properties of nano-crystals synthesized by Langmuir Blodgett technique.	Department of Science & Technology	Ongoing
“New symmetries beyond the electroweak scale	Department of Science & Technology	Ongoing
“Nano structured multifunctional magnetic nanoparticulates	Department of Science & Technology	Ongoing
“A lab on chip of Cardiac Diagnostics	Aeronautical Development Agency	Ongoing
“Theoretical studies of electronic structure and optical properties of polymers.	Department of Science & Technology	Ongoing
“Study of Astrophysical point sources of gamma rays.	Department of Science & Technology	Ongoing
“NMR study of spin-liquid states in novel magnetic systems.	Department of Science & Technology	Ongoing
“A large Ion Collider Experiment (ALICE) Operation and Utilisation	Department of Science & Technology	Ongoing
“Establishment of low temperature/high magnetic field facilities-phase-II: Torque magnetometer and scanning hall probe microscope/magnetometer.	Department of Science & Technology	Ongoing
A joint theoretical and experimental study of diluted magnetic semiconductor	International Collaboration Projects	Ongoing

Project Title	Agency Name	Status
“Nanostructuring of nanofluidic/microfluidic devices for enhanced blood filtering and detection of blood analytes associated with biosensors.	International Collaboration Projects	Ongoing
“Statics and Dynamics of Low-Dimensional Disordered Systems”	Department of Information Technology	Ongoing
Projects completed during 2012-13		
“Workshop on Grid & Cloud Computing to be held during April 1-3, 2012 at IIT Bombay	Board of Research in Nuclear Sciences	Completed
“Optimization study of various parameters of Resistive Plate Chamber for India based Neutrino Observatory	Department of Science & Technology	Completed
“Linear and Nonlinear Optical Properties of Semiconductor Clusters- Women Scientist Scheme (WOS)	Department of Science & Technology	Completed
“Development of Ceramics and Nano Structured Magnetics Refrigerates.	Defence Research & Development Organisation	Completed

Consultancy Projects

No. of jobs	:	1
No. Of faculty involved	:	1
Income generated	:	Rs.447000/-

Patents

Mohapatra, J., Mitra, A., Bahadur, D., Aslam, M.
Process for the preparation of monodisperse nanostructures IPA No. 3374/Mum/2012.

Extension Activities

Prof. C. V. Tomy was the Local Convener for the 57th DAE Solid State Physics Symposium (Sponsored by Board of Research in Nuclear Science, DAE, Government of India), which was held at the Indian Institute of Technology Bombay, Mumbai 400076 during December 3 - 7, 2012.

Visitors to the Department

Dr. Matin Durrani, Editor (Physicsworld) and his colleague Mr. James Dacey visited the department on September 13, 2012 in connection with the planned focus issue on physics in India.

A delegation from CNRS, France, consisting of **Jean-François Pinton**, Scientific Director, **Giancarlo Faini**, Vice Scientific Director- Condensed matter, **Bart Van Tiggelen**, Vice Scientific Director Theoretical physics, **Amina Taleb-Ibrahimi**, Vice Scientific Director Large infrastructures, and **Subbarao Basava**, Responsible International and European relations, visited the department on November 2, 2012.

Prof. Vincenzo Chiochia from ETH, Zurich, visited the department and gave a talk on Heavy flavour physics with the CMS experiment on March 7, 2013.

Dr. Raghunath Chelakkot, from School of Engineering and Applied Sciences (SEAS), Harvard University, visited the department and gave a talk on Semi flexible polymers : Instabilities under confinement, constraint and activity on February 12, 2013.

Dr. Amitabha Nandi from Yale University, USA, visited the department and gave a talk on Impact of the Dynamic Cytoskeleton on Intracellular Sub-Diffusion: A Local Motion Analysis on January 23, 2013.

Prof. Carl Carlson from College of William and Mary, Williamsburg, Virginia, USA, visited the department and gave a talk on Theory for Beyond the Standard Model Studies in Parity-violating Electron Scattering on January 17, 2013.

Prof. Richard MacKenzie from Groupe de physique des particules, Département de physique, Université

de Montréal, visited the department and gave a talk on Vacuum decay mediated by topological defects on January 10, 2013.

Dr. Ezinabar Namdas from Centre for Organic Photonics & Electronics, University of Queensland, Australia on “Developing Devices For The Future Using Organic Semiconductors: Transistors, Solar Cells and Lasers” on November 16, 2012.

Prof. Tae-Hun Lee from Saha Institute of Nuclear Physics, Kolkata, India, visited the department and gave a talk on Rephasing invariant parametrization of flavor mixing on October 23, 2012.

Prof. Purusattam Ray from Institute of Mathematical Sciences, Chennai, visited the department and gave a talk on Morphology of fracture surfaces on August 13, 2012.

Prof. Carsten A. Ullrich from University of Missouri, visited the department and gave a talk on Time-dependent density-functional theory: overview and recent highlights on August 10, 2012.

Prof. Masahiro Yamaguchi from Department of Electrical and Communication Engineering, Tohoku University, visited the department and gave a talk on Soft Magnetic Thin Film Applications at Radio Frequencies on July 30, 2012.

Prof. Surajit Sengupta from TIFR Centre for Interdisciplinary Sciences Hyderabad, India, visited the department and gave a talk on An-elasticity in crystalline solids: Evidence for a hidden mechanical critical point? on July 19, 2012.

Prof. Bikash Sinha from Homi Bhabha Professor, DAE Former Director, Saha Institute of Nuclear Physics & Variable Energy Cyclotron Centre, visited the department and gave a talk on Colliders to Cosmology, marvels of LHC, RHIC and Micro second Universe on April 10, 2012.

Conferences/Symposia/Workshops/Seminars

Shukla A.

Presented a talk titled A Pariser-Parr-Pople Model Hamiltonian based approach to the electronic structure and optical properties of graphene nanostructures in *ACCMS - Theme meeting on 2D Nanostructures: Graphene and Beyond* at Materials Research Center, Indian Institute of Science, Bangalore, July 29, 2012.

Prasad Shiva

Gave an invited talk at the *6th India - Singapore Joint Physics Symposium (ISJPS - 2013)* held at IIT Kharagpur during February 25 -27, 2013.

Presented a paper at the *21st International Colloquium on Magnetic Films and Surfaces*, held in Shanghai, China from September 24-28, 2012

Presented a paper at the *12th Joint Magnetism and Magnetic Materials and Intermag conference* held in Chicago, USA, from January 14-18, 2013

Aslam M.

Delivered an invited talk on Role of Defect states on electrical and magnetic properties of ZnO nanostructures: An Experimentalists View at *57th DAE-SSP Symposium*, December 3-7, 2012, held at IIT Bombay.

Mahajan A.V.

Delivered an invited lecture on Novel spin-liquid behaviour in some Ir-based systems at *57th DAE-SSP symposium*, December 3-7, 2012 held at IIT Bombay

Presented a talk titled Novel spin-liquid behaviour in some Ir-based oxide systems at the *Annual March Meeting of the American Physical Society*, March 18-23, 2013, at Baltimore Maryland, USA.

Sarin, P.

Plenary talk on “Heavy ion physics results from the CMS experiment at LHC”, Kruger-2012, *International workshop on discovery physics at the LHC*, University of Cape Town, South Africa, December 3-7, 2012

Narayanam, P.K., Soni, P., Srinivasa, R.S., Talwar, S.S., Major, S.S.

Presented a paper Growth of $\text{Zn}_{1-x}\text{Cd}_x\text{S}$ nanocrystallites in LB multilayers, *14th International Conference on Organized Molecular Films (ICOMF14)*, held during July 10-13, 2012, at Paris, France.

Narayanam, P.K., Soni, P., Srinivasa, R.S., Talwar, S.S., Major, S.S.

Presented a paper Effect of heat treatment on the photoluminescence of CdS nanocrystallites in LB multilayers, *14th International Conference on Organized Molecular Films (ICOMF14)*, held during July 10-13, 2012, at Paris, France.

Botcha, V.D., Singh, G., Narayanam, P.K., Sutar, D.S., Talwar, S.S., Srinivasa, R.S., Major, S.S.

Presented a paper Graphene Oxide LB monolayers transferred on surface modified SiO_2 and Si substrates, *14th International Conference on Organized Molecular Films (ICOMF14)*, held during July 10-13, 2012, at Paris, France.

Botcha, V.D., Singh, G., Narayanam, P.K., Sutar, D.S., Talwar, S.S., Srinivasa, R.S., Major, S.S.

Presented a paper Isotherm studies and optimization of LB deposition process of GO monolayers, *14th International Conference on Organized Molecular*

Films (ICOMF14), held during July 10-13, 2012, at Paris, France.

Singh, G., Botcha, V.D., Sutar, D.S., Narayanam, P.K., Talwar, S.S., Srinivasa, R.S., Major, S.S.

Presented a paper Reduction of graphene oxide LB monolayers deposited on Ti substrate, *14th International Conference on Organized Molecular Films (ICOMF14)*, held during July 10-13, 2012, at Paris, France.

Singh, G., Botcha, V.D., Sutar, D.S., Narayanam, P.K., Talwar, S.S., Srinivasa, R.S., Major, S.S.

Presented a paper Reduction and nitrogen doping of graphene oxide LB monolayers by ammonia plasma treatment, *14th International Conference on Organized Molecular Films (ICOMF14)*, held during July 10-13, 2012, at Paris, France.

Singh, D., Kumar, R., Ganguli, T., Srinivasa, R.S., Major, S.S.

Presented a paper Effect of Thickness on the Epitaxial Quality of ZnO Grown on Sapphire by Reactive RF Magnetron Sputtering, *6th International Conference on Technological Advances of Thin Films & Surface Coatings*, held during July 14-17, 2012, at Singapore.

Mohanta, P., Singh, D., Kumar, R., Ganguli, T., Srinivasa, R.S., Major, S.S.

Presented a paper Effect of ZnO buffer layer thickness on the epitaxial growth of GaN by reactive magnetron sputtering, *6th International Conference on Technological Advances of Thin Films & Surface Coatings*, held during July 14-17, 2012, at Singapore.

Singh, D., Singh, S., Kumar, U., Srinivasa, R.S., Major, S.S.

Presented a paper Transparent conducting Ga-doped ZnO thin films grown by reactive co-sputtering of Zn and GaAs, *4th International symposium on Transparent Conducting Materials*, held during October 21-26, 2012, at Crete, Greece.

Nandi, R., Joshi, P., Singh, D., Mohanta, P., Srinivasa, R.S., Major, S.S.

Presented a paper Structure and optical properties of ZnO nanorods grown chemically on sputtered GaN buffer layers, *4th International symposium on Transparent Conducting Materials*, held during October 21-26, 2012, at Crete, Greece.

Yadav, B.S., Mohanta, P., Singh, D., Kumar, R., Ganguli, T., Srinivasa, R.S., Major, S.S.

Presented a paper Transparent conducting $\text{In}_x\text{Ga}_{1-x}\text{N}$ alloy films deposited by reactive co-sputtering of GaAs and indium, *4th International Symposium on Transparent Conducting Materials*, held during October 21-26, 2012, at Crete, Greece.

Bhushan Kanagalekar, Pragya Das, Bhushan Bhujang, S. Muralithar, R. P. Singh, and R. K. Bhowmik

Presented a poster titled "Large triaxial deformation in ^{126}I " at the *International Conference on Nucleus-Nucleus Collisions (NN2012)* during May 27-June 1, 2012 at San Antonio, Texas, USA.

Kabra D.

Presented a talk titled : The Influence of Side-Chain Position on the Optoelectronic Properties of a Red-Emitting Conjugated Polymer at the *3rd Federation of Asian Polymer Societies Conference and MACRO-2013* held at Indian Institute of Science, Bangalore-India from May 15-18 2013.

Dhar S.

Presented a talk titled : Control of the electronic properties of ZnO nanoparticles by surface engineering through Tb doping, at the *Sixth International Conference on Advanced Materials and Nanotechnology (AMN 6)*, Auckland, New Zealand, February 11-15, 2013

A.F. Croxall, B. Zheng, F. Sfigakis, I. Farrer, H.E. Beere, C.A. Nicoll, K. Das Gupta, D.A. Ritchie

Presented a talk titled Demonstration and characterisation of an ambipolar high mobility transistor in an undoped GaAs/AlGaAs quantum well in *UK Semiconductors 2012 Conference and Exhibition*, July 4-5, 2012 at Sheffield, United Kingdom,.

A.F. Croxall, B. Zheng, F. Sfigakis, K. Das Gupta, I. Farrer, H.E. Beere, C.A. Nicoll, D.A. Ritchie

Presented a poster titled Demonstration and characterisation of an ambipolar high mobility transistor in an undoped GaAs/AlGaAs quantum well in *International Conference on the Physics of Semiconductors, ICPS 31*, July 29 - August 3, 2012 at Zurich, Switzerland.

A.F. Croxall, H. E. Beere, I. Farrer, C.A. Nicoll, D.A. Ritchie, B. Zheng, and F. Sfigakis, K. Das Gupta

Presented a talk titled Demonstration and characterisation of an ambipolar high mobility transistor in an undoped GaAs/AlGaAs quantum well in *17th International Conference on Molecular Beam Epitaxy*, September 23-28, 2012 at Nara, Japan.

Yajnik U.

Delivered a talk on Left-Right symmetry, supersymmetry : Cosmological constraint at the *Eleventh Conference on the Intersections of Particle and Nuclear Physics, CIPANP*, May 29 - June 03, 2012 St. Petersburg, Florida, USA

Delivered a talk on The relevance of Very Light Dark Matter at the *International Conference on New Frontiers in Physics, CERN-EPS*, June 10-16, 2012 at Kolymbari, Crete, Greece.

Delivered a talk on Baryon asymmetry of the Universe and CP violation at *CP violation in elementary particles and composite systems - PCPV, ICTS-TIFR*, February 19 -23, 2013, at Mahabaleshwar

Conferences/Symposia/Workshops (Coordinated/chaired by faculty)

Sarin, P

Co-chaired a workshop on Effective utilization of high performance computing resources at C-DAC Pune conducted on October 26, 2012 at IIT Bombay.

Invited Lectures

Sain Anirban

Delivered an invited lecture on Micromechanics of Dislocations in sheared solids in April 2013, at Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.

Ramadevi P.

Delivered an invited lecture at McGill University, Montreal, in June 2012.

Das Gupta K.

Delivered an invited talk on Ambipolar Field Effect Transistors in GaAs-AlGaAs Heterostructures and Quantum Wells, in Solid State Physics Laboratory (SSPL) on June 12, 2012 at New Delhi, India.

Yajnik U.

Delivered an invited talk on “Scale of Left-Right symmetry and supersymmetry, constrained by cosmology” at GPP, Universite de Montreal, Montreal, Canada on May 17, 2012

Delivered an invited talk on “Through the looking glass: Mere mirage or a road not taken?” at Theoretical Physics Colloquium at TIFR, Mumbai, on October 16, 2012.

Delivered an invited popular lecture for students on From micro to macro: The story of our unfolding Universe at P.T. Sarvajani College, Surat, on November 27, 2012

Honorary Work

Paramananda P.,

Refereed papers for Physical Review Letters, Physical Review E, *CHAOS and Journal of Physical Chemistry*.

Das Gupta K.,

Refereed papers for *Electrochemical Society Journals and Journal of Materials Engineering and Performance*.

Vasa P.

Refereed papers for Physical Review D.

Yajnik U.

Worked as an honorary member of the governing body of EKLAVYA, Bhopal.

Faculty Members and their Specializations

1. Dipan K. Ghosh

Theoretical condensed matter physics,
Exactly solvable models in Magnetism

2. Gautam Mukhopadhyay

Theoretical condensed matter physics,
Magnetism & magnetic materials,
Nano scale physics,
Statistical physics, Non-equilibrium physics

3. Shiva Prasad

Magnetism and magnetic materials, Nano scale physics, Thin films and multilayers

4. S.S. Major

Nanomaterials (semiconductors/carbon based materials), Nano scale physics, Thin films and multilayers

5. Bhanu P. Singh

Nano scale physics-Experimental Laser physics and spectroscopy, Non-linear optics

6. Urjit A. Yajnik

Theoretical high energy physics, Cosmology

7. D.S. Misra

Nanomaterials (semiconductors/carbon based materials), Nano scale physics, Thin films and multilayers

8. Raghava Varma

Experimental nuclear physics, Relativistic heavy-ion physics

9. S. Umasankar

Theoretical high energy physics

10. Tapanendu Kundu

Experimental, Laser physics and spectroscopy, Non-linear optics

11. Prabhakar .P. Singh

Theoretical condensed matter physics

12. C.V. Tomy

Magnetism and magnetic materials, Superconductivity and low temperature physics

13. Alok Shukla

Theoretical condensed matter physics

14. Avinash V. Mahajan

Magnetism and magnetic materials, Superconductivity and low temperature physics

15. K.G. Suresh

Magnetism and magnetic materials

16. M. Senthil Kumar

Magnetism and magnetic materials, Nano scale physics, Thin films and multilayers

17. Pragya Das

Experimental nuclear physics

18. N. Nambudiripad

Magnetism and magnetic materials, Superconductivity and low temperature physics

19. P. Ramadevi

Theoretical high energy physics

20. Punit Parmananda

Non-linear dynamics, Non-equilibrium physics

21. Dibyendu Das

Statistical physics, Non-equilibrium physics

22. Basanta Kumar Nandi

Experimental nuclear physics, Relativistic heavy-ion physics

23. Asmita Mukherjee

Theoretical high energy physics

24. Anirban Sain

Statistical physics, Non-equilibrium physics

25. Subhabrata Dhar

Nanomaterials (semiconductors/carbon based materials), Magnetism and magnetic materials, Thin films & multilayer growth processes, Experimental Laser physics and spectroscopy

26. Aslam Mohamad

Nanomaterials (semiconductors/carbon based materials), Magnetism and magnetic materials, Nano scale physics

27. Tathagat A. Tulsi

Quantum computation theory

28. Pradip Sarin

Experimental nuclear physics

29. Kantimay Das Gupta

Low temperature transport in semiconductor heterostructures and bi-layers, Probing electronic interaction by Coulomb drag method, Vortex phases in superconducting thin films..

30. Parinda Vasa

Optical and Near-field spectroscopy, Optical properties of semiconductors nanoparticles

31. Kumar Rao

Theoretical Particle Physics

32. Sadhana Dash

Experimental nuclear physics, Relativistic heavy-ion physics

33. Dinesh Kabra

Optoelectronics, Light emitting polymers

34. Suddhasatta Mahapatra

Experimental Quantum Computation, Molecular Beam Epitaxy of II-VI compounds

35. Kailash C. Rustagi

Nanomaterials (semiconductors/carbon based materials), Nonlinear optics, Theoretical condensed matter physics

36. S.H. Patil

Theoretical physics, elementary particles, quantum mechanics and applications to atoms, molecules, and nuclei

37. Yogesh K. Gambhir

Conventional Nuclear Physics.
High Spin States and Super-deformations.
Exotic Nuclei and Neutron Halos.
Relativistic Mean Field for Finite Nuclei (Structure and Reactions.)
Equation of State, Nuclear Matter Under Extreme Conditions and Very Dilute Neutron Matter in Practically Proton Free Environment



Shailesh J. Mehta School of Management

Introduction

Since its establishment in 1995, the Shailesh J. Mehta School of Management has emerged as a significant player in management education in the country. The School functions as a self-funding entity, and also contributes a significant and growing addition to the Institute corpus. This year was marked by a further strengthening and consolidation of the academic programmes of the School.

The School currently has 22 full-time faculties, 2 Distinguished Guest Professors, 2 Visiting Professors and 4 Adjunct Faculty members.

Academic Programmes

The School runs a full-time Master of Management programme to develop professionals who manage the business activities in a dynamic environment in which technology is a key determinant of organizational success. The School also offers both full-time as well as external Ph.D. programmes to develop future cutting edge researchers. The School has started B. Tech.

Minor in Management from 2008. In 2012-2013, the School has awarded both Master of Management and Ph.D. degrees as shown in the following table.

Degrees Awarded

M. Mgt.	:	117
Ph. D.	:	5

The total number of scholarships awarded in 2012-13 for Master of Management Programme is 40. The total number of scholarships awarded in 2012-13 for the Ph. D. Programme is 16 including two Shailesh J. Mehta Endowment Scholarship, one AICTE National Doctoral Fellowship, four IRCC Partial Financial Support, and one UGC Junior Research Fellowship.

R&D Activities

Sponsored Research Projects	:	12
Ongoing	:	11
Completed	:	01
Faculty Involved	:	08

Some of the sponsored projects are as listed below:

Name of the Project	Sponsored by	Status
"Fuzzy decision-making approach to production-inventory problems in the context of supply chain management	IRCC	Ongoing
"Spiritual Climate of Business Organizations and its Impact on Employees Engagement and Learning and Innovation in Teams	Seed Grant	Ongoing
"Accelerating Industrial Competitiveness through Innovation	IRCC	Ongoing
"Capacity Creation in IP Education and Research	IP Chair, MHRD	Ongoing
"Development of Decision Support System for Project Scheduling Using Meta-Heuristics (R&D)	MHRD	Ongoing

Name of the Project	Sponsored by	Status
“Collaborative activities in the area of entrepreneurship: National Network Project	Wadhwani Foundation Indo US Collaboration	Ongoing
Working on a sub-project focusing on Technological capabilities of bigger Systems and Modules	MNRE, IITB, NCPRE	Ongoing
“Technology-gap in Indian Industries Analysis in the post-1991 era	IRCC	Ongoing
Simultaneous Optimization of Mean and Variance for Multiple response Problems	Department of Science and Technology (DST), India	Completed

Consultancy Projects

SJMSOM has undertaken two consultancy projects during April 2012 March 2013 wherein one faculty member is involved and revenue generated out of these projects is Rs.195800/-

Extension activities

CONTINUUM, the rolling seminar series, is a premier event at the SJMSOM. The seminars aim to cover the latest trends in management by inviting eminent speakers from business and academia. Each of these seminars focuses on issues and challenges faced by a specific management function and aims at drawing insights from the knowledge and experience of the speakers. The seminars are well attended by delegates from different organizations, our distinguished alumni, and students from various Business Schools and from other departments of IIT Bombay. The Continuum series also featured various competitions among students, like, case study contests, paper presentations and business games.

Finance Continuum : Finance Continuum was organised by the school on July 28, 2012. with its theme as Financial innovations for sustainable growth. Speakers at the event are as given: Dr. Prabhakar Patil, Joint Director, SEBI.; Mr. G. Chockalingam, Executive Director & CIO, Centrum Capital.; Mr. Anup Bagchi, Managing Director & CEO, ICICI Securities.; Mr. Pramod Kumar, Director & Head of Advisory, Barclays India.; Mr. Rajesh Mokashi, Deputy Managing Director, CARE Ratings.; Mr. Jacob Mathew, Managing Director, MAPE Advisory.; Mr. Manishi Raychaudhuri, Managing Director, BNP Paribas.; Mr. Harsh Nanda, Executive Director, Goldman Sachs.; Mr. Amit Sharma, National Head - Capital Market, Karvy.; Mr. Vivek Joshi, Associate Director, Kotak Investment Advisors.; Dr. G R Ramachandran, Head of Global Research, ICICI Bank.

Marketing Continuum was organised by the School on July 29, 2012 and the continuum was based on the theme Evolution of Marketing to Revolutionize Businesses. Following were the invited speakers at the continuum: Ms. Anuradha Aggarwal, Senior VP - Brand Communication, Insights and Online, Vodafone India Ltd.; Mr. Kashyab Vadapalli, Chief Marketing Officer, eBay India.; Mr. Shailendra Katyal, Director-Marketing, Lenovo India.; Ms. Manmeet Vohra, Marketing Director, TAG Heuer India.; Mr. Raghavendra Shenoy, VP Sales & Marketing, J&J Medical India.; Mr. Pawan Sarda, Chief Marketing Officer, Future Group.; Mr. Shankar Gupta, Chief Executive Officer, ACG PAM Pharma Technologies Pvt Ltd.; Mr. Rohit Parulekar, Director -Sales & Marketing, Schindler India

Systems Continuum was held on September 1, 2012, and its theme was Gearing Systems for the road ahead. Invited speakers at the event were: Mr. Pallab Talukdar, Chief Executive Officer, Fujitsu.; Mr. Abhay Chitnis, Chief Technology Officer and Vice President, L&T Infotech.; Mr. Atul Jayawant, Chief Information Officer, Aditya Birla Group.; Mr. Jay Venkatraman, Director Engineering, Tesco.com.; Mr. Sudhir Reddy, Vice President and Chief Information Officer, MindTree.; Mr. Thathagat Varma, Head of Strategic Programs and Senior Director, Yahoo.; Mr. Kiran DB, Regional Director, Microsoft.; and Mr. Patrick Mathias, Vice President, Cisco Systems

Operations Continuum was held on September 2, 2012, and its theme was Reshaping your Supply Chain to manage Volatility. Invited speakers at the event were: Dr. Rakesh Sinha, Chief Operating Officer (Operations) Godrej Consumer Products Limited.; Mr. Pravin Chaudhari, Director, Kansai Nerolac Paints Ltd.; Mr. Sanjeev Singh, Head, Supply Chain, TATA Steel.; Mr. Sudipto Paul, Engagement Manager, McKinsey & Company.; Mr. T.S. Venkatram, Supply Chain Director, Kellogg India.; Mr. Arvind Singh Rana, Senior Consultant, Vector Consulting Group.; Mr. Anurag Dwivedi, Head SCM, Western Region, Nestle India.

Consulting Continuum was held on March 17, 2013, and its theme was Unconventional Strategies in a Converging World. Invited speakers at the event were: Mr. Ganesh Ramachandran, GM, Wipro Consulting Services. Mr. Raj Nair, Chairman, Avalon Consulting.; Mr. Milan Seth, Partner Advisory Services and Technology Sector Leader, Ernst & Young.; Mr. Burzin Dabash, Executive Director, Axis Risk Consulting.; Mr. Sagar Paul, Head Customer Engagement and Knowledge Management, Mu Sigma.; Mr. Kunal Mhaske, VP - Services at EXL Services Ltd.

Technology Continuum was held on March 18, 2013, with its theme as Evolution of Technology: From

Business Enabler to Business Driver . Invited speakers at the event were: Prof. V. Ramgopal Rao, Professor, Centre of Excellence in Nanoelectronics, IIT Bombay.; Mr. C. S. Venkataraman, Senior Advisor,Tata Power SED.; Mr. Reapan Tikoo, CEO, Powai Labs.; Mr. Mallikarjun Kande, Group Manager, ABB.; Mr. Parag Wani, Technology and Design Head, Crompton Greaves.; Dr. B.N. Jagtap, HOD, Atomic and Molecular Physics, BARC.

Management Development Programmes through Continuing Education and Quality Improvement Programme, IIT Bombay

Sr. No.	Title of the programme	Dates
1	Advanced Certificate Program in Business Analytics, a distance learning programme conducted through Hughes platform.	October 2011 - September 2012
2	CEP on Leadership Development for ACG Worldwide	June - December 2012
3	Nineth Batch of Executive Programme in Management	July 2012 - April 2013
4	Offered the following module to the participants of CEP on Strategic Leadership from ACG group	November 6, 2012
5	Designed and coordinated a five-day Continuing Education Programme [CEP] on Strategies for Organizations Growth for the senior executives	January 21- 25, 2013
6	Offered a session in the CEP conducted for the faculty of ICT, Mumbai on Institution Building: What Can ICT Learn from IIM Ahmedabad?	February 1, 2013
7	Organised a workshop for the students and faculty of SJMSOM on Learning What is Not Taught	February 2-3 & 16, 2013
8	CEP Institution Building through Appreciative Mindset for Institute of Chemical Technology, Matunga, Mumbai	February 2013

Extension Activities

Momaya K. S.

Evolving cooperation between IIT Bombay, SJMSOM and Hitotsubashi University, Institute of Innovation Research, Tokyo, Japan. In Phase I, initiated people exchanges to discuss areas of shared interest.

Collabrative Practicum (CP)

Developed, implemented and improved processes for this high credit-large numbers (21 credits, 116 students) unique element of the new M.Mgt. curricula.

Organized and coordinated several seminars by experts from India and abroad (e.g. USA, Japan) during the last two years.

Ghosh, A.

Chaired a committee at SJMSOM, for reviewing the proposed performance measurement system by IITB.

Was the Faculty Coordinator from SJMSOM for the TechConnect, part of Techfest 2013

Was the member of the panel constituted by the Director for the paper setting and evaluation of performance in written test in respect of the candidates called for Test/Interview for the post of Assistant Registrar, on January 15-16, 2013.

Visitors to the Department

Dr. Takahiro Sato, Professor, Research Institute for Economics and Business Administration (RIEB), Kobe

University, delivered a lecture on The Effect of corruption on the manufacturing sectors in India, February 12, 2013.

Dr. Jagdish N. Sheth, Charles H. Kellstadt Professor of Marketing, Emory University, delivered lecture on Impact of Emerging Markets on Innovation, January 17, 2012.

Dr. Debasish N. Mallick, Opus College of Business, University of St. Thomas, delivered a lecture on A Contingency Approach to Managing New Product Development, January 17, 2012.

Dr. Ajitabh Ambastha, Dy. VP., Tata Capital, delivered lecture on Building & Sustaining Org. Competitiveness, September 29, 2012.

Dr. C. V. Natraj, Technical Advisor to the Society for Innovation and Development, IISc, Bangalore, delivered a lecture on Entrepreneurship and Innovation, June 13, 2012.

Conferences/Symposia/ Workshops/ Seminars (participated/Papers Presented)

Mishra, T.

Presented a paper Assessment of Urban Sustainability index- A Case Study of Mumbai, *3rd International conference of Urban Biodiversity and Design*, held during October 8 - 12, 2012, IIT Bombay.

Presented a paper Characterizing energy poverty: Implications for energy access policies, *8th Biennial International Workshop* held during October 25-27, 2012 at IGIDR, Mumbai, India.

Presented a paper Effectiveness and Sustainability of Water Supply: An Empirical Analysis, *Third annual international sustainability conference* during 6-8 March, 2013 at IIM Shillong, India.

Ghosh, A.

Attended the *48th National Management Convention of All India Management Association* held in Mumbai on September 25-26, 2012.

Ananthakumar, U.

Presented a paper Price discovery in Commodity Futures Markets: An Integrated Framework, *3rd International Conference on Managing Inclusive Growth: The bottom-up Approach for Harmonious Development* held at IBA, Greater Noida, March 2013.

Mukherjee, I.

Presented a paper A Hybrid GA-based Ant Colony Strategy for Continuous Correlated Multiple Response

Optimization Problem in the *IEEE Colloquium on Humanities, Science & Engineering Research*, Malaysia, December 2012.

Presented a paper Multiple Response Optimization using Hybrid Ant Colony Strategy, *7th Scientific Conference Economy and Efficiency contemporary solutions in logistics and production*, Poznan, Poland, November 2012, 1st Plenary Lecture.

Narang, H. K. , Mahapatra, M. M. , Jha, P. K. and Mukherjee, I.

“Modelling and predicting the effects of SAW process parameters on weldment characteristics and shape profiles, Proceedings of the Institution of Mechanical Engineers, Part B, Journal of Engineering Manufacture, Accepted, 2012

Rao, S.N. and Dani Hemal

“Acquisitions: Analysis of Stock Market Performance, *International Conference on Finance and Banking*, held on December 13-15, 2012 at IMI Delhi. The Conference was jointly organized by International Management Institute (IMI) Delhi and ESCP Europe.

Das, D. and Dutta, P.

Paper presented: A Simulation Study of Bullwhip Effect in a Closed-Loop Supply Chain with Fuzzy Demand under Possibility Constraints, *International Conference on Fuzzy Systems and Neural Computing*, held during April 25-26, 2012, at Paris, France.

Nagare, M. and Dutta, P.

Paper presented: A fuzzy-stochastic inventory model without backorder under imprecise customer demand, *International Conference on Operations Research and Enterprise Systems*, held during February 16-18, 2013 at Barcelona, Spain.

Gharote, M., Patil, R.J., Lodha, S.

Presented a paper Trainees assignment problem in Information Technology (IT) service organizations, *International Conference on Applied Operational Research*, held during July 25-27, 2012, at Bangkok, Thailand.

Patil, R.J., Shah, J.

Presented a paper Optimal Dynamic Sales and Production Plans for Product Innovations in the Presence of Scarcity Effects, *Nirma International Conference on Management*, held during January 9-11, 2013, at Nirma Institute of Management, Ahmedabad.

Patil, R.J., Tiwari, D., Shah, J.

Presented a paper A Two Period Sequential Unreliable Newsboy Problem, *International Conference on Trade, Markets and Sustainability*, held during February 22-23, 2013, at Symbiosis Institute of International Business, Pune.

Arakal Jeevan J. and Sharma, D.

Presented a Paper Creating Market Access through Producer Organisations- Understanding Issues Affecting Sustainable Marketing Collaboration from a Small & Marginal Producer Perspective, At *37th Conference of the Macromarketing Society*, June 13-16, 2012, Berlin.

Rao, Subir S. and Adil, G. K.

Class based storage with exact S-shaped traversal routing in low-level picker-to-part systems”, *International Journal of Production Research* (Accepted), 2013.

Rao, Subir S. and Adil, G. K.

Optimal class boundaries, number of aisles and pick list size for low-level order picking systems, *IIE Transactions* (Accepted), 2013.

Jain, B. C., Adil, G. K., and Ananthakumar, Usha

An instrument to measure factors of strategic manufacturing effectiveness based on Hayes and Wheelwrights model “”, *Journal of Manufacturing Technology Management* (Accepted), 2012.

Arora, S., Sharma, D. and Kalro, A.

“An Inquiry into a Brand Name fit, *the Doctoral Colloquium at the Indian Institute of Management, Ahmedabad*, held during January 7-8, 2012 at IIM Ahmedabad.

Arora, S. Kalro, A. and Sharma, D.

Presented a paper Brand Name Fit using Formant Analysis, *the 6th Great Lakes-NASMEI International Marketing Conference*, held during December 29-30, 2012 at the Great Lakes Institute of Management, Chennai.

Kalro, A., Sivakumaran, B. and Marathe, R.R.

Presented a paper The gloves are coming off! To use direct/indirect comparative ads: Depends on the comparison strategy *the Asia Pacific Association of Consumer Research Conference*, held during July 6-8, 2012 at Queenstown, New Zealand.

Conferences/Symposia/Workshops/Seminars (Coordinated/Chaired by Faculty)

Mukherjee, I.

Chaired a session in the *International IEEE Colloquium on Humanities, Science & Engineering Research*, held during December 2012, at Kota Kinabalu, Malaysia.

Chaired a session in the *7th Scientific Conference on Economy and Efficiency contemporary solutions in logistics and production*, held during November 2012, at Poznan, Poland.

Dutta, P.

Chaired the session on Methodologies and Technologies, *International Conference on Operations Research and Enterprise Systems*, held during February 16-18, 2013 at Barcelona, Spain.

Chaired the session on Fuzzy Systems and Neural Computing, *International Conference on Fuzzy Systems and Neural Computing*, held during April 25-26, 2012 at Paris, France.

Invited Lectures

Rao, S.N.

Delivered an invited lecture on Valuation for Mergers and Acquisitions, at IIM Shillong and on Behavioral Finance, at T A Pai Management Institute, Manipal.

Momaya, K.S.

Delivered an invited lecture on Evaluating Competitiveness: Concepts and Tools for policy decisions, at Ministry of Commerce, New Delhi, on May 18, 2012

Delivered an invited lecture on Export Competitiveness: Learning from Japan, *Export Competitiveness of Gujarat Conclave*, at Gandhinagar, on January 9, 2013.

Delivered an invited lecture on Competitiveness in Context of Accelerating Industrial Engineering, at NIT, Jalandhar, on January 14, 2013.

Delivered an invited lecture on Asia and Innovation: Perspective from India, at Institute of Innovation Research, Tokyo, on December 14, 2012

Pandey A.

Delivered an invited lecture on Demystifying Research at the Trainers Forum Annual LearnFest, Mumbai, in April 2012.

Delivered an invited lecture on Leading Change in Holistic Way at MTHR Global and BSE Institute, Mumbai, on July 20, 2012.

Ghosh, A.

Was invited to chair and participate in a Panel Discussion on Organic, BCI & Fair Trade in Cotton Branding & Retailing” at the International Conference on the theme “Back to Glory Challenges Facing Indian Cotton” held on April 9-10, 2012, at IIM Ahmedabad.

Significant Awards/ Distinctions

Mukherjee, I.

Listed in Marquis *Who's Who in the World*, 2012 (30th Pearl Anniversary Edition)

Seconded by Government of India to teach a course (Inventory & Logistic Management) to the School of Industrial & Systems Engineering, AIT Bangkok in January 2013

Momaya, K. S.

Member, Board of Advisors, National Competitiveness Research, Korea, 2011-12

Editor, International Journal of Global Business and Competitiveness (IJGBC)

Dutta, P.

Swiss Government Fellowship by Swiss Federal Commission for the Academic Year 2012-2013.

Best Merit Paper Award, ICOR-2012, IMECS, March 14-16, Hong Kong.

Sonar, R.M.

Chief Editor, Computer Society of India Communications (CSI-C)

Membership of Scientific Societies/Bodies/ Organisations

Momaya, K. S.

Member of Academy of Management

Life Member of Global Institute of Flexible Systems Management

Honorary Work

Ananthakumar, U.

Reviewed paper for *International Journal of Operations and Production Management*, July 2012

Rao, S.N.

Examiner for Ph D thesis (IIT Kanpur)

Momaya, K.S.

Reviewed papers for GLOGIFT12

Ghosh, A.

Offered a half day interactive session on The concept of design management and role of innovation for success in a competitive business environment for the first year students of Post-Graduate Programme in Strategic Design Management at NID, Gandhinagar campus on September 8, 2012

Acted as an External referee for evaluating Fellow (Doctoral) Thesis titled A study of medical technology adoption by tertiary care hospitals submitted by Mr. Janardan Vaidyanathan, Fellow student of NITIE, Mumbai, The thesis was defended on September 21, 2012.

Was an external member of the Thesis Examination Committee of a thesis submitted by Mr. Sanjay Dhir of IIM Lucknow in the area of Strategic Management.

Pandey, A.

Reviewed papers for Journal of Management, Spirituality and Religion, Springer

Bapat, V.

Coordinator for the Open Programmes, In House Programmes, Skill Enhancement Programme on Project Management for Department of Atomic Energy, GOI.

Faculty Members and their Specializations

1. Anand Kusre

Management of New Ventures

2. Anand Patwardhan

Vulnerability and adaptation to global change, Technology policy, Economics and regulation of information and communication technology

3. Arti Kalro

Marketing Management, Communication and Presentation Skills

4. Ashish Pandey

Organization Development, Organization Behavior (Macro)

5. Atanu Ghosh

Strategic management, Services Marketing, Relationship Marketing, Supply Chain Management Product Launch and Brand Building

6. Dinesh Sharma

Marketing Strategy, Market Research, Sales & Distribution management

7. Gajendra K. Adil

Operations Management and Decisions Sciences

8. Indrajit Mukherjee

Quality Management, Operations Management, Applied Operations Research.

9. Karuna Jain

Operations Management, Technology and Innovation Management, Supply Chain Management, Project Management, Intellectual Property Management

10. Kirankumar Momaya

Competitiveness, Strategic / Technology Management

11. Niranjana Tarikere

Operations Management

12. Pankaj Dutta

Operations Research, Retail Inventory & Supply Chain Modeling, Project Management, Mathematical Finance, Business Dynamics Modeling & Simulation, Optimization

13. Rahul Patil

Operations Management,

14. Rajendra Sonar

Intelligent systems, hybrid Intelligent systems, business intelligence using knowledge-based systems, N=1 Analytics

15. Shivganesh Bhargava

Prediction of Performance, Organizational Wrongdoing, Reward Preference in Indian Organizations, Managing of Human Resources in Technical Institutes

16. Sapar Narayan Rao

Corporate finance, Investment Management, Valuation, Mergers & Acquisitions, Capital Markets

17. S.V.D. Nageswara Rao

Corporate Finance and Capital Markets

18. Shishir Kumar Jha

Copyright, Digital Economy, International Business

19. Trupti Mishra

Economics: Economics of Pollution and Climate change, Valuation of Water Resources

20. Usha Ananthakumar

Applied Statistics, Applied Multivariate Analysis.

21. Varadraj Bapat

Financial Reporting, Managerial Accounting, Financial Inclusion

22. Vinish Kathuria

Industrial organization, Environmental management, Regulatory economics

Distinguished Guest Professors**1. Dr. Jahar Saha**

Operations Research

2. Prof. Jaitirth (Jerry) Rao

International Business

Adjunct Faculty**1. Dr. Kamal Sharma**

Managerial Effectiveness Skills, Technology Forecasting and Assessment

2. Dr. Raj Hirwani

Patent Analysis, Intellectual Property Rights

3. Dr. Atul Kanyalkar

Purchase and Supply Chain Management

4. Mr. Sanjeev Chachondia

Industrial Marketing



Centre for Environmental Science & Engineering

Introduction

The Centre for Environmental Science and Engineering (CESE) was established in 1985. The Centre has a core group of nine faculty members (eight regular and one Emeritus) with multi-disciplinary background and diversifying research interests. In addition to the above nine faculty members, two visiting faculty also joined CESE. Apart from this, the professionals from consultancies and government organizations visit the centre for delivering the lectures from time to time. Currently, the centre is expanding teaching and research activities

Academic Programmes

Since 2010, the center offers a dual degree M.Sc. Ph.D. programme in addition to already existing M. Tech. and Ph.D. programmes. In addition to these three programmes, the centre is running a minor in Environmental Science and Engineering for undergraduates studying in other departments at IIT Bombay. In near future, a dual degree B. Tech.- M. Tech. programme will also be started. CESE also offers an Institute core course Environmental Studies: Science and Engineering to undergraduates and M. Sc. Ph. D. students. Besides, the centre runs several elective courses for sensitizing students across all disciplines towards the urgent need for protection and restoration of environment by adapting environment friendly life styles.

The centre currently offers M. Tech., Ph. D. and M.Sc.- Ph.D. programmes in Environmental Science and Engineering with a strong focus in teaching and research.

Degrees Awarded last year

M. Tech.	: 15
Ph. D.	: 2

R&D Activities

The on-going research activities of the Centre are focused towards addressing the priority areas (local and global) set by major national agencies like MHRD, CPCB, SPCB, MNRE, DBT, MoEF, CSIR, DST, AICTE. In addition, the Centre has already established strong links and collaborations with leading industries, academic institutions and national/international agencies by conducting sponsored research and offering consultancy and technical services. The research activities of CESE are supported by excellent experimental and computational facilities, competent and dedicated technical staff and high quality students. The centre is also actively engaged in organizing workshops and CEP courses for benefiting the professional from other academic institutions, industries and governmental sectors.

Three new projects have been awarded in 2012-2013. The details of the projects are given below.

Sponsored Research Projects

Sponsored Research Projects :

New	: 3
Ongoing	: 10
Completed	: 4
Faculty Involved	: 8

List of sponsored research projects is as follows:

Name of the Project	Sponsored by	Status
“Improvement in Biodegradability of Cresylic Spent Caustic Waste Stream (Generated From Petroleum Refinery) Using Catalytic Wet Oxidation in Combination with Adsorption Process	CSIR, New Delhi	New
“Evaluation of Trophic State of Lakes in Thane City	Thane Municipal Corporation	New
“Study of Particles Released from Rural Cooking Devices	Washington University in St. Louis	New
“Characterization and Treatment of Wastewater from Large /Small Scale Biomass Gasification Systems	IIT Bombay, under ACCESS (MAGEEP)	Ongoing
“Biological Treatment of Biomass Gasifier Wastewater Using Algal-Bacterial System in Rotating Biological Contactor	DBT, New Delhi	Ongoing
“Environmental Quality and Pollution: Ganga River Basin Management Plan	MoEF, New Delhi	Ongoing
“Preventive Technological Interventions for Improving Environmental Attributes of Ship Recycling in Alang <i>i.e. Green Alang Initiative</i>	Gujarat Maritime Board, Government of Gujarat, Gandhinagar	Ongoing
“Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India	European Commission, Brussels, Belgium	Ongoing
“Multivariate Flood Frequency Analysis: Nonparametric Approach	Department of Science and Technology, Government of India, New Delhi	Ongoing
“Continuous Arsenic Removal Using Zero-valent Iron Filter (ARUZIF) from Drinking Water	Department of Science & Technology	Ongoing
“Design and Development of Vacuum Pyrolysis Plant to Process Various Agricultural and Agro-Industrial Biomass to Demonstrate Its Technical and Economical Feasibility	Ministry of New and Renewable Energy	Ongoing
“Sustainable Technology for Removal of Arsenic from drinking water: Principles and performance of Electrocoagulation	McDonnell Academy, St. Louis, USA	Ongoing
“Development of continuous mode arsenic removal technology for drinking water based on indigenous zerovalent iron	Department of Science & Technology.	Ongoing
“Climate Change Research: Atmospheric Aerosol Characterization using Multi-Sensor Data from Satellite and Ground Observations	Lloyd Register Engineering Education and Research Trust	Completed
“Wastewater Minimization in Batch Plants Through On-Site Treatment, Reuse and Recycle Processes	DST, New Delhi.	Completed
“Energy Recovery Options From Municipal Solid Waste and Control/Treatment Measures of Carbon Emissions From Landfills	DST, New Delhi.	Completed
“Simultaneous Nitrification/ Denitrification of Fertilizer Wastewater Using Sequencing Batch Bioreactor with Mixed Biomass Containing <i>Thiosphaera pantotropha</i>	DBT, New Delhi.	Completed

Consultancy Projects:

A total of on consultancy jobs were undertaken by 3 faculty members. Total income generated from consultancy work was Rs. 1,13,38,371/-

Extension Activities

Dikshit, A.K.

Chief Guest for Civil Engineering Forum at Bapuji Institute of Engineering and Technology, Davangere, September 2, 2012.

Chief Guest for Institute Welcome Function for Fresh UG Students at Bapuji Institute of Engineering and Technology, Davangere, September 3, 2012.

Chief Guest for the National Seminar on Bioseparation and Downstream Processing at Thadomal Shahani Engineering College, Bandra, Mumbai, October 23, 2012.

Distillery Wastewater Management at Continuing Education Programme on Industrial Wastewater Management organized by CESE, IIT Bombay on April 24, 2012.

Asolekar, S.R.

1st meeting of Powai Lake Rejuvenation Committee set-up by the MCGM and IIT Bombay held on March 25, 2013 in Victor Menezes Convention Centre (VMCC), IIT Bombay.

Member of Syllabus Review Committee of Civil and Environmental Engineering Department, IIT Patna

“World Environment Day Celebration and Book Release Function held on June 5, 2012, in Jal Vihar, Ground Floor Conference Hall, Indian Institute of Technology Bombay

Garg, A., Mukherji, S.

Training programme on Industrial Wastewater Management April 24-25, 2012, CESE, IIT Bombay.

Karmakar, S.

CEP and QIP course titled as: Advanced Hydrologic Modeling for Climate Change Impacts Assessment (18 22 February 2013), venue IIT Bombay, Conveners: Subhankar Karmakar (CESE) and Subimal Ghosh (Civil Engineering)

Visitors to the Department

Prof. Yoram Krozer, University Twente CSTM in Enschede and Sustainable Innovations Academy (SIA) in Amsterdam, Netherlands visited CESE to deliver a

set of lectures on “Toward Sustainable Innovations” during February 25 - March 1, 2013 in CESE Seminar hall.

Conferences/ Symposia/ Workshops/ Seminars (participated/Papers Presented)

Dikshit, A.K.

Delivered keynote on Membrane Filtration and Wastewater Treatment in the *National Seminar on Bioseparation and Downstream Processing* organised by Thadomal Shahani Engineering College, Bandra, Mumbai, October 23, 2012.

Asolekar S.R.

Workshop on Coastal, River Zone Management, Regulations and Development held during January 10-11, 2013 in Victor Menezes Convention Centre (VMCC), IIT Bombay; jointly organized by CESE, IIT Bombay, NEERIs Mumbai Zonal Centre and Mahad Manufacturers Association.

Workshop on Sustainable Innovations, Eco-efficiency in Business Decisions, Greening of Supply Chain and CSR held on February 27, 2013 in CESE, IIT Bombay.

Invited by UN CEO Water Mandate to speak at the *CEO Water Mandates Multi-Stakeholder Working International Conference* on Corporate Water Stewardship and the Post-2015 Development Agenda during March 5-7, 2013 in Mumbai.

Invited by Central Advisory Board-WaterEX World Expo 2013, Mumbai, to speak on the topic “Managing Ganga and Other Water Bodies” at the *International Exhibition and Conference Waterex World Expo 2013* held during January 15-16, 2013 in Bombay Convention and Exhibition Centre, Goregoan (East), Mumbai

Invited by Naushad Ali Sarovar Samvardhini (NASS) to speak on the topic “Principles of Preventive Environmental Management for Aquatic System” at the *International Conference on “Urban Lakes, Ecology, Rejuvenation and Technology and Economics* held in the Shipping Corporation of India, Powai, Mumbai during September 7-8, 2012.

Apte, R., and Dikshit, A.K.

“Fly Ash Reuse and Utilization Options, *NTPC-NETRA Workshop on Coal to Energy for Sustainable Development*, Power Management Institute, Noida, January 10-11, 2013.

Kumar, D., Prasad, P., Chaturvedi, M. K. M., and Asolekar, S. R.

“Typologies of Failures of Constructed Wetlands and the way forward” presented in the National

Conference on *Water Quality Management* organized by Department of Civil Engineering, Malaviya National Institute of Technology Jaipur, during December 20-22, 2012.

Ranjan, S., Kumar, D., and Asolekar, S. R.

“Reflection of Sewage Treatment Technologies in the Context of Inlet and Outlet Quality Parameters” presented in the National Conference on *Water Quality Management* organized by Department of Civil Engineering, Malaviya National Institute of Technology Jaipur, during December 20-22, 2012.

Prasad, P., Kumar, D., and Asolekar, S. R.

“Significance of Primary Treatment in Enhancement of Constructed Wetlands” presented in the National Conference on *Water Quality Management* organized by Department of Civil Engineering, Malaviya National Institute of Technology Jaipur, during December 20-22, 2012.

Kumar, A., Kumar, D., and Asolekar, S. R.

“Kinetics of Waste Treatment in Constructed Wetlands” presented in the National Conference on *Water Quality Management* organized by Department of Civil Engineering, Malaviya National Institute of Technology Jaipur, during December 20-22, 2012.

Srivastava, A., Kumar, D., and Asolekar, S. R.

“Tertiary Treatment of Post-Constructed Wetlands, Aimed at Reuse” presented in the National Conference on *Water Quality Management* organized by Department of Civil Engineering, Malaviya National Institute of Technology Jaipur, during December 20-22, 2012.

Hiremath, A. M., and Asolekar, S. R.

“Ballast Water Management Current Status and Future Challenges: An Engineering Aspect” presented in the National Conference on *Water Quality Management* organized by Department of Civil Engineering, Malaviya National Institute of Technology Jaipur, during December 20-22, 2012.

Deodhar, N.M., Patil R.S., and Sethi, V.

“Energy Conscious Air Conditioning Designs for Modern Retail *National Conference ACRECONF*, February 5-6, 2013, ISHRAE, New Delhi.

Mukherji S.

Presented a paper *Water Disinfection using Free and Immobilized Silver Nanoparticles and Elucidation of Mechanism of Antibacterial Activity* *Workshop on Nanoparticles: Chemistry & Toxicity* held on March 15, 2013, IIT Delhi, New Delhi, India.

Yadav, B.R., and Garg, A.

The student presented a paper *Ferulic Acid Degradation by Wet Oxidation Process in the International Conference on Global scenario in*

environment and energy (ICGSEE 2013) held on March 14-16, 2013, MANIT Bhopal, Bhopal.

Gupta, A., and Garg, A.

The student presented a paper *Utilization of Sewage Sludge Derived Adsorbent in Wastewater Treatment in International Conference on Advances in Chemical Engineering (ACE 2013)* held on February 22-24, 2013, IIT Roorkee, Roorkee.

Garg, A.

Delivered invited talk on Sustainable Water Management in Industries in *Indo-French Seminar on Recent Advances and Innovations for Sustainable Water Management* held on December 3-6, 2012 at IIT Delhi, Delhi.

Delivered invited talk on Mechanical Biological Treatment for MSW, *1st International Brainstorming Workshop on Waste to Energy in India* held on August 25, 2012, Mumbai

Deodhar, N.M., Patil R.S., and Sethi V.

Participated in the National Conference on ACRECONF held on February 5-6, 2013 at ISHRAE, New Delhi.

“IAQ and Energy : A Nexus, *8th National Conference ACR Trendz*, October 5-6, 2012, ISHRAE Pune

Bherwani, H.B., Patil, R.S., Kumar R.

“Impact of Urbanization on Regional and Local Climate, *International Conference on Climate Change and Humanity (ICCCCH)*, Rome, Italy, February 24-25, 2013, Full paper accepted.

Lokeshappa, B., Dikshit, A.K.

“Metals in Cement Fly Ash Mixtures, *4th International Symposium on Energy and Environmental*, IIT Bombay, India, December 9-12, 2012.

Deval, Animesh, and Dikshit, A.K.

Construction, Working and Standardization of Microbial Fuel Cell, *4th International Conference on Environment and Sustainable Development (ICESD2013)*, Dubai, January 19-20, 2013.

Starkl M., Amerasinghe. P., Essl L., Jampani M., Kumar D., Asolekar S. R.

“Potential of Natural Technologies for Decentralized Wastewater Management in India, Decentralized Wastewater Management, *International Water Association*, November 20-22, 2012, Nagpur.

Kalbar, P. P., Karmakar, S., and Asolekar, S. R.

“Estimation of Environmental Footprint of Municipal Wastewater Treatment in India: Life Cycle Approach *Proceedings of International Conference on Environmental Science and Technology*, Chennai, India, March 10-11, 2012.

Kalbar, P. P., Karmakar, S., and Asolekar, S. R.

“Selection of Appropriate Technology for Wastewater Treatment: Incorporation of Sustainability Criteria and Experts’ Opinion in a Multiple Attribute Decision Making Framework Proceedings of *International Symposium on a Sustainable Future (ISSF-2012)*, IGIDR, Mumbai, India, January 19-21, 2012.

Vittal, H., Karmakar, S., and Ghosh, S.

“Detection of Spatio-temporal variations of rainfall and temperature extremes over India”, *American Geophysical Union (AGU) meet*, San-Francisco, USA, December 2012.

Musthafa, O.M., Karmakar, S. and Harikumar, P.S.

“Evaluation of River Water Quality Monitoring Network: A Multi-variate Statistical Approach to Kabbini River Catchment (India), *IWA World Water Congress and Exhibition 2012*, International Water Association (IWA), Busan, Korea, September 2012.

Mishra, H., Rathod, M., Karmakar, S., Singh, D.N., and Kumar, R.

“Assessment of Human Health Risk to MSW Landfill Leachate Contamination, *Environmental Health 2013 Science & Policy to Protect Future Generations*, Elsevier, Boston, USA, March 2013.

Karmakar, S., Kumar, P., and Varekar, V.

“Multivariate Flood Frequency Analysis: A Comparative Study of Nonparametric, Parametric and Copula-based Approaches. *AOGS AGU (WPGM) Joint Assembly*, Singapore, August 2012.

Varekar, V., Karmakar, S., and Jha, R.

“Seasonal Evaluation and Redesign of Surface Water Quality Monitoring Network: An Application to Kali River Basin, India. *AOGS AGU (WPGM) Joint Assembly*, Singapore, August 2012.

Singhal, D., and Garg, A.

“Prediction of Environmental Impacts from Using Municipal Solid Waste Derived Material as Co-fuel in Cement Kiln. Proceedings of *The Twenty-Eighth International Conference on Solid Waste Technology and Management*. Philadelphia, PA, USA, March 2013.

Bherwani, H.B., Patil, R.S., and Kumar R.

Participated in the *2nd National Conference on Environment and Biodiversity (EBI) in India, December 29-30, 2012, New Delhi*.

Adsul P., Patil R.S., Kumar R.

Participated in *2nd National Conference on Environment and Biodiversity (EBI) in India, December 29-30, 2012, New Delhi*.

Madav, V., Bhusnoor, S.S., Bhandarkar, U.V., and Sethi V.

“Hot Gas clean up studies in a small scale low temperature down draft Gasifier, Paper published in

conference proceedings of *5th International Freiberg conference on IGCC & XtL Technologies*, Leipzig, Germany May 21- 24, 2012.

Sharma, R., Deodhar, N.M., Patil, R.S., Sethi, V.

“Ventilation Design for Indoor Air Quality Management as per Indian Climatic Conditions *10th International Conference*, July 8-12, 2012, ISIAQ, Brisbane

Menon R., Sethi V., and Husar, R.B.

An iterative fitting algorithm for matching aerosol size distributions to spectral extinction data”, *Visibility and Air pollution, Air & Waste Management Association, Whitefish, MT, September 24-28, 2012*.

“Multi-sensor view of atmospheric aerosol patterns over India”, Poster presented at McDonnell International Scholars Academy *4th International Symposium on Energy & Environment: Abundant Clean Cost-effective Energy Systems for Sustainability (ACCESS)* held in Mumbai, during December 9 - 12, 2012.

Husar, R.B., Hoijarvi, K., Westphal, D., Scheffe, R., Keating, T., Poirot, R., DuBois, D.W., Bleiweiss, M.P., Eberhard, W.L., Menon, R., Sethi, V., and Deshpande, A.

“Applications of satellite observations to aerosol analyses and forecasting using NAAPS model and the DataFed distributed data system”, *Fall meeting, American Geophysical Union*, San Francisco, December 3-7, 2012.

Agnihotri, S., Mukherji, S., and Mukherji, S.

Presented a paper Antimicrobial Activity of Silver Nanoparticles Immobilized on a Surface Functionalized SU-8 Polymer, *3rd International Conference on Multifunctional Hybrid and Nanomaterials*, held during March 3-7, 2013, at Sorrento, Italy.

Presented a paper Development of Nanoparticle based Systems for Disinfection of Water, *3rd MRS Trilateral Workshop on Nanotechnology Applications in Energy, Water and Healthcare*, held during November 19-21, 2012 at IIT Bombay, Mumbai, India.

Mukherji, S., Chavan, A., and Jeswani, H.

Presented a paper Algal Bacterial Biofilm in Rotating Biological Contactor for Removal of Organic Contaminants from Wastewater: Advantages and Challenges *International Conference on Algal Biorefinery: A Potential Source of Food, Feed, Biochemicals, Biofuels and Biofertilizers (ICAB 2012)*, held during January 10-12, 2013 at IIT Kharagpur, Kharagpur, India.

Kargupta, W., Ganesh, A., Mukherji, S.

Presented a paper Assessment of Carbon Sequestration Potential of Microalgae, *Chlorella*

pyrenoidosa and *Scenedesmus abundans* in a Tubular Batch Photobioreactor and Effect of Gas Flow Rate
International Conference on Algal Biorefinery: A Potential Source of Food, Feed, Biochemicals, Biofuels and Biofertilizers (ICAB 2012), held during January 10-12, 2013 at IIT Kharagpur, Kharagpur, India.

Mukherji, S., Sethi, V. Mahajani, S., Giammar D., and Fortner, J.

Presented a paper Characterization and Treatment of Wastewater from Large/Small Scale Biomass Gasification Systems 4th *International Symposium on Energy and Environment: Abundant, Clean, Cost Effective Energy Systems for Sustainability*, MAGEEP-2012 held during December 9-12, 2012 at Mumbai, India.

Madhav, V., Panchratna, D. Jeswani, H., Sethi, V., Mahajani, S., Giammar D., Fortner, J., and Mukherji, S.

Presented a paper Gas Cleaning and Wastewater Treatment for Small Scale Gasification Systems 4th *International Symposium on Energy and Environment: Abundant, Clean, Cost Effective Energy Systems for Sustainability*, MAGEEP-2012 held during December 9-12, 2012 at Mumbai, India.

Mukherji, S.

Presented a paper Advances in Bio-Transformative Processes and Toxicity Evaluation Techniques for Complex Organic Pollutants", *Second International Conference on Drilling Technology 2012 (ICDT-2012) and First National Symposium on Petroleum Science and Engineering 2012 (NSPSE-2012)* held during December 6-8, 2012, at Department of Ocean Engineering, IIT Madras, Chennai, India.

Mukherji, S., and Mohanty, S.

Presented a paper Bioavailability Enhancement During Uptake of Multicomponent Non-Aqueous Phase Liquids in Presence of Rhamnolipids, *SETAC-Asia Pacific 2012 Learning from History and Applying Advancing Science to Build a Safer and Sustainable Environment* held during September 24-27, 2012, at Kumamoto, Japan.

Jasmine, J., and Mukherji, S.

Presented a paper Characterization of Oily Sludge from an Oil Refinery in India and Biodegradability Assessment, *SETAC-Asia Pacific 2012 Learning from History and Applying Advancing Science to Build a Safer and Sustainable Environment* held during September 24-27, 2012, at Kumamoto, Japan.

Presented a paper Treatment of simulated biomass gasification wastewater using an Algal-Bacterial System," *Ecotechnologies for Wastewater Treatment*, held during June 25-27, 2012, Santiago de Compostela, Spain.

Singhal, D., and Garg, A.

Presented a paper Prediction of Environmental Impacts from Using Municipal Solid Waste Derived Material as Co-fuel in Cement Kiln in *The Twenty-Eighth International Conference on Solid Waste Technology and Management* held on March 10-13, 2013, Philadelphia, PA, USA.

Phatak, P., Gupta, S.K., Garg, A., and Mukherji, S.

The student presented a paper Impact of Cycle Time on Nitrogen Removal in SBR for Simulated Fertilizer Industry Wastewater in *Nutrient Removal and Recovery 2012: Trends in NRR* organized by IWA, UK, held on September 23-25, 2012 in Harbin, China.

Adekola, O., Stamp, J. D., Majozi, T., Garg, A., and Bandyopadhyay, S.

One of the co-authors presented the paper A Unified Approach for the Optimization of Energy and Water in Multipurpose Batch Plants in the *11th International Symposium on Process Systems Engineering* held on July 15-19, 2012, Singapore.

Bherwani, H.B., Patil, R.S., Kumar R.

Participated in *International Conference on Bioenergy, Environment and Sustainable Technologies (BEST)*, Thiruvannamalai, January 27-30, 2013.

Sharma, R., Deodhar, N.M., Patil R.S., Sethi V.

Participated in *10th International Healthy Buildings Conference 2012*, Brisbane July 8-12, 2012.

Conferences/ Symposia/ Workshops/ Seminars (Coordinated/Chaired by Faculty)

Dikshit, A.K.

Chairman for Awareness Initiative on Energy, Environment and Ecology (AIEEE 2013) organized by Environmental Science and Engineering Association, IIT Bombay, March 16, 2013.

Coordinator for the Technical session on the Energy-Water Nexus in the MAGEEP2012 4th International Symposium on Energy and Environment held at Bombay, December 9-12, 2012.

Suresh, A.K., and Sethi, V.

Institute Symposium MAGEEP-2012, December 9-12, 2012.

Sethi, V., Patil, R.S., Kumar, R. and Deshpande, A.

DST-SERB School on Air Quality Management, IIT Bombay, December 6-7, 2012.

Workshop on Air Quality Modelling and Management for Urban and Industrial Areas in India, IIT Bombay,

May 10-12, 2012, (Funded by MPCB, JSW and Thermo Fisher)

Invited Lectures

Dikshit, A.K.

Delivered keynote on We Civil Engineers Build the Society at Bapuji Institute of Engineering and Technology, Davangere, September 2, 2012.

Asolekar S.R.

Invited by Centre for Science and Environment (CSE) to speak on the topic “Wastewater Treatment and Reuse / Recycle - Challenges and Opportunities in Urban Areas” at the *Rajasthan State Workshop* jointly organized in partnership with Department of Urban Development, RUIFDCO and HMC RIPA and supported Ministry of Urban Development, Government of India, under CCBP JnNURM programme on “Urban Water conservation and reuse and recycle” held in Jaipur on February 7, 2013

Invited by MNIT Jaipur to deliver keynote address at the *National Conference on Water Quality Management* on “Principles of Environmental and Ecological Systems Management in the Context of Continuum and Discontinuities” during December 20-22, 2012 in Jaipur.

Invited by Lucknow Management Institute to deliver keynote speak on “Water Crisis: What is in it for a Common Person” at *SN Tripathi Memorial Lectures 2012* on “Climate Change, Water & Energy Crisis held in Indian Railways Institute for Transport Management” on August 23, 2012 in Lucknow.

Invited to speak in the *7th Ship Recycling Conference* on “Greening of ship recycling in India: Upgrading facilities in Alang” during June 19-20, 2012 in London, UK.

Invited to speak in the *4th Asia Ship Recycling and SNP Summit* held on “Green Ship Recycling” during July 3-4, 2012 in Shanghai, China.

Mukherji, S.

“Application of Microorganisms for Wastewater Treatment and Remediation, *Shodh - Inter Disciplinary Research Weekend* organized by Society for Promotion of Undergraduate Research (SPUR), held during November 3 - 4, 2012 at IIT Bombay, Mumbai India,

Karmakar, S.

Invited presentation in a Brain-storming session on Downscaling and Impact Assessment for River-basin Scale Studies, Vulnerability, Hazard and Risk to Extremes, *Indian National Committee on Climate*

Change (INCCC), Ministry of Water Resources (MoWR), New Delhi, October 19, 2012.

Invited presentation in one-day workshop on *Building climate resilient cities: Responding to the emerging water crisis*, Risk management, floods and climate change, Monash Sustainability Institute and TERI, New Delhi, January 30, 2013.

Garg, A.

“Environmental Regulations in India An Overview of Principles and Future Demands, *Scottish Contaminated Land Forum Meeting*, University of Strathclyde, Glasgow, UK, June 6, 2012.

Significant Awards/Distinctions

Dikshit, A.K.

Excellence in Ph.D. Research Award to Ph.D. student Sanjay S. Singh guided by Dikshit A.K.

Member, Editorial Advisory Board, *Journal of Environmental Science and Engineering*, (Publishers: NEERI, Nagpur, India)

Member, Editorial Board, *Journal of Environmental Science and Health, Part A* (Publishers: Taylor and Francis Group)

Member, Editorial Board, *Journal of Clean Technology and Environmental Policy* (Publishers: Springer Verlag)

Mukherji, S.

“IIT Bombay Research Paper Award, IRCC, IIT Bombay, September 2012.

Member, Editorial Board for International Journal *Applied Nanoscience*.

Garg, A.

Member, Advisory committee, An International Conference Chemical, Biological and Environmental Sciences held on 8-10 January 2013, Taipei, China.

Member, Organizing committee, 1st International Brainstorming Workshop on Waste to Energy in India held on 24 - 25 August 2012, Mumbai, India.

Honorary Work

Dikshit, A.K.

Reviewed papers for Journal of Environmental Engineering (ASCE); Bioresource Technology; Journal of Clean Technology and Environmental Policy; Waste Management; Environmental Modelling & Software; Journal of Environmental Engineering Science; Waste

Management and Research; Water Science and Technology during April 2012-March 2013.

Delivered talk on Sustainable Water Management for Industries at Training Course on Rain Water Harvesting & Storm Water Management course for ONGC engineers organised by civil Engineering Department, IIT Bombay on April 4, 2012.

Member, Advisory Committee for Bio-Medical Rules, Govt. of Maharashtra since 2009

Member, Academic Advisory Committee, Nirma University, Ahmedabad since 2010.

Member, Selection Committee for Director of Regional Centre for Urban Development, Lucknow University.

Member, Selection Committee for Scientists, CSIR, NCL Pune.

Visitors Nominee for Faculty Selection, Jawaharlal Nehru University, New Delhi, 2012-2015.

Member, Sub-Committee for Development of National Sustainable Habitat Parameters in the field of Storm Water Management constituted by the Carbon Credit Cell of the Ministry of Urban Development, Govt. of India since 2010.

Honorary Professor in the School of Civil Engineering, Faculty of Engineering, University of KwaZulu-Natal, Durban, South Africa.

Invited External Member to the Senate of the NIT Jamshedpur (Jharkhand).

Invitee Member on the Academic Board of the Government College of Engineering, Amravati, Maharashtra.

Asolekar, S.R.

Member of the Technical Expert Panel (TEP) for the World Bank aided Capacity Building for Industrial Pollution Management Project (CBIPMP).

Member of Project Review and Supervisory Group Constituted by Ministry of HRD and Government of India for Establishing E-Training Environment for Training Technical Teachers and Students.

Member of the Dahanu Taluka Environmental Protection Authority (since 1997) constituted by the Honorable Supreme Court of India.

Member of Steering Committee on Environment, Forests & Wildlife for the 12th Five Year Plan constituted by the Honorable Planning Commission of India (2012-2017).

Member of Expert Committee formed for Evaluation of Non Combustion Technologies Suitable for our Country for Remediation of Poly-Chlorinated Bi-Phenyls under the Post National Implementation Project Sponsored by GEF and UNIDCO.

Mukherji, S.

Reviewed a paper for the following Journals: National Journal *Indian Journal of Biotechnology*,; International Journal, *Journal of Food Science & Technology*,; International Journal, *Applied Biochemistry and Biotechnology*,; International Journal, *Reviews in Environmental Science and Biotechnology*,; International Journal, *Environmental Science and Technology*, during 2012.

Reviewed papers for International Journal, *Journal of Hazardous Materials*, July 2012, August 2012 and March 2013.

Reviewed a paper for International Conference *International Conference on Metallurgical Coatings and Thin Films*, August 2012.

Karmakar, S.

Reviewed a paper Journal of Indian Society of Hydraulics, May 2012

Reviewed paper for Journal of Environmental Management, Elsevier, June 2012

Reviewed paper for Journal of Environmental Management, Elsevier, September 2012

Reviewed paper for Indian Journal of Geo-Marine Sciences, CSIR-NISCAIR, September 2012

Reviewed paper for Water Resources Research, AGU, September 2012

Reviewed paper for Water Resources Research, AGU, November 2012

Reviewed paper for Computing in Civil Engg., ASCE, December 2012

Reviewed paper for Hydrology Research, February 2013

Member, Editorial Advisory Board, Journal of Disaster Advances, India.

Garg, A.

Reviewed paper for Indian Journal of Chemistry, September 2012.

Reviewed paper for Journal of Environmental Management, December 2012.

Reviewed paper for International Journal of Environment and Waste Management, December 2012.

Reviewed paper for Asian Journal of Water, Environment and Pollution, March 2013.

Reviewed two project proposals submitted to Knowledge Foundation, Sweden in October 2012.

Reviewed a project proposal submitted to DST, New Delhi in October 2012.

Evaluated Ph.D. thesis submitted to Guwahati University, Guwahati University, Guwahati in April 2012.

Evaluated M. Tech. (Research) thesis submitted to National Institute of Technology Rourkela in April 2012.

Patil, R.S.

Member, Atmospheric and Space Science Board of Studies Committee, Pune University April 19, 2012 for two years.

Nominated as a member of MAPAN (Monitoring Air Pollution Automatic Network) Project Monitoring Committee (PMC), IITM, Pune, March 2013, for five years.

Conference and Inauguration of Centre of Environmental Research and Training (CERT) Vashi, Navi Mumbai, June 16, 2012; Honoured for Contribution to Research in Air Pollution.

Member, Expert Committee for Promotion Interviews at BARC, Trombay; February 13 June 13, 2012.

Member, Expert Committee for Civil Engineering Faculty Selection, IIT Kanpur, March 12, 2013.

Examiner, MNIT, Jaipur Ph.D. Thesis of Ms. Parul Gupta, 2013.

Examiner, EAD, BARC, M.Tech. Thesis Dissertation Mr. Mahesh Tiwari, June 2012.

Examiner, Dept. of Space & Atmospheric Science, Pune University, Ph.D. Thesis of Mr. Sanjay D. More, September 2012.

Review of Projects, Ministry of Earth Sciences, Delhi, March 5, 2013.

Reviewer, Research projects, Department of Science & Technology, Atmospheric Sciences under SERC, since 2004.

Faculty Members and their Specializations

1. Anil K. Dikshit

Water and Wastewater Treatment Technologies; Urban Solid Waste Management; Environmental Systems Modelling and Optimization; Sustainable Environmental Management of Industries; Environmental Impact Assessment; GIS Applications for Environment.

2. Shyam R. Asolekar

Development and modelling of reactors for treatment of domestic sewage and industrial wastewaters for

pollution control and reuse Combination of tertiary treatment technologies (advanced solutions) with low cost natural treatment systems (ecological solutions) aimed at reuse of sewage and industrial effluents for: a) Rejuvenation of lakes (renewal of contaminated water bodies), (b) Applications in green buildings, green habitats (renewal of urban environment), (c) Development of strategies to minimize carbon footprint of an industry

Assessment of technologies aimed at development of appropriate and rational treatment strategy to achieve a given desirable application of reuse of treated effluent (Decision Support Tool based on life cycle approach and sustainability criteria)

Hazardous, solid, and biomedical wastes management including decontamination of soils and sediments (field assessments, reactor development and modelling)

Preventive environmental management and sustainable development incorporating waste minimization, cleaner and greener technologies, eco-industrial networking and corporate social responsibility

Application of remotely sensed data for monitoring and modelling of environmental systems; Environmental planning, policy and law

3. Virendra Sethi

Air Pollution Science and Engineering, Aerosol Transport Measurements, Aerosol Characterisation. Satellite Data Assisted Air Quality Management, Biomass Gasification Hot Gas Cleanup, Engineering Education.

4. Sumathi Suresh

Remediation of Chlorinated Organic Compounds (pesticides), Textile Dyes, Heavy Metals using Bimetallic Systems, Immobilized Metals and Zero-valent Metals

Microbiological Processes for Treatment of Industrial Pollutants (textile dyes, pulp and paper mill wastes, heavy metals, tannery wastes): Elucidation of the Mechanism of Pollutant Removal and Design of Bioreactors

Microbial Remediation of Metabolites Formed from Chemical and Biological Treatment of Chlorinated Pesticides in Soil and Water

Application of Biological Processes (whole cell and enzyme based) for Developing Cleaner Technologies (for example pulp biobleaching using microbial xylanases and ligninases)

Microbial Toxicity Testing Assays for Biomonitoring Pollutants and Industrial Wastewaters

Enzyme Catalyzed Bioremediation Reactions
(Characterization of active site, inhibition of enzyme activity, structure-function relationship in enzyme catalysis)

5. Sanjeev Chaudhari

Arsenic removal from water, Biological nutrient removal from wastewater, Application of Natural coagulants for water and Wastewater treatment, Treatment of textile wastewater by biological and physicochemical processes

6. Suparna Mukherji

Biodegradation and Bioremediation of Complex Organic Pollutants, Toxicity Evaluation of Complex Mixtures, Environmental Application of Nanomaterials, Sorption Phenomena, Sampling and Analysis of Bioaerosols

7. Subhankar Karmakar

Environmental and Water Resources Systems Engineering, Uncertainty Modeling, Disaster Risk and Vulnerability Assessment.

8. Anurag Garg

Catalytic wet oxidation; Biological treatment processes for wastewater treatment, Municipal Solid waste characterization and treatment, Energy from solid waste; Decision support modeling for solid waste management.

9. Rashmi S. Patil

Emeritus Fellow

Air Pollution Modelling Monitoring and Management; Indoor Air Quality and Exposure Assessment; Environmental Impact Assessment

10. Rakesh Kumar

Adjunct Professor

BARC, Mumbai

11. Ajay Deshpande

Adjunct Professor

MPCB, Mumbai

12. Pramod Kulkarni

Visiting Faculty

NIOSH, Cincinnati, USA

13. Gurumurthy Ramachandran

Visiting Faculty

University of Minnesota

14. S. N. Tripathi

Visiting Faculty

IIT Kanpur



Industrial Design Centre

Introduction

Industrial Design Centre (IDC) at the Indian Institute of Technology (IIT Bombay) offers an excellent environment for academics, research and applications in the field of design. The centre interacts with industries and institutions for promotion and awareness of design. These are in the form of organizing seminars, conducting short term courses and workshops. In the area of design practice, IDC offers professional design consultancy and advisory services to industries and other organizations. The total faculty strength is 26.

Dr. Iko Avital, Head of Product Design Studies, Sami Shamoon College of Engineering, Israel, and Prof. Lance G Rake from The University of Kansas, Department of Design, School Of Architecture, Design and Planning, Kansas, were appointed as Visiting Professor during September 3, 2012 March 1, 2013, and August 21, 2012 - February 20, 2013 respectively.

Design Degree Show 2012 an annual event

It is the annual event, showcasing the design efforts at the IDC at IIT Bombay. Design Degree Show (DDS) is aimed at creating design awareness in society and simultaneously offers a platform for people to meet and interact, as a facilitator for new ideas to emerge and fruitful collaborations to materialize. A large number of public, students, entrepreneurs and representatives of various industries and media visited this exhibition. It is covered well by major newspapers, magazines and TV channels.

DDS 2012 Alumni Meet and two days seminar on Abhikalpana, theme - Design Innovation was held at IDC during June 26 -27, 2012 and further at Nehru Centre, Mumbai during June 30-July 1, 2012.

Participation in Film Festivals

The animated films *Baat Wahi Hai* and *Tanko Bole Chhe* were nominated and screened at the Aadhar Heritage Film Festival, held in Ahmedabad, (2012) and Dada Saheb Phalke Film Festival at New Delhi (2013).

The films were screened at ADDA Film Club, TISS 2012, at Kala Ghoda Film Festival, 2013, and at Bhavans College, 2013. The film *Tanko Bole Chhe* was also nominated at SCRIPT 2013, Cochin, Kerala.

The animated film *Bemata* was nominated in the River to River, Florence Indian Film Festival 2012, Jaipur International Film Festival, Jaipur 2013, and IDSFFK (International Documentary and Short Film Festival of Kerala), 2012. It was screened at ADDA Film Club, TISS 2012, at Kala Ghoda Film Festival, 2013, and at Bhavans College, 2013

Students Award

Students from the Industrial Design Centre have won various awards as follows:

Mr. Piyush Kumar Verma won the *Best Animation Award* (Student Category) at 3rd Dada Saheb Falke Film Festival 2013.

Ms. Swati Agarwal won the *Special Festival Mention* for her Film "*Gajar Ka Halwa*" at Dada Saheb Film Festival 2013. She has also won the *Excellence in Media and Entertainment Award(EME)* for the Best Indian Animated Short Film(student) for her Film "*Gajar Ka Halwa*" hosted by the **Infocom - Assocham EME Awards 2013. Her film Gajar Ka Halwa was nominated in TASI Viewers Choice Awards 2012 as well.**

Mr. Anaroop Kerketta won the **Indo-Canada student Innovation Award (ICSIA) Best Student Animation Film, FICCI Frames 2013** for his short animation Film '*Inside my Mind*'. He won the *Special Jury Mention* at the Infocom - Assocham EME Awards 2013. He also got *Nomination* for his Film '*Inside my Mind*' in the IAFF Golden Kuker 2013 Sofia.

Academic Programmes

The academic programmes offered at the department are meant to develop skills, knowledge and aptitude among students to become creative problem-solvers who can bring about innovation in the manufacturing

and communication industries. At the end of their education they are expected to make a meaningful contribution to the industry and set new future directions. The department offers M.Des. in Product Design, Visual Communication, Interaction Design, Animation and Mobility and Vehicle Design, programmes.

Four students from Institute of Ergonomics under the Department of Mechanical Engineering, TU Darmstadt, Germany visited the department under the IDC-IAD student exchange program from November 5 - December 14, 2012, in the area of Ergonomics and Design.

List of the projects are as follows:

Degrees Awarded

M.Des.	:	54
Ph.D.	:	1

R & D Activities

Sponsored Research Projects : 16

New	:	2
Ongoing	:	12
Completed	:	2
Faculty Involved	:	7

Project Title	Sponsoring Agency	Status
Tama Pilots	Janssen Pharmaceutica Nv	New
Scaling The Rural Enterprise Under The Indo-UK Collaborative Research Initiative On “Bridging The Urban And Rural Divide.”	DST	New
Indian Language Input Method	Nokia	Ongoing
Development of Robust Document Image Analysis & Recognition System for Printed Indian Scripts (OCR Consortium Project Phase - 2)	DIT	Ongoing
Faculty Research Fellowship	India Post	Ongoing
Architectural Typologies: Exploring Alternative Living Solutions for Semi-Urban India	HUDCO	Ongoing
Design Support	HUDCO	Ongoing
Online Design Courses Developed for E-Kalpa, D Source	MHRD	Ongoing
Word-Image Relationship and Collaborative Design	IRCC	Ongoing
Design Guidelines for Light Weight City Bus	The Automotive Research Association of India	Ongoing
Design & Development of an Ergonomic Enclosure For User End Secrecy Device	Defence Research & Development Organisation	Ongoing
Design & Development of an Ergonomic Enclosure for Hand-Held Terminal	Defence Research & Development Organisation	Ongoing
Design and Coordination of Dandi Salt Satyagraha Memorial	Ministry Of Culture	Ongoing
Frugal Innovation Approach Towards Enhancing Driver Environment for Volvo 9400	Volvo Technology Corporation	Ongoing
Multi-Modal Support for Vuis For Low Techsavvy Users	IBM	Completed
Project UNITE	Johnson & Johnson	Completed

Consultancy Projects

The department undertook 22 jobs generating Rs. 10769487/-

The total number of faculty involved was 11.

Extension activities

The following Workshop and CEP Courses were conducted during the year:

Getting Started with Your PhD Proposal, IDC, IIT Bombay, February 2013

Three workshops for traditional potter communities were held at Bhubaneswar, between January and March 2013.

Conducted a CEP Course on Design course for Godrej jointly from October 17, 2012 to January 23, 2013.

Monsoon course on HCI 2012, IDC, IIT Bombay in July 2012

Visitors to the Department

Mr. Carl Bennet, Chairman of Getinge group, Sweden, interacted with faculty members and discussed possibilities of collaboration, during his visit on March 22, 2012.

Mr. Ashis Kothari, founder of Kalpavriksha, an organization working for environmental awareness, and co-author of *Churing the Earth: The Making of Global India*, delivered a talk titled *Radical Ecological Democracy* at IDC (organized jointly with CTARA) on February 13, 2013.

Mr. Pankaj Rishi Kumar, film-maker, visited IDC to screen *In God's Own Land*, a film that seeks to understand the development debate emerging from the setting up of Special Economic Zones on February 27, 2013.

Sri Ratan Tata, Chairman Emeritus of the Tata group visited IDC IIT Bombay, February 25, 2013 to know more about the activities held at the department.

Mr Yoshimitsu Maruno, Paper Merchant, Overseas Division, Takeo Co. Ltd., delivered a talk on Different types of papers and their impact on Printing, May 17, 2012.

Prof. Arun Garg, Univ of Wisconsin, USA, interacted with Mobility Students on Ergonomics Of Patient Handling on June 24, 2012.

Prof. B.S Samarasiri, Director, Engineering Design Centre, University Of Moratuwa, Sri Lanka., and his team visited IDC on December 21, 2012 to get an exposure on the Design School and Ergonomics.

Conferences/Symposia/Workshops/ Seminars (participated/Papers Presented)

Ray, G.G.

Presentation on "Safety for All : Think safe products and create awareness", Keynote Presentation in *HWWE 2012 International Conference*, G.B.Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India, December 6, 2012.

Panel Member, Session 21, Ergonomics Product Design and Globalization, South East Asian Network of Ergonomics Society Conference, *SEANES2012*, Langkawi, Malaysia, July 11, 2012.

Ray, G.G., and Pal Swati Biswas

"Investigation on Hand Twisting Force Developed by The Indian Elderly for opening Different Kinds of Bottle Packaging", Session No.11, South East Asian Network of Ergonomics Society Conference, *SEANES-2012*, Langkawi, Malaysia, July 10, 2012.

Joshi, Anirudha, Rashinkar, P., Emmadi, N., Rath, J., Srivastava, S., Rajput, N.

Organized *National Conference India HCI; 2012* for Landmark-based Audio Visual Interfaces for Way-Finding for Less Educated Users during April 18-21, 2012, Pune,

Joshi, Anirudha, Chakravraty, A., Shrivastava, A., Emmadi, N., Krishnan, A., Bindlish, S., Srivastava, S., Rajput, N.

Participated in *International Conference Usability Evaluation of Visual IVR Systems; APCHI; 2012*, organized by APCHI, August 28-31, 2012, Matsue, Japan.

Sabnani, Nina

Presented a paper "Sewn Narratives", at the *First Global Conference on Storytelling* at Prague, on May 13, 2012.

Presented a paper "Art as Identity", co-authored with Judy Frater at the *Cumulus Conference, Northern World Mandate on What is the function of Art in Contemporary Society*, organized by Aalto University School of Design and Architecture, at Helsinki, on May 25, 2012.

Presented a paper "Ethnographies through Animation", at an *International Conference De-territorializing Identities: Cultures, Literatures and*

the languages of the Indegenous organized by the Department of English, Maharaja Agrasen College, at Delhi University, New Delhi, on February 7, 2013.

Workshop on Animated Ethnography: Participatory Approaches with Craft Artisans for their *Summer School* organized by School of Social and Political Studies, University of Edinburgh on June 17, 2013.

Workshop for children on Storytelling at *Kitab Khana* organized by Kala Ghoda Festival, Mumbai, February 2013.

Sabnani, Nina; and Frater, Judy

Presented a paper “Social Mobility: Narrative Experiments with Traditional Textiles in Kutch”, at a *National Conference on The Status of Folklore and Oral Discourse among the Endangered Languages and Cultures of India* organized by Central Institute of Indian Languages(CIIL), and Indian Folklore Congress, at Mysore on December 17, 2012.

Iyengar, A., and Joshi, A.

Participated in *International Conference Evaluating Anonymous Social Networking for PLHA with Social Prototypes; ACM Dev; 2013*, organized by ACM in Bangalore, January 11-12, 2013.

Sharma Nishant, and Joshi Purba

Presented a paper “A Collaborative Playful Approach for Teaching Abstraction to Design Entrants”, at *International Conference on Design Principles and Practices*, held during April 6-8, 2012 at Chiba University, Japan.

Mohanty, Raja

“Design Education and the Idea of Emptiness”, Paper presented at the *Designing Design Education For India Conference*, organized by the India Design Council, Pune, on March 13-15, 2013.

Malhotra Anisha(PhD student), and Poovaiah R.

“Developing Young Thinkers: An exploratory experimental study aimed to investigate design thinking and performance in children”, in *ICoRD’13 4th International Conference on Research into Design, 2013*, at IIT Madras

“Young children as game designers: An approach to collaborative learning and design education”, in proceedings of *Designing Design Education in India 2013 International Conference*, Pune, India, March 2013.

Conferences/Symposia/Workshops/ Seminars (Coordinated /Chaired by Faculty)

Ray G.G

Chaired Session 11, *Hand and Foot Biomechanics South East Asian Network of Ergonomics Society Conference, SEANES-2012*, Langkawi, Malaysia, July 10, 2012. Also gave a Keynote Presentation 7, at conference on July 12, 2012.

Chaired Technical Session No. II, *HWWE 2012 Conference*, from July 9-13, 2012 at Panthnagar from December 6- 8, 2012

Joshi Anirudha

Chaired the Conference *India HCI 2012* (co-chair review papers track, co-chair students design consortium track) April 18-21, 2012, Pune, organised by India HCI.

Invited Lectures

Joshi Anirudha

“Interaction Design for Those with Less Education”, PreCog Group, IIIT Delhi, Guest Lecture, October 2012.

“Interaction Design for Those with Less Education”, CUTE Centre, NUS Singapore, February 2012.

“Integrating Human-Computer Interaction with Software Engineering processes”, *IFIP TC13 workshop*, Université Paul Sabatier, Toulouse, March 2013.

Significant Awards/Distinctions

Sabnani, Nina

Tanko Bole Chhe : “SCRIPT 2013”, Kerala, Best documentary film

Baat Wahi Hai : “Dada Saheb Phalke Film Festival 2013”, New Delhi

Tanko Bole Chhe : “Aadhar Heritage Film Festival 2012”, Ahmedabad

Honorary Work

Ray, G.G

Member of the CII National Committee on Design 2012-13, CII Headquarters, 23 Lodi Institutional Area, Lodi Road, New Delhi, July 16, 2012.

Jury Member for the 2nd edition of CII Design Excellence Awards 2012. CII Headquarters, 23 Lodi Institutional Area, Lodi Road, New Delhi, December 12, 2012.

Jury Member, Indiestar 2012, Indian Institute of Packaging, MIDC Area, Andheri (East), Mumbai 400 093, August 24 -25, 2012.

Member of the Faculty Selection Committee for new Design Department at IIT Hyderabad, January 23, 2013.

Sabnani, Nina

Member of the following Advisory Board/ Academic Committee: Script committee Childrens Film Society India (CFSI); (Advisory Board, Centre for Media and Culture Studies (CMCS), Tata Institute of Social Science (TISS); Academic Council, Film and Television Institute of India (FTII); Steering Committee for Storytelling: Global Reflections on Narrative; Editorial Committee member, Deep Focus Cinema Journal (quarterly).

Appointed External Examiner by NTU, UK for Communication Design

Programme at Pearl Academy, Delhi (2013-2017)

Faculty Members and their Specializations

1. U.A. Athavankar

Basic Design, Product Design, Product Semantics, Cognition and Imagery, Environment Design, Furniture Design, Exhibition Design

2. A.G. Rao

Product Design, Basic Design, Bamboo Craft, Creativity

3. K. Munshi

Design & Design management, Mobility and Vehicle Design, and Design Integration

4. Ravi Poovaiah

Designing for children, Collaborative Environments, Digital Resources for Learning, Information Visualisation And Design, New media Design and Interaction Design, Visual Language and Communication Design Wayfinding, and Identity and Information Systems

5. V.P. Bapat

Basic Design, Product Design

6. K. Trivedi

Graphic Design, Indian Design Traditions, Exhibition Design.

7. G.G. Ray

User Centered Design, Control Panel Ergonomics, Workstation Design Manual Material Handling, Design

for the Elderly, Design for People with Special Needs. Mobility / Vehicle Ergonomics, Furniture ergonomics

8. K. Ramchandran

Product design and Mobility Design

9. Ravi Hazra

Architecture, Sustainability, Urban Design and Street Furniture/Signage Design, Interior and Furniture Design

10. N. Sadhu

Product Ergonomics

11. B. K. Chakravarthy

New Product Innovation, Collaborative Design, Humanizing Technology, Product Styling and Perception, Creativity

12. Anirudha Joshi

Interaction Design, User Studies, Usability Evaluations, Text Input In *Indic Scripts*, *Interaction Design For Those With Less Education*, *Interaction Design For Healthcare*, *Learning Indic Scripts*

13. Raja Mohanty

Visual Arts, Aesthetics, Communication Design, Art and Design, Pedagogy

14. G.V. Sreekumar

Typography, Publication Design, Information Design and Data Visualization, Font Design, Human Anatomy, Visual Design, Illustration.

15. Nina Sabnani

Animation film-making, Documentary cinema, Illustration, Storytelling, and Visual Ethnography

16. Shilpa Ranade

Animation, Illustration, Graphic Design

17. Sumant Rao

Animation, Special Effects, Film making, Education

18. Mandar Rane

Graphic Design, Book and Publication design, Corporate identity Systems, Interface design and Interactive applications

19. R. Sandesh

Product Design: Context based Industrial/Product Design Basic Form and Form Abstraction and Expression. Craft Practices and Traditional Vocation based Livelihood Opportunities Design Based Study of Traditional Craft Communities and Craft Practices.

20. Phani Tetali

Animation, gaming, Storytelling with Sequential Art, Illustration, and Cartooning

21. Balan Sudesh

Areas of Study and Research: Digital Film-making, Photography, Cinematography

22. Nishant Sharma

Automotive Design, CAID Computer Aided Industrial Design, Automotive Design, Vehicle Design Process, Product Form and Aesthetics, Participatory Innovation

23. Purba Joshi

Product Design, Computer aided Design, Form Design, Product Interface Design, and Nature of material and processes

24. Narayan Parasuram

Sound Design, Music Appreciation, Designing Content for Children

25. Pramod Khambete

Interaction Design, Design Management



Centre of Studies in Resources Engineering

Introduction

The Centre of Studies in Resources Engineering (CSRE) was established at the Indian Institute of Technology Bombay by the Ministry of Education and Social welfare, Govt. of India under S & T policy with the recommendations of IIT Council for advancing the frontiers of science and technology and generating manpower required in the area of Natural Resources Engineering in 1976.

Geoinformatics and Natural resources engineering is an interdisciplinary area encompassing diverse issues of exploration and management of natural resources such as land, water, mineral, forest, soil and ocean resources; socio-economic aspects of sustainable development with respect to environmental impact of natural resources exploitation, renewable energy resources management; global warming and climate change. The researchers and teachers come from diverse backgrounds of science and engineering working on theoretical and applied problems in Image Processing and Analysis, Geographic Information Systems, Synthetic Aperture Radar image analysis and applications, Agro-Informatics, GPS and Digital Photogrammetry, Natural Hazard Assessment and Disaster Mitigation, Coastal and Marine Environment, and Terrain Evaluation. State-of-the-art techniques including satellite remote sensing, GIS and GPS are used extensively in the study of above themes.

The Centre receives research grants from government and other scientific organisations such as DST, ISRO, DRDO, ONGC etc. Sponsored research and consultancy activities achieved considerable progress in microwave remote sensing with development of new methods. Three component and four component decomposition theorems and polarimetric discriminators were developed for identification of snow which has resulted in the RADAR snow index development and interferometry based coherence analysis for snow cover mapping. The Centre has also contributed towards high resolution image analysis, hyper-spectral image analysis, and content based image retrieval and educational content development. High resolution remotely sensed images present unique

challenges to image analysis researchers as it requires new information extraction strategies that capture the spatial, textural and spectral information present in these images. The centre is also working on theoretical aspects of Geospatial technology such as Development of Efficient Algorithms, Dynamic Models and Multi-Dimensional Data Handling etc. New consultancy and sponsored research projects were taken up during the last one year. Student supervision is progressing well both at M.Tech. and Ph.D. levels. All the courses listed in the bulletin were taught this year at B.Tech. and M.Tech. levels.

Research Work is in progress currently in the areas of Development of Efficient Algorithms, Spatio Temporal Processes, Spatial Data Security, Data Structures and Visualization Methods. Research work is also in progress in planetary remote sensing especially geology of Mars using VNIR-SWIR and thermal remote sensing data (CRISM and THEMIS data) with the main objective of identifying and mapping hydrothermal minerals in Valles Marineris.

Infrastructural facilities were augmented with a new Graphics Processing Unit (GPU) (NVidia Tesla C2075) which provides a high performance computing platform. Upgradation is carried out with ENVI/IDL software for image processing (25 users licenses), ArcGIS with server and 32 user licenses, 3D monitors with stereo vision and GPS (Gagan Indra Dhanush) pen drives.

Significant Collaborations

Academic collaboration with the Graduate School of Agricultural and Life Sciences, University of Tokyo to participate in research and education activities on Asia agro-informatics and a Mentor/Mentee Consortium involving Academia and Industries with IIT Hyderabad, Colleges of Engineering and Horticulture/Amravati/Maharashtra, TCS/Mumbai and Datamatrix/Pune has been formed in the proposed ITRA Project to use multi-mode ICTs in Groundwater-Agriculture systems

Collaborations have also been made with Centre for Exploration Targeting, University of Western Australia and WH Bryan Mining and Geology Centre, University of Queensland, Australia.

Academic Programmes

Students Intake	
M. Tech	: 19
Ph. D.	: 10
Degrees Awarded	
M. Tech	: 22
Ph.D.	: 03

The Centres postgraduate programme on Geoinformatics and Natural resources engineering is multidisciplinary in nature with the objective of providing a balanced approach for studying Resources, Applications, Tools and Techniques. The Centre offers M. Tech and Ph. D. programme in Geoinformatics and Natural Resources. Presently, 13 faculty members are engaged in teaching and research with expertise in various areas of remote sensing and resources engineering and allied subjects. There are presently 59 Ph.D. scholars on its rolls. Some of the application research areas actively pursued in the Centre are Water Resources, Terrain Evaluation, Land use Planning and Monitoring, Rural Development and Agro-informatics, Mineral systems studies and Mineral Exploration, Natural Hazards of Droughts, Desertification, Landslide, Avalanche, Earthquake, Tsunami, Marine Resources and Ecology, Snow, Glaciers and Atmospheric Physics and Chemistry. The tools and algorithmic research areas offered include Digital Image Processing, Digital Photogrammetry and Cartography, Geospatial Technologies and Synthetic Aperture Radar Information Analysis and Polarimetry. The student can choose a topic that suits his/her background and interest for dissertation work. Students are admitted for M. Tech and Ph. D programmes from GATE disciplines of CS, IT, EC, EE, PH, CE, MA and AG, and are eligible for placements in both private sector and Govt. organizations such as ISRO, DRDO, and CSIR. A few of the M.Tech. students who graduated from the Centre are pursuing doctoral programs abroad as well as at IIT Bombay.

B. Tech., (U.G. Minor Programme) in Geoinformatics and Applications and M. Tech Institute Elective are also being offered by the Centre. The Centre has admitted 22 students for M. Tech GNR programme this year. The Centre participates in the basic and applied areas of Resources Engineering through sponsored research projects in frontier areas and offers expertise in the consultancy projects. A virtual laboratory and a web/CD-ROM tutor for digital image processing for remote sensing are prepared which are useful at M.Tech. level as additional resources to supplement classroom discussions. Both students and instructors can benefit from these tools.

R & D Activities

The R & D activities of the Centre are in the area of remote sensing, natural resources identification,

development & management and spatial data base systems and applications. New research and development work is taken up in the area of virtual laboratory development for microwave image processing and analysis to enable students from remote locations perform satellite image processing and analysis experiments.

Development of inversion algorithms for estimation of geo-physical parameters of snow such as grain size, snow wetness and snow density using polarimetric SAR data and implementation and validation of developed algorithms for Himalayan region.

Remote sensing and GIS applications to hydrology, earth sciences including mineral exploration, terrain evaluation and land use planning, wetland and coastal investigation, desertification and drought monitoring, environmental management, landslide investigations.

Microwave remote sensing of soil moisture and SAR Interferometry, training and Database development.

Algorithms for high resolution and hyperspectral image processing and analysis

Theoretical aspects of Geospatial Technology related to development of efficient algorithms, dynamic models, spatial data security methods and spatial data structures

Stratospheric Ozone and Trace Gases Assessment and Monitoring

Development of multimedia educational content for digital image processing with emphasis on remotely sensed images

Ensemble classifiers, hyper spectral image analysis and high resolution image segmentation and classification.

Geo-ICT and Sensor Network in Agriculture/ Environment

Geosemantics, image information mining, cloud computing-based Geocomputations

Bio-physical variables retrieval from remote sensing data

The Centre continues to interact with Department of Space, Govt. of India, through ISRO-IIT Bombay Space Technology Cell which sponsors research projects in the areas of remote sensing and Space technology.

Sponsored Projects

New Projects	: 02
Ongoing	: 10
Completed	: 04
Faculty Involved	: 12

Project Name	Sponsored by	Status
“Virtual lab and e-Tutor for microwave remote sensing	ISRO-IIT(B) Space Technology Cell	New
“GeoSpatial Data Security Methods	CAIR, DRDO, Bangalore	New
“Effect of Terrain Relief and Vegetation Cover on Interferometric SAR derived Digital Elevation Models	ISRO-IITB Cell	New
“Development of Methodologies for Snow Pack Parameters Estimation by Using SAR Polarimetry and Interferometry - India -Japan Cooperative Programme	(DST- Japan Society of Promotion of Science - JSPS) (MOU with Tokyo University, Japan)	New
“Snow pack parameters estimation and glacier movement studies using SAR polarimetry data JAXA 2012 (ALOS PALSAR data)	(MOU with JAXA)	New
“Soil Moisture Mapping and Agriculture Crop Studies using ALOS PALSAR-2 Polarimetric SAR Data (JAXA)	(MOU with JAXA)	New
“Satellite Image Processing and Analysis Virtual Lab	MHRD	Ongoing
“Chandrayaan -1 MiniSAR Data Analysis for Lunar Polar Region	Department of Space, Government of India	Ongoing
“Development of Methodology for snow pack characterization and glacier movement studies using multifrequency SAR time series satellite data	Department of Science and Technology	Ongoing
“Elevation data information from Tandem-X experiment for updating the mass balance of some Himalayan glaciers in Bagha basin	DLR, Germany by providing 30 scenes of Tandem-X high resolution DEM free of cost for research work.	Ongoing
“Monitoring snow and glaciers of Himalayan region-Phase 2	Department of Space	Ongoing
“Mass balance studies of Himalayan glaciers using digital elevation models obtained through Cryosat-2	European Space Agency by providing 30 scenes of c cryostat-2 satellite data free of cost for research work.	Ongoing
“3D crustal modelling and resource potential mapping of deep-seated mineral deposits of the Aravalli province, Western Rajasthan	IRCC, IIT Bombay	Ongoing
Development of land parameter retrieval techniques & tools for polarimetric SAR data Analysis	ISRO, SAC, Ahmedabad	Ongoing
“Geo-ICT and Sensor Network based decision support systems in agriculture and environment assessment	DST-JST	Ongoing
“Utilisation of leading edge ICT to enhance Australian and Indian ground water and land Resources under climate change scenarios	Australia-India Strategic Research Fund	Ongoing

Project Name	Sponsored by	Status
“Development of Methodologies for Snow Pack Parameters Estimation by Using SAR Polarimetry and Interferometry	ST/Science & Engineering Research Council	Ongoing
“Combining passive and active microwave observations for improving snow parameters estimation over Himalaya	DRDO	Ongoing
“Snow and glacier characteristic and interferometry studies of Gangotri glacier region using TerraSAR-X	B DLR Germany	Ongoing
“Development of Methodology for snow pack characterization and glacier movement studies using multi-frequency SAR time series satellite data.	Department of Science and Technology	Ongoing
“Monitoring snow and glaciers of Himalayan region-Phase 2	Department of Space	Ongoing
“Combining passive and active microwave observations for improving snow parameters estimation over Himalaya	DRDO, Dehradun	Completed
“Development of Methodology for generation of high resolution digital terrain model and land/snow cover maps using airborne LIDAR and digital photogrammetric techniques	DRDO, Dehradun	Completed
Development of Land Parameter Retrieval Techniques and Tools for Polarimetric SAR Data Analysis	Space Application Centre, ISRO, Ahmedabad	Completed
“Elevation data information from Tandem-X experiment for updating the mass balance of some Himalayan glaciers in Bagha basin	DLR Germany (by providing 30 scenes of Tandem-X high resolution DEM	Completed
“Mass balance studies of Himalayan glaciers using digital elevation models obtained through Cryosat-2	European Space Agency (by providing 30 scenes of cryostat-2 satellite data)	Completed
“Snow and glacier characteristic and interferometry studies of Gangotri glacier region using TerraSAR-X	DLR Germany (by providing 30 scenes of high resolution TerraSAR-X data	Completed
“Microwave Remote Sensing and SAR Tutor with Virtual Laboratory	ISRO-IIT(B) Space Technology Cell	Completed

Consultancy Projects

Consultancy Projects	:	07
Faculty Involved	:	06
Revenue Generated	:	53.45 lakhs

Consultancy Projects were received from several organizations such as MCGM, DRDO, Dehradun, NIKO Resources, Bharat Petroleum Corporation Ltd, ONGC, Ahmedabad etc.

Extension Activities

Conferences / Workshops Organized

Porwal Alok

Organized a workshop on Mineral prospectivity Mapping in the GIS in Mining and Exploration Conference held at Perth, Australia, from December 6-8, 2012

Adinarayana, J.

Co-organizer for *Indo-Australia Workshop at International Water Management Institute (IWMI)*, Hyderabad, January 21-24, 2013 and *Agriculture Working Group Workshop ICT applications in Agriculture*, Colombo, August 25-29, 2012.

Durbha Surya

Conducted one day Tutorial on Advanced Classification Techniques for Remote Sensing at *IEEE Geoscience and Remote Sensing Symposium at Munich*, Germany, July 2012.

Krishna Mohan, B.

Member, Organizing Committee for Indian Computer Vision, Graphics and Image Processing Conference, IIT Bombay, December 16-19, 2012.

Conferences /Symposia/ Workshops/Seminars (participated/Papers Presented)

Venkatachalam, P

Attended *ASPRS 2013 Annual Conference at Baltimore*, Maryland, USA during March 25- 28, 2013 and presented a paper on The Plateau-Hill Algorithm to convert 16bps Images to 8bps Images.

Mohan, B. K.

Participated in the *IEEE Geoscience and Remote Sensing Symposium (IGARSS 2012)* from July 22-27, 2012 held at Munich, Federal Republic of Germany and presented one oral and three poster papers.

Participated in the *Indian Computer Vision, Graphics and Image Processing conference*, from December 16-19, 2012 held at IIT Bombay.

Rao, Y.S.

Participated in the *IEEE Geoscience and Remote Sensing Symposium (IGARSS 2012)* from July 22-27, 2012 held at Munich, Federal Republic of Germany and presented papers.

Attended *3rd International Polarimetric SAR Workshop* in Niigata University, 2012 Niigata, Japan and *IEEE IGARSS 2012* held in Munich during July 22-27, 2012.

Durbha, S.S.

Participated in the *IEEE Geoscience and Remote Sensing Symposium (IGARSS 2012)* from July 22-27, 2012 held at Munich, Federal Republic of Germany and presented papers.

Adinarayana, J.

Attended *8th Asian Conference for Information Technology in Agriculture and World Conference on Computer in Agriculture*, Taipei, Taiwan and *33rd Asia-Pacific Advanced Network Conference*, February 13-17, 2012, Colombo, Sri Lanka

Inamdar, A. B.

Attended *GISSA Ukubuzana 2012 Conference*, October 2-4, 2012 Johannesburg, Gauteng, South Africa

Krishna Mohan B.

Attended *IEEE Geosci. Remote Sensing (IGARSS 2012) Symposium* during July 2012 at Munich, Germany,

Venkataraman, G.

Visited Munich (Germany) and attended *IEEE-IGARSS 2012 conference* during July 22-27, 2012.

Surya Durbha

Attended the *IEEE Geoscience and Remote Sensing Symposium (IGARSS 12)*, Munich, Germany, July 2012

Khire

Attended a *conference on Environmental Health 2013* at Boston, USA, between March 3-6, 2013.

Azmi, S., Agarwadkar, Y. Y., Apte, M., and Inamdar, A.B.

“Understanding grids and effectiveness of hexagonal grid in spatial domain Framework for analysing coastal vulnerability due to sea level rise and coastal floods using R Monitoring Primary Ecological Health off Mumbai Coast using Chlorophyll Trend as Primary Parameter, Environmental Health Monitoring, March 2013

Azmi, S., Agarwadkar, Y. Y., Apte, M. and Inamdar A.B.

“TIDER: FOSS for Tidal prediction, *FOSS 4G*, 2012, IIIT Hyderabad

“Cost Benefit Analysis of R over proprietary GIS and Remote Sensing Software: A Review, *GISSA Ukubuzana 2012*, Ukubuzana.

Avik B.

“Unsupervised classification of dual band polarimetric SAR image using non-gaussian statistical models, *International Symposium on Space Geodesy and Earth System (SGES2012)*, Shanghai, China.

“Non-Gaussian Statistical Analysis of Synthetic Aperture Radar Image, *8th International Conference on Microwaves, Antenna, Propagation & Remote Sensing, ICMARS-2012*, Jodhpur, India.

Shitole, S., Rao, Y.S., and Krishna Mohan, B.

“Influence Of Speckle Filtering On Polarimetric Sar Data Classification, *6th International Workshop on Science and Applications of SAR Polarimetry and Polarimetric Interferometry, POLinSAR 2013*, European Space Agency (ESA) ESRIN, Frascati, Italy from January 28, 2012 to February 1, 2013.

“Speckle Filters Evaluation Based On Separability And Polarimetry Index “6th International Workshop on Science and Applications of SAR Polarimetry and Polarimetric Interferometry, POLinSAR 2013”, European Space Agency (ESA) ESRIN, Frascati, Italy from 28 January 2012 to 1 February 2013

Banerjee Biplab, Buddhiraju Siddharth, Krishna Mohan, B.

“Road Extraction from high resolution satellite images : A novel region and boundary based approach, *Indian Conference of Computer Vision, Graphics and Image Processing*, Proc. Indian Computer Vision, Graphics and Image Processing, ICVGIP, 2012.

Krishna Mohan Buddhiraju, Tiwari Krishna Kumar, Laxminarayana Eeti, Choubey Anubhooti, Parkar Adib

“An e-Tutor and a virtual laboratory for satellite image processing and analysis, *IEEE conference on Geoscience and Remote Sensing IGARSS 2012*: 7373-7376

Imdad Ali Rizvi, Krishna Mohan, B.

“Object-based analysis of WorldView-2 imagery of urban areas, *IEEE conference on Geoscience and Remote Sensing IGARSS 2012*, pp. 431-434.

Varma Surender, Banerjee Biplab, Krishna Mohan, B.

“Representation of desert sand dunes by surface orientation using radon transform, *IEEE conference on Geoscience and Remote Sensing (IGARSS)*, 2012.

Banerjee Biplab, Varma Surender, Krishna Mohan, B.

“Satellite image segmentation: A novel adaptive mean-shift based approach, *IEEE conference on Geoscience and Remote Sensing (IGARSS)*, 2012.

Prakash, A., Durbha, S. S., King, R. L., Younan, N. H.

“Multi-Task Learning for Disaster Image Mining, *Image Information Mining Conference: Knowledge Discovery from Earth Observation Data (IIMCG and GRSS)*, German Aerospace Center (DLR), Oberpfaffenhofen, Germany, 2012.

Patil, V., Durbha, S. S., Jagarlapudi, A.

“Standards-Based Sensor Web for Agro-Informatics Applications, *Proceedings of the IEEE International Geoscience and Remote Sensing Symposium*, Munich, Germany, 2012.

Bhangale, U., Durbha, S. S.

“Application of GPGPU for Spatio-Temporal Detection and Monitoring of Oil Spills, *Proceedings of the IEEE International Geoscience and Remote Sensing Symposium*, Munich, Germany, 2012

“Information theoretic approach for Geospatial Ontology Matching, *Proceedings of the IEEE*

International Geoscience and Remote Sensing Symposium, Munich, Germany, 2012.

Durbha, S. S., King, R., and Younan, N. H.

“Geo-Enabled Synchrophasor Data Exchange Framework Based on Sensor Web, *proceedings of 2012 IEEE PES General Meeting*, San Diego, CA: IEEE.

Singh Gulab, Sang-Eun Park, Yoshio Yamaguchi, Wolfgang-Martin Boerner and Venkataraman, G.,

“Full-POL-SAR Decomposition Scheme over Wet Snow Areas, *Proceedings of IEEE IGARSS-2012*, Munich, Germany.

Hariprasad C, Venkatraman. G., Murti M.V.R., Arora Manohar Arora

“Snowmelt runoff modeling for Bhagirathi river basin using SRM and MODIS *Proceedings of Geomatrix12 International conference*, IITB, India, 2012

Birajdar Farjana, Rongali Gopinadh, Narvekar, P., Snehmani, Venkataraman, G.

Scaling issues in correlating Ground based and satellite based observations over Himalayan regions, *International Symposium on Cryosphere and Climate Change*, Manali, April 2- 4, 2012.

Surendar, M., Singh Gulab, Bhattacharya Avik, Venkataraman, G., and Bharathi Arun, P.

“Snow Surface Wetness Estimation Based on Polarimetric Decomposition Theorem, *8th International Conference on Microwaves, Antenna Propagation & Remote Sensing (ICMARS-2012)*, Jodhpur, India, December 11-15, 2012.

Chelamallu Hari Prasad, Venkataraman, G., Murti, M.V.R.

“MODIS snow cover validation for Bhagirathi River Basin in NW Himalaya, *ASPRS-2013 International Conference*, Baltimore, Maryland, USA.

Khire, M. V.

“Mapping of potential desertification hazard based on LU/LC changes and rainfall trends using expert system approach, in *International Conference on Environmental Health 2013* at Boston, March 3-6, 2013.

Zope-Chaudhari, S. and Venkatachalam P.

“Protection of Geospatial Data: Present Approaches and Research Needs, *proceedings of 33rd Asian Conference on Remote Sensing*, November 26-30, 2012, Pattaya, Thailand.

Dhamecha Rahul and Venkatachalam Parvatham

“The Plateau-Hill Algorithm to convert 16bps Images to 8bps Images, *Proceedings of ASPRS 3013 Annual Conference*, March 25-28, 2013, Baltimore, Maryland, USA.

Mendiratta Priya, and Gedam, S. S.

“Assessing the Urban fringe through Satellite images”, with ‘Case Study : Mumbai Metropolitan Region, *6th Urban Research and Knowledge Symposium theme: ‘Rethinking Cities: Framing the Future*, World Bank; Barcelona, Spain, October 8-10, 2012.

Shitole, S., Rao, Y.S., and Krishna Mohan, B.

“Effect of Deblurring using Self-Organizing Feature Map in Polarimetric SAR Data Filtering, *National Symposium on Space Technology for Food and Environmental Security*, held at New Delhi during December 5 -7, 2012

“Effect of Moving Window Size in Polarimetric SAR Data Filtering on Classification, *National Symposium on Space Technology for Food and Environmental Security*, held at New Delhi during December 5 -7, 2012

Chelamallu Hari Prasad, Venkataraman, G., Murti, M.V.R.

“MODIS daily snow cover map validation for parts of Indian Himalayas, *TROPMET -2012, National symposium on frontiers of Meteorological with special reference to the Himalaya*, November 2012

Chelamallu Hari Prasad, Venkataraman, G., Murti, M.V.R., and Aror Manohar

“Metrological analysis of Bhagirathi river basin for snowmelt runoff, *TROPMET -2012, National symposium on frontiers of Meteorological with special reference to the Himalaya*, November 2012.

Panda, S.K., and Gedam, S.S.

“Investigating ionospheric total electron content over low latitude Indian region by analysis of GPS signals during ascending part of 24th Solar cycle, *National Symposium on Space Technology for Food & Environmental Security & Annual Convention of Indian Society of Remote Sensing & Indian Society of Geomatics*, Delhi, India, 2012.

Samal Dipak R., and Gedam, Shirish S.

“Rainfall-runoff variability over a semi-urban catchment, *International conference on SWAT*, IIT Delhi-2012.

“Monitoring land use change over a rapidly changing semi-urban river basin, Maharashtra, India *ISRS*, New Delhi, 2012.

Suryavansh, R. K., Gedam S. S. and Sankhua R. N.

“Use of advance geospatial tools for estimation of spatial rainfall, *CBI&P*, New Delhi, October 2012

“River basin management using advance geospatial & simulation tools, *India Water Week-2012*, April 2012.

Azmi S., Agarwadkar Y.Y., Apte M, and Inamdar A.B.
Spatio-temporal trend analysis of Sea Surface Temperature off Mumbai coast, December 2012.

Invited Lectures

Rao, Y.S.

Delivered lecture on Classification of Multi-Frequency and Multi-Polarization SAR Images for Various Land Features, *3rd International Polarimetric SAR Workshop* in Niigata 2012, Niigata, Japan, August 23-25, 2013

Adinarayana, J.

Given a lead paper presentation on ICDTs in agriculture/rural systems in National Workshop GIS applications in natural resources management, February 20, 2013 NAARM/ICAR, Hyderabad.

Delivered lecture on ICDTs in agriculture and rural sectors, CEP course Training to Engineers, Water Resources Department, Govt. Maharashtra, July 7, 2012; Civil Engineering Department, IITB.

Delivered a talk on ICDTs in decentralized planning, National Workshop Decentralized Planning July 11, 2013, NIRD/Hyderabad.

Mohan, B. K.

Delivered four invited lectures at Centre for Artificial Intelligence and Robotics (CAIR), DRDO during July 2012 on Image Processing.

Delivered two lectures on hyperspectral image analysis in Hyperspectra-13 held at Dept. of Earth Sciences, IIT Bombay, during January 2013.

Delivered a lecture in Short Term Training Program at Pimpri-Chinchwad College of Engg. during May 2012 and at Shah and Anchor College of Engg., July 2012

Delivered five lectures in the QIP Short Term Course on Satellite Image Processing and Applications during March 25-29, 2013 at CSRE, IIT Bombay.

Rao, Y.S.

Delivered two lectures at IIST, Thiruvananthapuram, ISRO, 30-10-1012, on SAR Signal Processing and Interferometry.

Delivered two lectures at Deference Institute of Advanced Technology, DRDO, Pune. November 29 and 30, 2012 on SAR signal processing and Ground Moving Target Indication, (GMTI)

Delivered a talk at Xavier Institute of Engineering, Mahim, Mumbai, January 9, 2013 on Introduction to SAR signal processing

Venkatachalam, P.

Delivered a lecture on GIS Theory and Application for Irrigation Management in the CEP course on Training to Engineers, Water Resources Department, Government of Maharashtra on June 28, 2012 at IIT Bombay.

Alok Porwal

Delivered a lecture on GIS-based mineral potential mapping, at Indian School of Mines, on October 8, 2012.

Gedam, S. S.

Delivered a guest lecture at Ruia College Mumbai On Remote Sensing, GIS and GPS Education, in National Seminar Geo-Spectrum: Towards New Frontier on February 26, 2013.

Significant Awards and Distinctions

Adinarayana, J.,

Vice Chairman, Asia-Pacific Advanced Network Agriculture Working Group (APAN/Ag-WG) from August 2012 for two years (<http://apan.net/wg/agriculture.php>)

Vice President and Board Member for the Asian Federation for Information Technology in Agriculture (AFITA) for the Years September 2012-Current (<http://www.afita.org/>) and Editorial Member of CIGR (International Commission of Agricultural and Biosystems Engineering) Journal 'Agricultural Engineering International', USA (Section Editor, Information Technology and Systems ITS)

Alok Porwal

Awarded Adjunct Associate Professorship at the WH Bryan Mining and Geology Centre, University of Queensland, Brisbane, Australia

Conference chair for - Mining and Exploration Conference 2012, Perth Australia and Session convener and chair at 34th International Geological Congress, Brisbane; and Keynote speaker at 34th International Geological Congress, Brisbane

Surya Durbha

Awarded a Certificate of Appreciation from the Editorial Office of the International Journal of Image and Data Fusion (Taylor & Francis)

Member, Board of Studies, Indian Institute of Remote Sensing (IIRS), Department of Space, Dehradun.

Program committee member of Spatial and Spatiotemporal Data Mining (SSTD-12), Petascale Data Analytics: Challenges and Opportunities (PDAC-12) and 7th IAPR Workshop on Pattern Recognition in Remote Sensing (PRRS 2012). and Scientific Committee: (IEEE/GRSS) IGARSS 2013

Advisory committee member of Encore 13 organized by Don Bosco institute of Technology, Mumbai and Program Committee Member: Indian Conference on Vision, Graphics, and Image Processing.

Avik B.

Member, Organizing committee for The Eighth Indian Conference on Vision, Graphics and Image Processing held from December 16 -19, 2012, Mumbai, India.

Venkatachalam, P.

Member, Academic Council, Indian Institute of Remote Sensing, Dehra dun; Member, Advisory Committee, Indian National Centre for Ocean Information Services, Hyderabad and Member, Editorial Board, Indian Journal of Geomatics

Mohan, B.K.

Member, Board of Studies, JNTU College of Engineering, Hyderabad and Member, Board of Studies, Indian Inst. Of Space Science and Technology, Thiruvananthapuram

Honorary Work

Mohan, B.K.

Reviewed manuscripts submitted to Indian Journal of Remote Sensing, International Journal of Remote Sensing, IGARSS 2013, IEEE Geosci. Remote Sensing Letters, Defence Science Journal, Journal of Coastal Research;

Examination of PhD theses from IIT Kanpur, MS University Baroda, NMIMS Mumbai

Examination of M.Tech. dissertations from DIAT Pune, Mumbai University

External expert on ISROs departmental promotion committees

Demonstrated educational tools developed in the Centre in TechConnect 2013 event as well as at selected educational institutes in Mumbai

Venkatachalam, P.

Reviewed manuscripts submitted to Indian Journal of Geomatics, Examination of PhD thesis from IIT Kanpur

Venkataraman, G.

PhD Thesis Reviewed for M.S university Baroda, Solapur University, Jawaharlal Nehru Technological University Hyderabad and Birla Institute of Technology, Mesra, Ranchi.

Reviewed manuscripts for Journal of Earth System Science, International Journal of Climatology, International Society for the Prevention and Mitigation of Natural Hazards, Current Science, IEEE-TGRS and Arabian Journal of Geosciences

Shyamalee Mukherji

Reviewed a paper for the IEEE International Geoscience and Remote Sensing Symposium 2013

Student Paper Contest and Reviewed 9 papers for the IEEE International Geoscience and Remote Sensing Symposium 2013.

Surya Durbha

Reviewed manuscripts for Journals Computers and Geosciences, IEEE Transactions on Geoscience and Remote Sensing, Geoinformatica, International Journal of Image and Data Fusion, Optical Engineering, International Journal of Digital Earth and ISPRS Journal of Photogrammetry and Remote Sensing

IEEE Transactions on Geoscience and Remote Sensing, International Journal of Image and Data Fusion, International Journal of Photogrammetry and Remote Sensing, Computers and Electronics in Agriculture, IEEE Geoscience and Remote Sensing Letters and IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing

Reviewed papers for IEEE Geosciences and Remote Sensing Symposium (IGARSS 12), 7th IAPR Workshop on Pattern Recognition in Remote Sensing ((PRRS 2012), Spatial and Spatiotemporal Data Mining (SSTD-12) and Petascale Data Analytics: Challenges and Opportunities (PDAC-12).

External Expert for evaluation of M.S. Thesis from IIT Kharagpur, Evaluation of IIRS E-Learning Program Tenders and departmental promotion review committee.

Member of IEEE, IEEE Geoscience and Remote Sensing Society, American Geophysical Union and Life Member of Indian Society of Remote Sensing.

Rao, Y. S.

External expert for promotion of scientists, SAC, Ahmedabad

Alok Porwal

Reviewed papers for international journals viz., Ore Geology Reviews, Natural Resources Research and Mathematical Geosciences.

Gedam, S. S.

Member Local Organising Committee: ICVGIP-2012

Faculty Members and their Specialization

1. (Ms.) P. Venkatachalam

Head and Professor of CSRE

Development of Efficient Algorithms in GIS, Spatio-Dynamic Modeling, Multi Dimensional spatial Data Handling and Spatial Data Visualization and GIS Systems - Software Development

2. Alok Porwal

Mineral systems modeling, Fuzzy systems and machine learning,, Hyperspectral and thermal infrared remote sensing, Geologic remote sensing of Mars.

3. J. Adinarayana

Agro/Rural Informatics

4. S. S. Gedam

Remote Sensing and GIS applications to Surface Hydrology, Landuse and Urban Planning (AM/FM), Stereo and Trinocular Image Processing and Analysis for Feature Extraction and Matching and Multimodal Stereo Image Analysis and Global Positioning System for Precision Geo-location, Modeling of Ionospheric and Tropospheric effects on GPS signals, Rapid Geo-tagging and Vehicle (Ambulance) Tracking in GIS environment for Rapid deployment for Emergency Medical Services.

5. A. B. Inamdar

Coastal and Marine Environmental applications of RS & GIS

6. M. V. Khire

Applications of Remote Sensing and GIS in Terrain Evaluation and Landuse/Landcover Mapping required in various type of civil engineering projects, analysis of floods, earthquakes, desertification, effects of urbanization, soil erosion etc.

7. B. Krishna.Mohan

Digital Image Processing and Analysis, High spatial and hyperspectral image analysis, Change detection, Machine learning and Educational content development for remote sensing and image analysis

8. M. V. R. Murti

Remote Sensing of Atmosphere and Trace gases; Spectroscopic Analysis of Planetary Materials, Instrumental Analysis of XRF, XRD, AAS and ICP-AES.

9. R. Nagarajan

Remote sensing and GIS applications to Natural Hazards-Landslides and Drought

10. Y. S. Rao

DEM Generation using Radar Interferometry(InSAR) Technology applications.

11. Shyamalee Mukherji

Computer Science and Engineering, Computational Methods and Computer Vision and Graphics

12. G. Venkataraman

Spatial Modelling for Mineral Exploration, Microwave Remote sensing to the study of Glacier

13. Surya Durbha

Image information mining, semantics, knowledge-based systems, big data analytics for geospatial applications, critical infrastructure protection, remote sensing and sensor webs.

14. Avik Bhattacharya

Microwave Remote Sensing



Centre for Technology Alternatives for Rural Areas

Introduction

Activities of Centre for Technology Alternatives for Rural Areas (CTARA) include the academic programmes (M.Tech, Ph.D. and TDSL) and R&D projects. CTARA also focuses on field experimentation and associations with both governmental and non-governmental community based organisations. The centre is headed by Prof. Milind Sohoni and has three core faculty members namely Prof. Narendra Shah, Prof. N. C. Narayanan and Prof. Anand Rao. The centre has continued with the appointments of Prof. Prasad Modak, Prof. Subodh Wagle as Adjunct Professors and Prof. Bakul Rao as Adjunct Associate Professor. Apart from the core and adjunct faculty, CTARA has been enthusiastically supported by its associate faculty members from other departments. During the year three new faculty members have joined the centre, among them two have joined as Assistant Professor and one as Adjunct Associate Professor.

Academic Programme

CTARA's sixth batch of 18 students pursuing M.Tech. (Technology and Development) was inducted in July

2012. Twelve degrees were awarded to the outgoing fourth batch of 2010-12. The fifth batch successfully completed field work in different parts of the country, the field work was for a duration of ten weeks. CTARA admitted four Ph.D. students during 2012-13.

Degrees Awarded

M.Tech. : 12

R & D Activities

The main thrust areas of R & D activity in CTARA include Appropriate Technology, Agro-Food Industrial development, Climate change, Water and Sanitation, Policy and Governance, Environmental Policy, and Management, Field assessments & remediation, Matrix characterization, Evidence based policy advocacy, Food and Nutrition, Woman and Child Health, Pedagogy of Engineering, Transdisciplinary research.

Sponsored Research Projects : 14

New	: 2
Ongoing	: 11
Completed	: 5
Faculty Involved	: 5

List of sponsored research projects as follows:

Name of the Project	Sponsored by	Status
"Process Improvements and Technology Dissemination in Jaggery Making	RGSTC, Government of Maharashtra	Ongoing
"Biochemical and Nutritional Characterization of Tender Coconut Water and its Shelf-life Extension	Healthcare Initiative, IRCC-IIT Bombay	Ongoing
"Rural Technology Action Group (West Zone)	Office of Principal Scientific Advisor, New Delhi	Ongoing
"Production and use of Medical Nutrition Therapeutic Foods in Clinical Trials for Malnourished kids at Sion Hospital	Toddler Food partners, US NGO, MN, USA	Ongoing
"Microwave Processing of Spices and Mushrooms	MoFPI, New Delhi	Ongoing

Name of the Project	Sponsored by	Status
“Demonstration and assessment of economic viability of new energy efficient and less polluting brick making technology (vertical shaft brick kiln)	RGSTC, Government of Maharashtra	Ongoing
“Global Energy Assessment,	International Institute for Applied Systems Analysis	Ongoing
“Environmental Impact Assessment of Farming Operations for Sugarcane and Cotton Crop Cycles	John Deere Pvt. Ltd.	Ongoing
“Preparation of Environmental Status of MMR in the Human Development Report	Mumbai Metropolitan Regional Development Authority (MMRDA)	Ongoing
“Electricity supply in rural areas	Seed grant, IRCC	Ongoing
“Localization of Solar Energy Through Local Assembly, Sale and Usage of 1 Million Solar Study Lamps	National Clean Energy Fund, MoF, Govt. of India	Ongoing
“Panchayat planning for Solar Integration in Kerala	National Centre for Photovoltaic Research, IIT Bombay	Ongoing
“Ganga River Basin Management Plan	Ministry of Environment and Forests, Government of India	Ongoing
Brain Storming Meeting Technology Watch group of the “Climate Change Programme (CCP) of DST”	Department of Science & Technology, New Delhi	Completed

Forthcoming, Policy and Governance Issues in Urban Water and Sanitation Sector: A Review and Lessons for Ganga Basin. Submitted a research report as part of the GRBEMP to the NGRBA, MoEF.

Conferences/Symposia/Workshops/ Seminars (participated/Papers Presented)

Shah, N. G.

Delivered an invited talk at BRAC- Bangladesh Meeting on Case-studies in Food Process Engineering, BRAC-Dhaka, Bangladesh, during March 15-16, 2013

Delivered an invited talk during Indo-Africa Programme, at Indian Institute of Packaging, Mumbai, on March 13, 2013.

Rao, A.B.

Attend the workshop on Indias Clean Coal Future organized by The Energy and Resources Institute (TERI), India, the Global CCS Institute (Australia), the Atlantic Council (USA) and the European Centre for Energy and Resource Security (EUCERS), Kings College London, UK, with the support of Konrad Adenauer Foundation (Germany), November 1, 2012, New Delhi.

Participated in the *PPG 2012 International conference on Public Policy and Governance* organized by the Department of Management Studies, Indian Institute of Science, and Public Affairs Centre, Bangalore, in academic collaboration with the Management School, University of Sheffield, UK, September 4-6, 2012, Bangalore. He presented following two papers:

“Development policy perspectives and capacity building measures to improve the local governance in semi-urban villages in Maharashtra, accepted for presentation in the PPG 2012 (International conference on Public Policy and Governance organized by the Department of Management Studies, Indian Institute of Science, Bangalore and Public Affairs Centre, Bangalore in academic collaboration with the Management School, University of Sheffield, UK), Bangalore, September 4-6, 2012.

“Planning Total Sanitation Campaign intervention for a semi urban village through public-people-private partnership, accepted for presentation in the conference PPG 2012, (International conference on Public Policy and Governance organized by the Department of Management Studies, Indian Institute of Science, Bangalore and Public Affairs Centre, Bangalore in academic collaboration with the Management School, University of Sheffield, UK), Bangalore, September 4-6, 2012.

Participated in the 4th *International MAGEEP Symposium on Energy & Environment: Access in Mumbai*, co-organized by Institute of Technology Bombay; Tata Institute of Social Sciences (Bombay) and Washington University in St. Louis, USA, December 9-12, 2012.

“Understanding the Impact of Lifestyle on Carbon Footprint presented at the International Conference on Trade, Markets and Sustainability (ICTMS-2013) organized by the Symbiosis Institute of International Business (SIIB), Pune, February 22-23, 2013.

Poster titled “Assessment of Carbon Mitigation Potential of Bioenergy Alternatives” presented at the 3rd *National Research Conference on Climate Change*, held at IISc Bangalore on November 3-4, 2012.

Poster titled “Techno-economic Assessment of Pumping Alternatives in Dimbhe Region” presented at the 3rd *National Research Conference on Climate Change*, held at IISc Bangalore on November 3-4, 2012.

“Use of Open Source Tools for Water Resources Planning and its use in Vulnerability Assessment *International Conference on Agriculture and Climate Change*, New Delhi, January 29-30, 2013.

“Towards environmental assessments for change in land use of Industrial to Residential and Commercial Land Use Conversions in Core City 15th *International Conference on Humane Habitat (Theme: Reinventing Our Metropolises as Sustainable Humane Habitats)*, Mumbai, February 2-4, 2013.

Narayanan, N. C.

“Rural Urban Water Transfers and PPPs in Drinking Water: A Case Study of Mansi Wakal Dam in Udaipur, Forthcoming, Pune: SOPPECOM

“Water Governance in South Asia: Paradigm Shifts and Civil Society Responses, Routledge, New Delhi

“Sustainable Development: A Critique and Engagement in the *Seminar Sustainable Development: Indo Canadian Perspective* by the Department of Economics, and UGC Area Studies Centre for Canadian Studies, SNDT Womens University, March 19-20, 2013, Mumbai.

“Agriculture to Tourism and Deepening Environmental Crisis in Lake Vembanad in the *Second Anil Agarwal Dialogue 2013: Excreta Does Matter; on urban Indias water supply and waste management challenges* by Centre for Science and Environment at the India Habitat Centre, March 4-5, 2013, New Delhi.

“Centralised Techno-centric Imagination for Waste Water Treatment: A Critique Consultation, *meeting on Climate change aggravating peri urban water stress across South Asia* by the South Asia Consortium for Interdisciplinary Water Resources Studies, February 5-6, 2013, Hyderabad.

“Connecting the Last Mile : Paradigm Shifts and Governance Providing Rural Drinking Water in India, in a *Conference on Water Management* by C. Achuthamenon Foundation, December 21-23, 2012, Trivandrum.

“Agriculture and Environment: Linking Policy and Knowledge in Kuttanad Region, *Kerala Environment Congress-2012* (Agriculture and Environment) at the Rajiv Gandhi Institute of Biotechnology, August 16-18, 2012, Trivandrum.

“Water Sector: Paradigm Shifts and Challenges to Governance at the Department of Political Science, University of Kerala, May 16, 2012, Trivandrum.

“Political Ecology of Resource Degradation in Kerala, in the *Seminar on Broad-streaming Kerala Development: Challenges. and Path Ahead* at the Santhigiri Social Research Institute, May 26-27, 2012, Trivandrum.

Faculty Members and their Specializations

1. A.W. Date

Heat Transfer, Thermodynamics and Energy Conversion, Energy Systems, Appropriate Technology

2. Narendra G. Shah

Agro-Food Industrial development, Biomass processing for food and energy

3. Anand B. Rao

Climate change and CDM, Energy and environment, Sanitation

4. N. C. Narayanan

Water Policy, Governance and Conflicts. Interdisciplinary research in environment and development (political ecology)

5. Subodh M. Wagle

Public Policy and Governance, Independent Regulatory Agencies, Infrastructure Reforms, Water Sector Regulatory, Urban Governance Reform

6. Prasad Modak

Environmental Policy, Environmental Impact Assessment, Environmental Management, Environmental Modeling

7. Bakul Rao

Environmental impact framework for rural areas, State of environment studies, Field assessments & remediation, Matrix characterization, Climate change

8. Satish Agnihotri

Policy and Governance, Evidence based policy advocacy, Food and Nutrition, Woman and Child Health

9. Milind Sohoni

Drinking water-rural and urban, groundwater and watershed modelling. Pedagogy of Engineering



Centre for Formal Design & Verification of Software

Introduction

The Centre for Formal Design and Verification of Software was set up in April 1999, with broad objectiveness to Carry out R&D activities towards building advanced tools and environments, based on formal methods for industrial scale safety-critical applications; to Create resources, develop expertise and provide consultancy for Independent Verification and Validation (IV & V) for safety-critical systems used in DAE and other similar organizations; and to Provide education and training in Verification and Validation (V & V) of such systems.

The importance of formal methods based software engineering in design and verification of safety critical software was the primary inspiration behind DAE's establishing the Centre for Formal Design and Verification of Software (CFDVS) through BRNS, and in collaboration with IIT Bombay and TIFR. The Centre started functioning more than a decade back, in 1999. Although the initial focus of the Centre was on design and verification of software, it was soon realized that the scope of activities needed to be expanded to include both software and hardware systems, in order to provide a comprehensive approach to design and verification of safety-critical systems. Over the past 14 years, it has established itself as a national R & D Centre in the area of formal verification of high-integrity software and hardware. CFDVS has contributed to several R&D programs in formal verification, and has taken up sponsored industrial projects from various Government organizations like VSSC, ADA, DRDL and DRDO, and also from high-profile private organizations like Intel, Microsoft Research, Texas Instruments, General Motors, etc.

Establishing CFDVS has benefited DAE in terms of research and development of advanced formal verification tools. Important benefits to DAE from this endeavor can be summarized as follows.

A significant outcome has been the development of the software tools ACE (1999-2001) and ACE-II (2003-2006). The entire implementation and testing of these tools were carried out by BARC scientists, in close technical collaboration with IIT Bombay. Both ACE and ACE-II are designed for formal verification of

safety critical MISRA C programs. ACE-II can be additionally used to verify absence of run-time arithmetic errors in MISRA C programs. It may be noted that ACE and ACE II have capabilities similar to software tools developed at CEA (French Atomic Energy Agency) that are used in safety assessment of neutron flux measurement systems.

ACE has been used in the verification of trip, interlock and control system software for LWR project (2001-2002), and also in verifying a part of safety PLC software at BARC (2007). ACE was also used to carry out formal verification of GUH software in the LCA project of ADA (2001-2002). ACE-II has been used in formal verification of a part of on-board software developed by DRDL (2007-2008). In addition, formal verification of FDIL diagnostic on-board software from VSSC was done as a case study in 2002. All R&D activities on ACE and ACE-II were done jointly by CFDVS and BARC.

Other tools developed at CFDVS over the past few years include two automatic program analysis tools called Dagger and Spine, for analyzing properties of numerical programs, and for programs manipulating dynamically allocated data structures, respectively. In addition, a tool called TravelARE has been developed for searching state spaces of large sequential circuits. Recognizing the growing use of FPGA-based hardware modules in safety critical control systems, work on development of a tool for formal verification of VHDL programs (intended to be mapped to FPGAs) has already been initiated on collaborative basis with CFDVS. This work is in an advanced stage at present, and experiments on VHDL system designs from BARC are currently being carried out.

Scientists from DAE have also been able to access a large number of academic and public domain verification tools like model checkers, theorem provers and modeling language environments via CFDVS. Evaluation and trial use of expensive tools like SCADE was carried out at the centre. The SCADE suite of tools has now been procured at BARC, IGCAR and NPCIL to help in mathematically rigorous development and verification of embedded software.

Scientists from BARC have also participated in various R&D activities at CFDVS. This work has resulted in journal publications and in papers at peer-reviewed international conferences. CFDVS also organized three workshops on formal methods in safety critical industrial systems (2000, 2002 and 2005) to introduce the use of formal methods to a larger audience engaged in design and verification of safety critical software and hardware systems. A workshop on Model-based Development using Esterel/Scade was also conducted under the aegis of CFDVS in 2009. Scientists from BARC, NPC and IGCAR have attended these workshops in good numbers. Scientists from DAE closely associated with CFDVS have also served as faculty in these workshops.

Principal Investigators of CFDVS have given invited talks and tutorials at various places in India and abroad. These include several invited talks given at BARC, ADA, VSSC, several IITs, Institute of Mathematical Sciences at Chennai, NICTA, Univ. of New South Wales at Sydney, Technical University of Catalunya at Barcelona, National University of Singapore, Stanford University, Google, Intel, Motorola Laboratories at Adelaide, IRST at Trento, Texas Instruments India at Bangalore, etc.

Technical Scope of Work at the Centre

Designing and verifying safety-critical software or hardware is a complex and challenging task. This requires a conscious shift to a systematic way of developing software and hardware, and employing mathematically rigorous techniques as much as possible. Such a systematic development approach necessitates the use of modeling, simulation and formal analysis techniques. Use of formal languages for modeling and specification enables the use of rigorous verification techniques that can give much higher levels of confidence than that obtainable using traditional engineering approaches. This explains why formal specification and verification techniques are being increasingly used in industries developing high integrity computer based systems worldwide. However scalability of verification techniques is a hurdle that has often come in the way of their successful deployment in industrial applications. Despite significant advances over the past three decades in the theory and practice of formal verification, the success of automated verification techniques has been primarily restricted to analyzing simple/shallow properties of large real-life systems, or reasoning about complex/deep properties of small systems. The literature contains a few examples of custom-crafted automated verification of complex properties of large real-life designs. However, generalizing these techniques to larger classes of practical systems is fraught with fundamental computational challenges.

The problem of automatically verifying complex properties of large software or hardware systems is now acknowledged to be one of the most challenging

problems in Computer Science. Needless to say, this has profound implications in today's world where computer systems are all-pervasive. In view of the importance of this problem, there is currently a worldwide effort, popularly known as the "Grand Challenge Problem in Computing" (initiated by Prof. Tony Hoare of Oxford University) that seeks to find the right combination of techniques (both theoretical and practical) that can eventually help in automatically proving non-trivial properties of a million lines of real-life code. It is widely agreed that the magnitude of technological challenges involved in this task is so enormous that it would be impossible to achieve this goal without collaborative efforts of several groups from all over the world, and without several technologies, theories and tools working co-operatively. Several prominent research groups around the world have been working independently and also collaboratively on different aspects of this problem, and significant progress has been reported over the past few years. Since CFDVS is the only R&D Centre in Indian academia dedicated to formal verification activities, it would be appropriate to ensure that the activities of CFDVS over the next 5 years are aligned to the larger objective of this worldwide effort, while continuing to benefit end-users in Indian organizations.

During the past 14 years, tools and techniques developed at CFDVS have been applied successfully to small and medium sized problems, both from the academia and industry. This has demonstrated our ability to handle the technological challenges involved in addressing complex problems at the small to medium scale. The next logical step for CFDVS is to focus on automated techniques for larger real-life systems, and to make the resulting technologies available to the end-user community in India. This can reap significant benefits in verification projects undertaken at DAE, ISRO, DRDO etc. for two reasons. First, aligning with a global effort in formal verification (the Grand Challenge Problem) would allow leveraging on and building on significant work in the public domain being done by other research groups elsewhere in the world. This not only avoids re-inventing the wheel, but also helps bootstrap quickly so that researchers at CFDVS can work on developing cutting-edge formal verification capabilities beyond those already available today. Second, since the technology is intended to be developed in CFDVS, issues related to technology transfer from foreign organizations to DAE, ISRO, DRDO etc. can be effectively circumvented. There is therefore a strong case for CFDVS to be part of the worldwide effort to address the Grand Challenge Problem in Computing, while continuing to develop theories, prototype tools and techniques for problems relevant in the Indian context.

Academic Programmes

In addition to developing technologies and executing actual verification projects, CFDVS has also contributed towards training DAE manpower. One scientist from BARC has completed her M.Tech., and two scientists from BARC are currently admitted to the Ph.D. program of HBNI, with guides from the faculty members at the centre.

Constant support from DAE has helped CFDVS consolidate its activities over the past 14 years. Student strength (at M.Tech and Ph.D. levels) in CFDVS has grown to very healthy numbers over the years. Over the last 14 years, 14 Ph.D. students have worked/are still working on their doctoral dissertation at CFDVS. Of these, five Ph.D. students have already graduated, one student has submitted his dissertation, and one student is currently in the process of writing his dissertation. In addition, more than 70 M.Tech. students and more than 50 B.Tech. students from IIT Bombay have done their M. Tech. and B. Tech. projects, respectively, from CFDVS. Research and development work done at CFDVS has resulted in more than 75 publications in international peer-reviewed conferences and journals.

The use of mathematically rigorous techniques for verification and validation of safety critical software and hardware is growing worldwide, and CFDVS is well-poised to continue contributing towards indigenous development of tools and technologies in this domain in the coming years. Having successfully demonstrated that high-quality formal verification technology can be developed and implemented indigenously during the first 14 years of its existence, CFDVS is now embarking on a more ambitious research

and development plan for the next 5 years. This includes, among other objectives, addressing scalability issues in formal verification, and development of hardware and software analysis tools that can be applied to real-life systems with complex control, data processing and communication components.

R & D Activities

Goals of Research and Development activities of the center include contribution towards larger scale applicability of formal verification techniques to real-life hardware and software systems. The core research agenda of the centre therefore to focus on the development of theories, tools and technologies to scale up the sizes of systems (both hardware and software) to which automated verification methods can be applied. This eventually helps end-users verify larger sub-systems than is currently possible, leading to an overall improvement in the reliability of the system. The Centre performs research with clear objectives to evolve techniques and tools that are easy to adopt in software and hardware development environments for high integrity systems.

The research and development project carried at CFDVS can be broadly classified in the following category:

- Logic, Symbolic Simulation, Model checking and Theorem Proving
- Trusted Translation Systems
- Static Assertion Checking Tools
- Tools and Techniques for GALS Systems and SoCs

List of ongoing research Projects:

Sr. No.	Title of the Project	Status
1	Development of ACE II	Ongoing
2	CESE : A Visual Formalism for Specification and Verification of SoCs	Ongoing
3	VEDAC and EXPERT : Modeling and Verification Tool-sets for GALS	Ongoing
4	Design and Analysis of High-Speed Interfaces for GALS systems	Ongoing
5	Slicing Tools for Synchronous Reactive Programs	Ongoing
6	Reachability Analysis in Timed Automata	Ongoing
7	Bounded Model Checking of IDL formulae	Ongoing
8	Optimizations for Automata-based Validity Checking of QDDC	Ongoing
9	Clock Reducing Approximations in Verification of Timed Automata	Ongoing
10	Symbolic Model checking with Additive Decomposition	Ongoing
11	Inductive Theorem Proving and Rewriting Techniques	Ongoing
12	Verification of Programmable Logic Controllers	Ongoing
13	Test derivation of Distributed Component-based Systems	Ongoing
14	Automatic Generation and Verification of Optimizers	Ongoing
15	Trusted Code Generators	Ongoing

List of sponsored projects

Project title	Sponsored by	Status
Formal Verification of Hardware Modules in ANAIO FPGA	Bhabha Atomic Research Centre, Mumbai	New
Visual Specification and Modeling of Distributed Systems	General Motors, Bangalore	Ongoing
Formal Verification of Akash on board process.	DRDL, Hyderabad	Ongoing
Development of tool for formal verification of VHDL based data and control Dominated designs used in safety critical systems	BRNS, Mumbai	Ongoing
Analysis of SCADE lusture models : Run time monitoring and testing	BRNS, Mumbai	Ongoing
Development of Techniques and Tools for Formal Verification of Computer Systems with Improved Precision and Scalability	BRNS, Mumbai	Ongoing
Feasibility Study of Formal verification of on board Software	Vikram Sarabhai Space Centre, Trivandrum	Completed
Improving GCC ports of ABACUS and ANUPAMA	ANURAG, DRDO, Hyderabad	Completed

Based on consultation with the collaborators and end-users of verification technologies in BARC, and also after taking into account the general requirements of formal verification tools in the design and verification community in India, the following three R&D sub-projects have been identified for execution over the next five years. Each project involves development of theories, techniques and automated tools, and is envisaged to be tested on real designs from DAE organizations.

Safety Checking in Large Finite State Spaces: The goal of this sub-project is to develop a tool for checking safety properties of very large finite state systems with $>2^{1000}$ states. Such systems routinely arise in networks of embedded controllers in safety-critical systems. The theoretical component of this sub-project poses several challenging problems. The proposed tool implementation is intended to run on a custom-configured cluster of high-performance computers in order to achieving scalability with precision.

Configurable Automated Program Analysis: As part of this sub-project, an automated program analysis tool is intended to be developed for detecting run time errors in ANSI C programs. The theoretical component of this sub-project involves developing new techniques to allow a fine-grained control of the accuracy and scalability of program analysis. The tool implementation is intended to improve the precision of analysis i.e. reduce false positives, while allowing non-trivial programs to be automatically analyzed.

Requirements Modeling and Analysis: The goal of this sub-project is to develop a mathematically rigorous framework for capturing and reasoning about requirement specifications. Such a framework is then intended to become the basis for a requirements modeling and analysis tool.

While execution of the three sub-projects outlined above is expected to account for a significant portion of the time commitments of various PIs, students and technical staff associated with CFDVS, other small to medium-scale projects in areas related to formal methods are likely to be initiated by various PIs as well. These projects are expected to lead to better insights and improvements in the three sub-projects identified above, in addition to contributing to the generation of new technologies and applications.

Advanced System (software & hardware) Design and Verification Facility

In addition to core R&D activities as outlined above, CFDVS will further augment and maintain its infrastructure of tools and hardware for supporting rigorous design and verification methodologies for computer-based systems. It is envisaged that a high-end multi-node compute server will be acquired and used as an experimental test bed to develop tools and techniques for compute-intensive formal verification tasks. This is expected to be the first-of-its-kind compute infrastructure in India devoted to formal verification tasks that are required to scale to much

larger systems than those amenable to automated analysis today.

Applications, Consultancy and Services

It is proposed that CFDVS will continue to provide a platform for collaboration to build expertise and resource base in the technologies useful for building reliable systems. The Centre will have the freedom to utilize this expertise and resource base to generate income by taking up sponsored projects from DAE, DOS, DRDO and from other private organizations.

Training and Education

The Computer Science and Engineering (CSE) Department at IIT Bombay currently does not have any specialization in the M.Tech. degree and offers only one common degree to all students. The number of M.Tech. students who work in CFDVS for their final project has increased to more than 10 per year in recent years. In addition, there are close to 5 Ph.D. students working in the area of formal methods at any point of time. These students are keenly sought after for their specialized skills in formal methods by various industries. CSE faculty members associated with CFDVS have been actively discussing the possibility of formulating a specialized M.Tech. program in CSE that focuses on “Formal Methods for Software Engineering”. The CSE Department’s Post Graduate Committee has also been exploring the possibility of introducing streams/specializations in the M.Tech. programme. A subcommittee of CSE faculty members has been formed to make recommendations on this. CFDVS has been working with the subcommittee to propose “Formal Methods for Software Engineering” as a CSE specialization.

Regardless of the outcome of the above process, CFDVS will continue its past trend of organizing periodic special training programs in verification techniques, formal methods, modeling language based design environments, software engineering aspects of programming for high integrity embedded systems, component based designs, program analysis, formal verification of hardware designs, etc. It is envisaged that the frequency of such workshops/training programmes will be increased to at least one in one and a half years.

Centre Staff

Participating Faculty

1. Prof. G. Sivakumar, CSE Dept. (The Head)

Area of Interest: Logic and Automated Reasoning, Networks and Distributed Systems.

2. Prof. Supratik Chakraborty, CSE Dept.

Area of Interest: Formal methods in analysis/validation/ verification of digital systems, Asynchronous and concurrent systems, Timing Analysis.

3. Prof. Sridhar Iyer, CSE Dept.

Area of Interest: Distributed Systems; Mobile computing; concurrency Analysis

4. Prof. S. Biswas, CSE Dept

Area of Interest: Parallel and distributed Processing, Neural Nets, Architecture

5. Prof. A. Sanyal, CSE Dept.

Area of Interest: Functional Programming, Compilers and programming languages

6. Prof. U. Khedker, CSE Dept.

Area of Interest: Programming Languages Compilers, data flow analysis

7. Prof. Kavi Arya, CSE Dept.

Area of Interest : Functional Programming Applications (Domain Specific Languages), Embedded Systems/Parallel Programming Language, Distance Learning

8. Prof. Krishna S., CSE Dept.

Area of Interest: DNA Computing, Membrane Computing, Grammar Systems, combinatorics on words, Formal Methods, Duration calculus and Logics of Time.

9. Prof. Ashutosh Trivedi, CSE Dept.

Area of Interest: Formal Methods in Design, Analysis, and verification of Systems, Hybrid and Timed Automata, Cyber-Physical Systems, Automata, Logic, and Games

10. Prof. S. Akshay, CSE Dept.

Area of Interest : Probabilistic verification with applications to systems biology, Modeling and verification of timed and distributed systems, Formal Methods

11. Prof. R. K. Shyamasundar (Adjunct Faculty)

Area of Interest : Design, Specification and Verification Real-Time programs, Synchronous Programming Languages, Hybrid Systems, Concurrent Process Calculi, Concurrent Constraints, Logic Programming, Mobile Computing, Formal Methods, Distributed Computing, automated reasoning.

12. Prof. P.K. Pandya (Adjunct Faculty)

Area of Interest : Logic, Concurrency, Programming Languages, Formal Methods and Software Engineering. Specific work has been on Duration Calculus, Refinement Algebra and CSP, Hoare Logics for Distributed Programs and Scheduling Theory.

Research Engineers/Scientists:

1. Mr. Abhisekh Sankaran
2. Mr. Hrishikesh Karmarkar
3. Ms. Shetal Shah



Centre for Research in Nanotechnology and Science

Introduction

Centre for Research in Nanotechnology and Science (CRNTS) has been the nodal point wherein the efforts of about 40 faculty across the Institute and affiliated to several departments are synergised. The Centre houses a number of research equipment required for research in Nano and makes them available to all. CRNTS promotes interaction among faculty of different departments and promotes interdisciplinary research in Nano sciences and technology.

Ph.D. programme in Nanotechnology had been initiated in 2008-09. The ratio of the number of successful applicants to the number of total applicants for Ph.D. is close to 1:200.

The facilities being set up in CRNTS presently include the Cell and Tissue Culture facility and the chemistry laboratory for synthesis of nanoparticles and nano-coatings.

Sophisticated Analytical Instrument Facility (SAIF)

From its inception in 1976, Sophisticated Analytical Instrument Facility (formerly known as Regional Sophisticated Instrumentation Centre), has grown over the past three decades and has successfully made efforts to acquire, maintain and provide advanced analytical research facilities to a broad spectrum of users from Universities, R&D laboratories, Industries and Educational Institutions. Due to generous grants from Department of Science and Technology, new sophisticated analytical instruments have been added to the centre at regular intervals to keep up with the ever developing research & advanced technology. One additional state-of-the-art facility viz., HR-LCMS (High Resolution Liquid Chromatograph Mass Spectrometer) added in the year 2013.

SAIF at IIT Bombay continued its endeavor of providing excellent instrumental facilities thereby attracting large numbers of scientific and research personnel from Universities, R&D establishments and

Industry. Large number of students & faculties at IIT Bombay extensively use SAIF facilities for their research work.

The Centre has provided facilities for the analysis of 33298 samples during the year 2012-13. The value of service provided is Rs. 2,14,58,869/- with concession and Rs. 7,91,95,756/- without concession. The contribution of SAIF to the various categories of users from IIT Bombay is given in Table-1 along with value of services provided.

Table 2 provides information on samples analysed during the year 2012-13 and the earnings accrued to SAIF from external users.

Academic institutions, R&D laboratories and Industry have continued to utilize the various analytical facilities at SAIF, IIT, Bombay.

The Department of Science & Technology, New Delhi continued to support SAIF facilities by providing financial support of Rs. 3.48 crore for procurement of state of the art facilities

As before, interaction with industries, various academic institutions has been a part of the SAIF activities, which include R & D. The Centre continues to interact with industries, academic & R&D institute as part of its activities. The following are the significant contributions during the year 2012-13.

**Table 1 : Contribution of SAIF to Academics at IIT Bombay
(April 1, 2012 - March 31, 2013)**

Sr No.	Course	No. of Users	No. of Samples	Charges (Rs.)	As per Industry Charges (Rs.)
1	B.Tech.	9	47	30080	120320
2	Dual Degree Programme	71	1949	1468760	5875040
3	M.Sc.	14	153	104650	418600
4	M.Tech.	115	1858	1313902	5255608
5	Ph.D.	381	14884	10502819	42011276
6	Other (Faculty/Staff)	39	753	709305	2837220
	Total	629	19644	14129516	56518064

**Sample Analysed Information (External+Internal)
Period : (April 1, 2012 to March 31, 2013)**

Sr No.	Instrument	No. of Users	No. of Internal Samples	No. of External Samples	No. of Samples	Internal Charges (Rs.)	External Charges (Rs.)	Charges (Rs.)
1	CHN	156	483	920	1403	267000	902512	1169512
2	ESEM	136	1212	0	1212	513550	0	513550
3	ESR	162	455	1648	2103	109110	316677	425787
4	ESR-JEOL	15	0	104	104	0	41755	41755
5	FEG-SEM	452	4528	1715	6243	4001970	1059751	5061721
6	FEG-TEM	282	2116	2	2118	3780506	6000	3786506
7	FTIR-IMG	273	1885	1024	2909	269150	198123	467273
8	GC-HRMS	119	143	760	903	77500	532082	609582
9	IAS	7	60	21	81	7500	2950	10450
10	ICP-AES	256	4556	3467	8023	1468025	931055	2399080
11	LCMS	113	978	832	1810	719750	816565	1536315
12	LRS	127	1904	51	1955	1909000	68639	1977639
13	NMR	146	141	1522	1663	95850	1020745	1116595
14	SIMS	46	185	50	235	186000	98054	284054
15	TEM	239	488	1022	1510	381300	982268	1363568
16	TG/DTA	121	269	449	718	182850	285688	468538
17	XRF	26	241	67	308	160455	66489	226944
	Total	2676	19644	13654	33298	14129516	7329353	21458869

Total Number of Samples Analyzed, Number of Users & Charges

Earnings are from External Samples Rs. 7329353

75% discount for University/Educational Institute

40% discount for research Institute

Samples analysed in different categories (April 1, 2012 - March 31, 2013)

Internal IITB	University	National Lab	Large Scale Industry	Total
19644	12113	933	608	33298

Amount charged with concession to users (Rupees) (April 1, 2012 - March 31, 2013)

Internal IITB	University	National Lab	Large Scale Industry	Total
14129516	4929599	839313	1560441	21458869

Amount charged without concession to users (Rupees)

Period : (April 1, 2012 - March 31, 2013)

Internal IITB	University	National Lab	Large Scale Industry	Total
56518064	19718396	1398855	1560441	79195756

Table 2: Samples Analysed (April 1, 2012 - March 31, 2013)

Annual Internal External Report				
Type	Users	Samples	Charges	Actual Charges
Internal	629	19644	14129516	56518064
External	2047	13654	7329353	22677692
Total	2676	33298	21458869	79195756

Department Wise Total Internal Charges

(April 1, 2012 to March 31, 2013)

Sr No.	Department	No. of Users	No. of Samples	Internal Charges (Rs.)	As per Industry Charges (Rs.)
1	Biosciences and Bioengineering	56	2035	1316355	5265420
2	C.E.S.E.	18	420	254440	1017760
3	Chemical Engineering	52	2506	1216575	4866300
4	Chemistry	69	952	674180	2696720
5	Civil Engineering	24	817	584325	2337300
6	Corrosion Science & Engg	4	46	29700	118800
7	Corrosion Science & Engineering	3	26	23000	92000
8	C.R.N.T.S	31	1647	1169045	4676180
9	C.R.N.T.S.	19	195	148684	594736
10	Earth Sciences	18	491	395750	1583000
11	Electrical Engineering	40	703	745520	2982080
12	Energy Science & Engineering	57	2221	1843990	7375960
13	Engineering Physics	4	18	25500	102000
14	Mechanical Engineering	35	419	255115	1020460
15	Met.Engg & Mat.Science	117	4627	3580147	14320588
16	Physics	40	1091	1055720	4222880
17	School of Bio-Science and Bio-Engg	18	1169	690525	2762100
18	School of Bio-Science & Bio Engineering	24	261	120945	483780

R&D Activities

Sponsored Research Projects:

Ongoing Projects:

“Development and Characterization of Nanophosphors for strategic applications PI: Mayuri N. Gandhi, Co. PI: Ajit R. Kulkarni, funded by DRDO.

Consultancy Projects:

“Analysis and Process modification of CETP at Ankleshwar Sponsored by (Funded by Enviro Technology Ltd.,) PI: Dr. C.S. Harendranath

Conferences/Symposia/Workshops/Seminars (participated/Papers Presented)

Uddipta Chatterjee, Siddhartha P. Duttagupta, Mayuri N. Gandhi

“Optical and Electrical Characterization of $\text{Cu}_2\text{ZnSnS}_4$ thin films prepared by non-vacuum process for photo detector application, *ISPTS I*, 2012

Uddipta Chatterjee, Siddhartha P. Duttagupta, Mayuri N. Gandhi, Nirav D. Vora, Isodiana Crupi

“Study of photoluminescence and electrical properties of CZTS/CZTSE thin films deposited by vacuum and non-vacuum process, *EMRS Strasbourg*, Spring Meeting, 2012.

Pramod K Nampoothiri, Mayuri N. Gandhi and Ajit R. Kulkarni

“Near Infrared emitting Ln^{3+} doped LAF_3 polymer nanocomposites,, communicated to *Materials Communication*.

Rajan Singh, Ajit R. Kulkarni and C.S. Harendranath
“Effect of Sintering Temperature on Composition, Microstructure and Electrical Properties of $\text{K}_{0.5}\text{Na}_{0.5}\text{NbO}_3$ Ceramics, *Current Applied Physics* (Under Review)

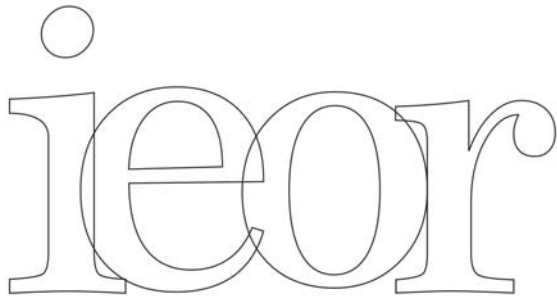
Extension Activities

Workshop on EPR spectroscopy

A workshop on EPR spectroscopy (Techniques and Applications) was held during the period February 4-6, 2013 at SAIF, CRNTS, IIT Bombay.

The three days workshop aimed at providing an exposure on instrumentation, latest trends in application and techniques with respect to EPR Spectroscopy. Laboratory session/demonstration with a state of the art ESR Spectrometer with advanced features on the dedicated software was an important aspect of this programme. Many research scholars from various universities across the country participated in the workshop. The programme included lectures from invited experts in the field from IIT, Bombay and other institutes. An application scientist from JEOL, JAPAN gave lectures on various attachments, applications on JEOL EPR Spectrometer. He was available for laboratory sessions too scheduled for afternoons sharing his expertise.

Topics covered include: 1. Theory and Instrumentation, 2. Hyperfine interaction in EPR, 3. Applications of EPR in Physics, Chemistry, biology etc., 4. Ferrites and EPR technique, 5. EPR of radicals, defect centres, nano materials etc.



Industrial Engineering & Operations Research

Introduction

Industrial Engineering and Operations Research (IEOR) at IIT Bombay is an interdisciplinary programme that offers Ph.D. and M.Tech. degrees in IEOR and an M.Sc.-Ph.D. dual degree in Operations Research. IEOR has seven faculty members and one emeritus fellow. Together with other institute faculty members who are associated with the programme in teaching and research, IEOR has a depth and breadth in capability that makes the programme unique in the country. Two new faculty joined the programme in the year 2012-13.

Academic Programmes

IEOR offers M.Tech., Ph.D. degrees and an M.Sc-Ph.D. dual degree. The current strength of Ph.D. students is 15 and is on the rise in the last two years. The M.Sc.-Ph.D. dual degree programme, started in 2009-10, now has 29 students on rolls. The M.Tech. programme has a total strength of 37 students. IEOR is also a participant in the IITB-Monash Academy Ph.D. programme, with four doctoral students in the joint programme.

A new Ph.D. level course, IE805: Advanced Topics in Integer Programming was offered in Spring 2013 with focus on a latest research in the field of integer programming. A new M.Tech. level course, IE606: Analysis and Control of Queues, was introduced in Spring 2013. This course covers advanced topics in queueing theory. IEOR continues to contribute to UG/PG teaching with significant number of students from other departments opting for IE labeled courses as electives.

Degrees Awarded in 2011-12

M.Tech. : 13

R&D Activities

The R&D activities of the IEOR group span a variety of areas ranging from optimization to simulation and scenario analysis. The supporting agencies range from government departments, research labs, private industry and private institutions.

Sponsored Research Projects

Project Title	Sponsoring Agency	Status
Application of optimal control and game theory in communication networks	Indo French Centre for Applied Mathematics	New
Second Generation Area Traffic Control System (CoSiCoSt2G)	Department of Information Technology	Ongoing
Some Train Pathing Problems	Department of S and T and DFG – Germany	Ongoing
Infrastructure aware resource allocation, Continuous Polling Models and Learning Algorithms	IRCC – Seed Grant	New
Scheduling Secondary and Primary users: utilizing surplus serving capacity	IRCC	New
Theory, Algorithms and Software for Mixed-Integer Nonlinear Optimisation	IRCC	New

Consultancy Projects

Apart from ongoing projects, the IEOR department undertook three consultancy projects which led to an income of Rs 10,96,493.

Visitors to the Department

Prof. Uday V. Shanbhag, Pennsylvania State University, delivered a lecture on “analysis and solution of stochastic variational inequality problems.”

Prof. Matthew Jackson, Stanford University, delivered a lecture on “Diffusion of microfinance” at the Institute Colloquium

Mr. Sayan Bhattacharya, doctoral student at Duke University, delivered a lecture on “Competitive equilibria with budget limits.”

Prof. Lavanya Marla, Carnegie Mellon University, delivered a lecture on “Robust resource allocation under uncertainty for transportation systems.”

Prof. Sudarshan Iyengar, IIT Ropar, delivered a lecture on “Human problem solving strategies on complex networks.”

Mr. Jai Narayan Tripathi, doctoral student at Electrical Engineering Department at IIT Bombay, delivered a lecture on “Optimization of power delivery networks.”

Prof. Niranjan Blachandran, Mathematics Department at IIT Bombay, delivered a lecture on “The probabilistic method.”

Prof. Anita Schoebel, University of Goettingen, delivered a lecture on “Optimization in public transport.”

Mr. Amit Parekh, FICO, delivered a lecture on “Math goes mainstream - Stories of applications of advanced analytics and optimization.”

Ms. Neeraja Sahasrabudhe, doctoral candidate at the University of Padova, delivered a lecture on “Covariance realization problems for spin systems.”

Prof. Raghavendra Gadagkar, Indian Institute of Science Bangalore, delivered a lecture on “War and peace: Conflict and cooperation in an insect society” at the Institute Colloquium.

Dr. Anuradha Banerjee, postdoctoral researcher at IIT Kharagpur, delivered a lecture on “Bulk-service queues with batch-size-dependent service.”

Prof. Dileep More, Indian Institute of Management Calcutta, delivered a lecture on “Suppliers selection and development using DEA: A case study.”

Dr. Shashi Mittal, Amazon Inc., delivered a lecture on “Robust appointment scheduling.”

Dr. Yogeshwaran Dhandapani, Postdoctoral researcher at the Technion – Israel Institute of Technology, delivered a series of three lectures on “Stochastic Geometry.”

Extension Activities

Three summer interns worked in IEOR in this year, working on various projects

Conferences/ Symposia/ Workshops/ Seminars (participated/Papers Presented)

Kulkarni Ketki, Venkateswaran Jayendran, “Hybrid Simulation and Optimization Approaches to the Scheduling Problem”, *ISCI2013*, February 21-23, 2013, IITM Research Park (Best paper award)

Vanga Ratnaji, Gupta Manu, Venkateswaran J., “Performance Evaluation of Bat Algorithm to Solve Deterministic and Stochastic Optimization Problems, *ISCI2013*, February 21-23, 2013, IITM Research Park.

John J., and Venkateswaran J., “Managing Impact of Epidemics: Epidemic Preparedness and Volunteer Staff Hiring”, *International Conference on Optimization Modelling and Applications (OPTIMA2012)*, November 29-December 1, 2012, Delhi University.

Thomas Anu, Krishnamoorthy Mohan, Singh G., and Venkateswaran, J., “A Single Machine Scheduling Problem with Partial Information Sharing,” *International Conference on Optimization, Computing and Business Analytics*, December 20-22, 2012, ORSI, Kolkata.

Gupta Manu, Venkateswaran J., Hemachandra, N., “Optimal pricing and pre-emptive scheduling in exponential server with two classes of customers,” *International Conference on Optimization, Computing and Business Analytics*, December 20-22, 2012, ORSI, Kolkata.

Veeraruna Kavitha, “Analysis of hybrid polling systems via discretization”, Lectures on Probability and Stochastic Processes VII, Indian Statistical Institute, Delhi, December 2012.

Singh, T. R., Rangaraj, N., Schuette, A., and Schlange, C.,
“Calculation of products virtual configurations sets for variety management”, *XVI Annual International Conference of SOM*, New Delhi, India, December 2012.

Mahajan, A., Leyffer, S., and Kirches, C.,
“Algorithms for solving convex MINLPs with MINOTAUR”, *21st International Symposium on Mathematical Programming*, August 2012.

Narayanan, V.,
“Some properties of integer hulls of convex sets”, *21st International Symposium on Mathematical Programming*, Berlin, August 2012

“Facial structure and representation of integer hulls of convex sets”, *Integer Programming and Combinatorial Optimization (IPCO) 2013*, Valparaiso, Chile, Springer, March 2013.

Kulkarni, K., and Venkateswaran, J.
“Hybrid simulation and optimization approach to the scheduling problem”, *International Simulation Conference of India*, IIT Madras, Chennai, February 2013.

Vanga, R., Gupta, M. Kumar, and Venkateswaran, J.,
“Performance evaluation of bat algorithm to solve deterministic and stochastic optimization problems”, *International Simulation Conference of India*, IIT Madras, Chennai, February 2013.

Ghosh, A., and Narayanan, V.,
“Characterizations of semidefinite representable sets”, *International Symposium on Applied Optimization and Game Theory Models*, Indian Statistical Institute, Delhi Centre, January 2013.

Narayanan, V., and Sharma, K.,
“Design of survivable communication networks”, *International Symposium on Applied Optimization and Game Theory Models*, Indian Statistical Institute, Delhi Centre, January 2013.

Ghatak, A., and Rao Mallikarjuna, K.S.,
“Spatial games and evolutionary stability against multiple mutations”, *Fifteenth International Symposium on Dynamic Games and Applications*, Bysice, Czech Republic, ISDG, July 2012.

Singh, T. R., Schlange, V., Rangaraj, N., and Schuette, A.,
“Customer order healing: Translating products from past to future”, *International Conference on Optimization Modelling and Applications (OPTIMA-2012)*, University of Delhi, Delhi, December 2012.

Damayyawar, D., and Rangaraj, N.,
“Inventory Planning and Management of a Cold Storage Facility for Grapes”, *XVI Annual International Conference of SOM*, New Delhi, India, December 2012.

Venkateswaran, J., and Joy, J.,
“Managing Impact of Epidemics: Epidemic Preparedness and Volunteer Staff Hiring”, *International Conference on Optimization Modelling and Applications (OPTIMA-2012)*, University of Delhi, Delhi, December 2012.

Singh, T. R., and Rangaraj, N.,
“Managing product variety through customer choice modelling”, *Third Biennial Supply Chain Management Conference*, Indian Institute of Management Bangalore, Bangalore, December 2012.

Verma, A. S., and Rangaraj, N.,
“A New Heuristic for Car Selection in Automotive Paint Shop Scheduling”, *International Conference on Optimization Modelling and Applications (OPTIMA 2012)*, University of Delhi, Delhi, December 2012.

Hansuwa, S., Rangaraj, N., and Pandey, R.,
“Some practical variants of the vehicle routing problem”, *International Conference on Optimization Modelling and Applications (OPTIMA-2012)*, University of Delhi, Delhi, December 2012.

Singh, V. V., Hemachandra, N., and Mallikarjuna Rao, K.S.,
“An SQP-based algorithm for computing Nash Equilibrium of stochastic games”, *International Conference on Optimization Modelling and Applications (OPTIMA-2012)*, University of Delhi, Delhi, December 2012

Rao Mallikarjuna, K.S.,
“Instantaneous Strategies in Stochastic Differential Games”, *Indo-UK Meeting on Controlled Stochastic Processes*, University of Liverpool, March 27, 2013.

BIG Workshop on Rationality, Decision and Evaluation, IGIDR, Mumbai, December 10–14, 2012

Conferences/Symposia/Workshops/ Seminars (Coordinated/ Chaired by Faculty)

The IDP group had Co-Organizer, Workshop and Conference on Stochastic Processes in Engineering, during March 10- 6, 2013 at IIT Bombay.

IEOR day was organized in November 2012, with talks by students and faculty and a quiz.

Invited Lectures

Rao Mallikarjuna K.S.,

“Game Theoretic issues in Constrained Nonlinear Optimization”, Advanced Workshop & Tutorial on Operations Research (AWTOR) 2012, IIM Indore, August 22-25, 2012.

“Tutorial on Evolutionary Game Theory”, Advanced Workshop & Tutorial on Operations Research (AWTOR) 2012, IIM Indore, August 22-25, 2012.

“Distributed Games”, Research Meeting on Strategic Network Formation and Evolution, BIRU, Indian Statistical Institute, Kolkata, March 7- 8, 2013.

Venkateswaran, J.,

Presented a keynote address on 'Hybrid Simulation and Optimization Approaches' at the ISCI 2013 conference, held during February 21-23, 2013 at IITM Research Park.

Narayan Rangaraj,

“Role of mathematical modeling and simulation in operations management” at Centre for Mathematical Modeling and Computer Simulation, Bangalore, December 2012.

Hemachandra, N.,

“A model for equilibrium in some firm-market interactions”, International Symposium on Applied Optimization and Game Theory Models, 2013, Indian Statistical Institute, Delhi Centre, January 2013.

Honorary Work

IEOR faculty refereed publications for “Mathematical Programming”, “Computational

Optimization and Applications”, “Mathematical Control and Related Fields”.

Faculty Members and their Specializations

1. Ashutosh Mahajan

Theory, Algorithms and Software for Mixed-Integer Linear and Nonlinear Optimization.

2. Veeraruna Kavitha

Stochastic processes, Performance Analysis, Queuing Theory, Polling systems, Optimal control, Game theory, Stochastic approximation, Wireless communications

3. Vishnu Narayanan

Integer Programming, Convex Optimization, and Polyhedral Theory

4. K.S. Mallikarjuna Rao

Game theory, Stochastic Control and Probability

5. Jayendran Venkateswaran

Modeling & Distributed Simulation (Discrete-event, System Dynamics), Integrated Supply Chain Analysis

6. N. Hemachandra

Methodologies like Markov decision models, Queueing models, Game theory, etc. Applications of such methodologies to Communication networks, Supply chains, Financial engineering, Logistics and Power systems.

7. Narayan Rangaraj

Optimization and Operations Research, Logistics and Supply Chain Management, Railway Operations, Transportation.

8. P.G. Awate

Scheduling, Inventory Management, Neural Networks, Knowledge-based Systems

Associated Faculty: Teaching and Research

A. Subash Babu (ME)

P. Chaporkar (EE)

Associated Faculty: Research

G. K. Adil (SJMSOM)

R. Banerjee (ESE)

V. S. Borkar (EE)

A. A. Diwan (CSE)

D. Manjunath (EE)

K. Moudgalya (Chem Engg)

A. Ranade (CSE)

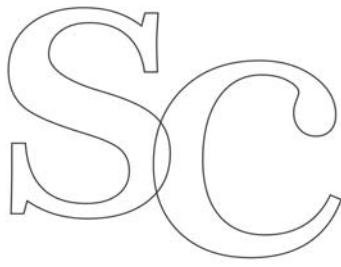
S.A. Sabnis (MA)

S. A. Soman (EE)

A. Subramanyam (MA)

K. Suresh Kumar (MA)

V. M. Tom (Civil Engg.)



Systems & Control Engineering

Introduction

The Systems and Control group formed in 1977, is a unique interdisciplinary program in the country that offers post-graduate education (M.Tech./Ph.D.) in the broad area of Systems and Control.

The group has eight core faculty members and about 11 associated faculty members from other academic units of the institute. The average doctoral strength is around 20 and the M.Tech. intake every year is around 20.

The research focus of the core group is in the areas of nonlinear control, robotics, path-planning, embedded control, coordination of autonomous vehicles, multi-agent systems, sliding mode control and applications, fractional-order modelling and control, optimization and optimization-based control, and stochastic processes. In addition, research in the areas of process control, identification, behavioural theory, matrix computation, automotive control are being pursued by the associate faculty members.

Many of the alumni of the group hold senior positions in the control and automation industry and research laboratories in the country.

Academic Programme

The Systems and Control group offers M.Tech. and Ph.D. programs.

Student Intake:

M.Tech.	: 16
Ph. D.	: 4

Degrees Awarded:

M.Tech.	: 20
Ph. D.	: 2

R & D Activities

Sponsored Research Projects

New	: 1
Ongoing	: 9
Faculty Involved	: 6

Sponsored Research Projects are as listed below:

Project Title	Sponsoring Agency	Status
Games Control and Optimization with Coupling Constraints	DST	New
Multivariable Control Scheme for Gas Turbines using the Model Predictive Control Strategy	DRDO	Ongoing
Design of Manually Readable & Automatic Readable domestic water meters suitable for rural areas	Ministry of Drinking Water and Sanitation	Ongoing
Constraint-based design of controllers and Pre filters (Indo- French collaboration)	DST	Ongoing
Decentralized Control of Multi-satellite formation flying	ISRO	Ongoing
Analysis and implementation of cooperative control behavior of adistributed multi-vehicle system	IRCC	Ongoing
R&D in collaborative missions-Phase 1	DST	Ongoing
Virtual Lab - Single board heating system	MHRD	Ongoing
AUV Matsya	IRCC	Ongoing
Control under communication constraints	IRCC	Ongoing

Visitors to the Department

Prof. Partha Guha of S N Bose National Centre for Basic Sciences visited the group during January 27 February 2, 2013. He delivered a series of lectures on nonholonomic dynamics and quantum control.

Conferences/Symposia/Workshops / Seminars (participated and Papers presented)

Sinha Arpita

“Consensus algorithms in multiagent systems”, CEP Course on Design Concepts on Control System for Guided Weapons and Vehicles, Naval Science and Technology Laboratory, India, July 2012.

Vachhani Leena and Sinha Arpita

Organized a QIP course on Motion planning and coordination of autonomous robots during May 7-11, 2012.

Chaterjee Debashish

Co-organizer for IMI workshop on Probability, IIT Bombay.

Kulkarni Ankur

Attended the IEEE Conference on Decision and Control, Maui, Hawaii, USA, December 2012.

Baburaj, P., and Bandyopadhyay, B.

“Discrete-time Integral Sliding Mode Flow Control for Connection-Oriented Communication Networks,” *12th International conference on Control automation, Robotics and Vision*, Guangzhou, China, December 5-7, 2012.

Lal Priya P.S., and Bandyopadhyay, B.

“Periodic Output Feedback based Discrete-Time Sliding Mode Control of Uncertain Linear Systems with Input Delay,” *IEEE International Multi Conference on Automation, Computing, Control, Communication and Compressed Sensing*, Kerala, March, 2013.

Patil Mukesh D., Nataraj, P.S.V., and Vyawahare, A. Vishwesh

“Automated Synthesis of Fractional-order QFT Prefilter using Interval Constraint Satisfaction Technique, the *5th IFAC Symposium on Fractional Differentiation and its Applications*, China, May 14-17, 2012.

Vyawahare, A. Vishwesh, and Nataraj, P.S.V.

“Development and Analysis of the Zero Power Fractional-order Transfer Function Model for a Nuclear Reactor with Slab Geometry, *The 5th IFAC Symposium on Fractional Differentiation and its Applications*, China, May 14-17, 2012.

Vyawahare, A. Vishwesh, and Nataraj, P.S.V.,

“Development and Analysis of the Fractional Point Reactor Kinetics Model for a Nuclear Reactor with Slab Geometry, *The 5th IFAC Symposium on Fractional Differentiation and its Applications*, Nanjing, China, May 14-17, 2012.

Srikant, S., and Akella, M. R.

“Stabilizing Controllers for Multi-Input, Singular Control Gain Systems, Completed, under review in *International Journal of Systems Science*.

Daniel Cullina, Kulkarni, A. Ankur, and Kiyavash Negar

“A Coloring Approach to Constructing Deletion Correcting Codes from Constant Weight Subgraphs”, *Proceedings of IEEE International Symposium on Information Theory*, 2012.

Kulkarni, A. Ankur, and Cokeman, P. Todd

“An Optimizer’s approach to Stochastic Control Problems with Nonclassical Information Structure”, *Proceedings of the IEEE Conference on Decision and Control*, 2012.

Awards and Distinctions

Nataraj, P.S.V.

Awarded by NVIDIA corporation, USA, for Accelerated Supercomputing of Global Optimization Algorithms. The award is for innovative use of GPUs. NVIDIA has also nominated him as the Chairperson of the University Coordination committee for India. Moreover, NVIDIA has sponsored a CUDA Research Center (CRC) at IIT Bombay, to support research in accelerated supercomputing with CUDA and GPUs.

Chaterjee Debashish

Received the Swiss National Science Foundation award for international visit number: IZKOZ2_142780; Visiting Professor to the Automatic Control Laboratory, ETH Zurich. June - August 2012.

Kulkarni Ankur

Has been awarded for INSPIRE Faculty Award, Department of Science and Technology, Government of India, 2013.

Invited Lectures

Prof. R. N. Banavar and his students Mr. H. Simha Mr. R. Bayadi, Mr. S. R. Sahoo and Ms. S. Gajbhiye delivered a series of lectures in the IITM-IITB Dynamics and Control Lecture Series held on during December 26-28, 2012 in IIT Madras, Chennai.

Kulkarni A. Ankur

Delivered a lecture on "Global Equilibria of Multi-leader Multi-follower games", at the Midwest Workshop on Control and Game Theory, Urbana, Illinois, USA, April 2012.

Faculty Members and their Specialization

Core Faculty:

1. Banavar R. N.

Convener, Systems and Control Engg.
Optimal control, Geometric mechanics and nonlinear control, Lagrangian and Hamiltonian mechanics.
Application areas - Mechanical (robotics), aerospace (launch vehicles, spacecrafts) and electrical power system networks.

2. Bandyopadhyay B.

Large Scale Systems, System Reduction, Nuclear Reactor Control, Sliding Mode Control (Continuous & Discrete), Power Systems - Stability & Control, Modeling, Control & Implementation of Smart Structures, Space Launch Vehicles - Stability & Control, Gas Turbines - Stability & Control, Flexible manipulators, Stability & Control Multirate Output Feedback based Control (POF / FOS].

3. Nataraj P. S. V.

Robust Stability and Control especially using quantitative feedback theory (QFT) techniques, Nonlinear System Analysis and Control, and Reliable Computing using interval analysis techniques.

4. Sinha Arpita

Cooperative control of Multi-agent systems, Resource Allocation, Team theory and its application, Game theory.

5. Vachhani Leena

Reconfigurable hardware, Embedded control systems, Robotic path planning algorithms, Hardware/software co-design.

6. Chatterjee Debasish

Constrained and optimization based control, in particular, stochastic model-predictive/receding-horizon control; switched and hybrid systems; control under communication and computation constraints; stochastic control; applications of stochastic process in engineering systems

7. Sukumar Srikant

Nonlinear and adaptive control, non-autonomous controller and state observer design, decentralized control, cooperative and network control, hybrid systems, mathematical control theory.

Application areas: Spacecraft attitude control, bio-mechanical systems, dynamics and control, power systems, autonomous vehicles and robotics, formation flying and consensus theory.

8. Ankur Kulkarni

Game theory, stochastic control, optimization, economics, information theory, combinatorics and systems biology.

Associated Faculty

1. Hemendra Arya

Department of Aerospace Engineering, Composite structures, Systems Design & Engineering Mechatronics

2. Moudgalya Kannan

Dept. of Chemical Engg.
Process Control, Simulation, Software Engg

3. Patwardhan Sachin C.

Dept. of Chemical Engg.
Control relevant dynamic modeling of linear and nonlinear systems, Nonlinear model predictive control, On-line fault diagnosis and fault tolerant control, Nonlinear state estimation and particle filtering, Online parameter estimation and adaptive predictive control

4. Bhartiya Sharad

Dept. of Chemical Engg.
Modeling, Identification and control of hybrid systems, Analysis of biological regulatory networks

5. Bhushan Mani

Dept. of Chemical Engg.
Fault detection and diagnosis, Sensor network design, constrained state estimation, Optimal alarm management, Statistical data analysis applications to pollution source identification and fermentation operations.

6. Belur Madhu N.

Dept. of Electrical Engg.
Systems & Control theory, Behavioral theory of Systems and Control, Optimal control, Numerical aspects, Hybrid systems

7. Pillai H. K.

Dept. of Electrical Engg.
Control theory; Behavioural theory of Systems; Multidimensional systems; optimal control; Coding theory; Optimization techniques.

8. Chakraborty Debraj

Dept. of Electrical Engg
Optimal Control, Differential Games, Nonlinear Feedback Theory, Control of Biological Systems and Diseases.

9. Borkar Vivek S

Dept. of Electrical Engg.

Stochastic Control, Learning Control Theory, Random Processes.

10. Gandhi P. S.

Dept. Mechanical Engg.

Nonlinear Dynamical Systems and Control, Mechatronics, Micro Electromechanical Systems (MEMS), Robotic systems, kinematics and dynamics, appropriate technology for India.

11. Suryanarayanan S.

Dept. Mechanical Engg.

Applications of tools from systems/control theory towards the design of mechatronic systems. Current problems of interest include controller design for large wind turbines, active flow control, controllers for automotive systems, energy management strategies for hybrid power devices.



Educational Technology

Introduction

The Interdisciplinary Programme (IDP) in Educational Technology (ET) was started in the institute from the autumn semester of the academic year 2010-11. Faculty members from almost all the departments of the institute are participating in the IDP. Different aspects of research in educational technology are being addressed by various research groups. Some of the areas are instructional design in different streams of science and engineering, video coding for the purpose of distance education - technology of coding and transmission, learner-centric tutoring systems, pedagogy and evaluation for online learning, concept inventory development, use of technology in classroom pedagogy, specific use of WEB 2.0 technologies, transformative pedagogical engagement for the student and the teacher, implementation and assessment of ICT tools to enhance learning in new or constrained situations, open source software, open source hardware, synchronous and asynchronous education, educational, methodologies, mining for textbook generation, design and deployment of virtual laboratories and remote triggered experiments, employing multivariate statistical/pattern recognition

methods for use in evaluating research methodologies, technology enhanced learning in different areas of science and engineering, exploring the role of simulations, models and animations in teaching large classes, designing collaborative environments for learning and social interaction, scaffolding for online teaching of programming to Hindi-medium students, methodology for creating 3D educational visualizations and exploring their effectiveness as compared to 2D animations, economic impacts of technology-enabled education and socioeconomic empowerment through technology education.

Academic Programme

The IDP Educational Technology offers a Ph.D. programme in educational technology and now, 15 students are pursuing their Ph.D. programme. The two courses that are offered to these students are "Introduction to Educational Technology and Research Methods in Educational Technology. The students are also encouraged to take additional courses in their core disciplines. These students include several teachers from colleges in and around Mumbai.

R&D Activities

Sponsored Research Projects

Title of the Project	Sponsored by	Status
"Project OSCAR++, Open Source Courseware Animations Repository	Ministry of Human Resource Development under the National Mission on Education through Information and Communication Technologies	Ongoing
"Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning	Ministry of Human Resource Development under the National Mission on Education through Information and Communication Technologies	Ongoing

Conferences/Symposia/Workshops/ Seminars (participated/Papers Presented

Kadam Kapil, Sahasrabudhe Sameer and Iyer Sridhar
“Improvement of mental rotation ability using Blender 3D,” *IEEE International Conference on Technology for Education (T4E)*, Hyderabad, India, July 2012.

Pal Yogendra and Iyer Sridhar

“Comparison of English versus Hindi medium students for programming abilities acquired through video-based instruction,” *IEEE International Conference on Technology for Education (T4E)*, Hyderabad, India, July 2012.

Iyer Sridhar and Murthy Sahana

“Demystifying Networking: Teaching non-majors via analogical problem solving,” *ACM Symposium on Computer Science Education (SIGCSE)*, Denver, USA, March 2013.

Mavinkurve Madhuri and Murthy Sahana

“Interactive visualization to teach engineering design competencies,” *Workshop Proceedings of 20th International Conference and on Computers in Education (ICCE 2012)*, Singapore, November 2012.

Banerjee Gargi and Murthy Sahana

“Effect of Instructors’ Pedagogy and TPACK on integration of computer based visualizations,” *Workshop Proceedings of 20th International Conference and on Computers in Education (ICCE 2012)*, Singapore, November 2012.

Tembe, B.L., and Kamble, S.K.

“Use of concept maps as an assessment tool in mechanical engineering education, *International Conference on Learning and Administration in Higher Education*, May 2-5, Nashville, Tennessee, 2012

Kamble, S.K. and Tembe, B.L.

“Teaching of the Second Law of Thermodynamics: Evaluation of learners’ concept maps, *The Second International Congress on Interdisciplinary Research and Development*, Bangkok, Thailand, May 31 - June 1, 2012.

“The effect of concept maps on achievement and attitude in a mechanical engineering course, *IEEE International Conference on Teaching, Assessment and Learning for Engineering 2012*, Hongkong (TALE2012).

“The effect of concept maps on problem solving performance in a mechanical engineering course,” *2nd World Conference on Educational Technology*

Researches Near East University, June 2012, Nicosia – North Cyprus.

Workshop Conducted

Research Methods in Educational Technology, under the “Teach 10000 Teachers” project of the National Mission in Education through ICT, MHRD, February 2-9, 2013.

Faculty Members and their Specialisations

1) P. J. Bhat

Educational Technology in Biosciences

2) M. C. Deo

Instructional Design for Civil Engineering

3) T. L. Eldho

Role of Geospatial Technologies in Enhancing Technical Learning, New Instructional Design Paradigms for fluid mechanics learning

4) V. M. Gadre

Video Coding for the purpose of Distance Education technology of coding and transmission

5) U. N. Gaitonde

Instructional design in Mechanical Engineering and Thermodynamics

6) Meenakshi Gupta

Educational Psychology

7) Sridhar Iyer

Learner-centric tutoring systems, Pedagogy for online learning, Concept inventory development

8) Shishir K. Jha

Use of technology in classroom pedagogy, Specific use of WEB 2.0 technologies, Transformative pedagogical engagement for the student and the teacher

9) Anirudha Joshi

Visual Design, Usability Studies, Human-Computer Interface Design, Interface Evaluation, Interface Design for Indian languages, New Media Design

10) A. V. Mahajan

Technology Enhanced learning, Physics Education

11) Kannan Moudgalya

IT literacy, bridging digital divide, virtual labs, open source software, open source hardware, synchronous and asynchronous education, educational methodologies, mining for textbook generation

12) Sahana Murthy

Pedagogy and evaluation of e-learning content Implementation and assessment of ICT tools to enhance learning in new or constrained situations, Use of technological tools in physics education

13) K. Narayanan

Economics of Education Economics impacts of Technology-enabled Education, Socioeconomic empowerment through technology education

14) Santosh Noronha

Design and development of remote triggered experiments, Employing multivariate statistical/pattern recognition methods for use in evaluating research methodologies

15) Prita Pant

Technology- Enhanced learning in metallurgical engineering and materials science, Exploring the role of models and animations in teaching large classes (up to 100 students)

16) M. B. Patil

Design and deployment of virtual laboratories and remote triggered experiments

17) D. B. Phatak

Educational Technology for Countrywide Education, particularly in Computer Science and Engineering

18) Ravi Poovaiah

Designing collaborative environments for learning and social interactions, Designing for children- with a focus on 'play and learn', Information design, structuring and visualisation, Interface design and Designing interactions, Temporal and spatial aspects of visual language

19) C. S. Solanki

Educational technology for photovoltaics

20) K. Sudhakar

Educational methodology

21) B. L. Tembe

New instructional design paradigms for thermodynamics and statistical mechanics, Application of methods of educational technology in chemical education

22) S. Umashankar

Technology enhanced learning, Physics education

23) J. K. Verma

Technologies for mathematics education for large classes

publications

Books/Monographs

Adarsh, S. and Janga Reddy, M.

Optimal Design of Irrigation Canals, LAP Lambert Academic Publishing (ISBN 978-3-659-33051-3), Germany, 2013.

Adinarayana, J.

A Chapter on “Development of Information System for Integrated Watershed Management using Remote Sensing and GIS”, by P D Aher, J Adinarayana, S D Gorantiwar and S A Sawant in *Advancement in Remote Sensing for Terrestrial and Atmospheric Applications*, Eds. Srivastava P K, Mukherjee S, Gupta M and Islam T, Springer verlag (2013)

A Chapter on “Data Mining and Knowledge Discovery in Groundnut Pest/Disease Precision Protection” by A. K. Tripathy, J. Adinarayana, S. N. Merchant, U. B. Desai, S. Ninomiya, M. Hirafuji and T. Kiura (2013). in *Geospatial Technology in natural resources management* (Eds. Soam et al.), New India Publishing Agency (ISBN:9789381450802), Delhi, pp. 81-116.

Arceivala, S. J. and Asolekar, S. R.

“*Environmental Studies: A Practitioners Approach*”, Tata McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2012.

Bandyopadhyay, B., Janardhanan, S., and Spurgeon, K. Sarah (Eds.)

Advances in Sliding Mode Control, Vol.440, Lecture notes in Control and Information Sciences, 379p., Springer Verlag, 2013, ISBN: 978-3-642-36985-8.

Bastia, R. and Radhakrishna, M.

A Reference Book on *Basin Evolution and Petroleum Prospectivity of the Continental Margins of India*, in *Developments in Petroleum Science Series*, Vol. 59, Elsevier Publications, U.K.

Chakravarthy, B. K.

Innovation by Design - Story of a post box, published by Springer New Delhi Heidelberg New York Dordrecht London, ISBN 978-81-322-0900-3, March 2013.

Desai, Y. M., Eldho, T. I., and Shah, A. H.

Finite Element Analysis (for Anna University), Pearson Publishers, 2013.

Eldho T.I.

Sustainable Water Resources Management – Theory & Practice (ed. T.I. Eldho), Monograph for CEP/QIP Course, IIT Bombay, June-July 2012.

Modelling Techniques for Water Resources Management (ed. T.I. Eldho), Monograph for CEP/QIP Course, IIT Bombay, June-July 2012.

Advances in Water Resources & Computer Modeling (ed. T.I. Eldho), Monograph for CEP/QIP Course, IIT Bombay, June-July 2012.

Eldho T.I., and Desai, Y.M.

Finite Element Method & Applications in Civil Engineering (eds. T.I. Eldho and Y.M. Desai), *Lecture-notes for CEP/QIP Course*, IIT Bombay, July 2012.

Gaur G. Ray and Bachwal Lavanya

Residential Interior Design for the Elderly: A Guide Book on ergonomic dimensional references for designing home interior, Published by Shroff Publishers & Distributors Pvt. Ltd, Mumbai, ISBN 13:978-93-5023-633-8., 2012

Kulkarni, Malhar

“Devadattiyam:Essays in honour of Prof. Johannes Bronkhorst”, in Johannes Bronkhorst Felicitation Volume, Peter Lang, Switzerland, edited along with F.Voegli, D.Feller et al., 2012, ISSN1661-755X ISBN 978-0343-0682-9hb, 2012.

Manik, D. N.

Control Systems, Manik D.N., Cengage Publishers, New Delhi, September 2012

Nagarajan, R.

Natural and Man-made disaster assessment An Introduction, Ms. Capital Publishing Company, New Delhi, 2013, pp.560.

Nataraj, N.

Mathematical Modelling and Applications to Industrial Problems a special issue of *International Journal of Numerical Analysis and Modelling, Series B*, Volume 3, Number 3, 2012.

Panda, R. K.

Ernest Sosa, “Knowing Full Well”, *Indian Journal of Analytic Philosophy*, Vol. V, No. 2, March 2012, pp.110-114.

Rastogi A K, Jha, N., and Choudhary, P.

AEM Application in Groundwater Hydrology and FEM Simulation of RC Well, LAP Lambert Academic Publishing (ISBN 978-3-659-15590-1), Germany, 2012.

Ravi, B.

Casting Simulation Case Studies. Kolkata: Institute of Indian Foundrymen, 2012.

Ravi, B., and Abhilash, E.

Aerospace Casting Technology. IIT Bombay: National Centre for Aerospace Innovation and Research, 2012.

Sabnani Nina

Co-editor and author of one chapter in the E-book *The Many Facets of Storytelling*, published by Inter-Disciplinary Press, Oxford, UK, ISBN:978-1-84888-166-2, 2013.

Designed, illustrated and written following books for children, *Its all the Same*, Written and Designed for Tulika Books 2013

Counting on Moru, Illustrated for Pratham Books, 2013

My Godri Anthology, Illustrated for Bookworm Goa, 2013

Sane, S.S.

Combinatorial Techniques, TRIM Series (Texts and Readings in Mathematics), Number 64, Hindustan Book Agency, New Delhi, January 2013.

Shimjith, S.R., Tiwari, A.P., and Bandyopadhyay, B.

Modeling and Control of a large Nuclear Reactor, Vol. 431, Lecture Notes in Control and Information Sciences, 138p., Springer Verlag, 2013, ISBN: 978-3-642-30588-7.

Singh, Ramesh K., and Srivastava, A.

“Engineering Applications of Lasers”, Manuscript under preparation to be published by CRC press

Tim Bunnell, D. Parthasarathy, and Eric Thompson ed.

Cleavage, Connection and Conflict: Rural, Urban and Contemporary, ARI-Springer Asia Series, Springer, 2013.

Chapters in Books

Adekola, O., Stamp, J.D., Majozi, T., Garg, A., and Bandyopadhyay, S.

“A Unified Approach for the Optimization of Energy and Water in Multipurpose Batch Plants”, *Computer Aided Chemical Engineering*, Vol. 31, pp. 1382-6.

Asolekar S.R., Kalbar P.P., Chaturvedi, M.K.M., and Maillacheruvu, K.

“*Rejuvenation of Rivers and Lake in India: Balancing Societal Priorities with Technological Possibilities*” in Volume 4 - Sustainability of Water Quality, Ed. Jerald Schnoor in *Comprehensive Water Quality and Purification*. Edited by Satinder Ahuj [Accepted, Elsevier Publication], (2013)

Bandyopadhyay, S.

“A Novel Design Procedure for Solar Thermal System”, in *Recent Advances in Sustainable Process Design and Optimization* (ISBN: 981-4271-95-0), eds. D. C. Y. Foo, M. M. El-Halwagi, and R. R. Tan, World Scientific Pub. Co. Pte. Ltd., Singapore, 2012, pp. 561-576.

Banerjee, R.

“Energy End Use: Industry”, in *Global Energy Assessment - Toward a Sustainable Future*, Cambridge University Press, Cambridge, UK and New York, USA and the International Institute for Applied Systems Analysis, Laxenburg, Austria, 2012, pp. 513-574.

Bhat, P. R.

“Dimensions of Culture: A Conceptual Analysis” in *Philosophy of Cultures: A Contemporary Understanding*, (Vanlalnghak & L. Lenka Eds), Akansha Publishing House, New Delhi, 2013. pp. 80-113.

“Human Autonomy and Ramchandra Gandhi” in *Ramchandra Gandhi: The Man and His Philosophy*, Edited by A. Raghuramaraju, Routledge, London, 2013, Pp. 85-117.

“Linguistic Representation: A Philosophical View” in *Linguistic Representation: The Road Ahead*, Edited by R. C. Pradhan, D K Agencies pvt. Ltd., 2012.

Bhatnagar, S., Borkar, V.S., Prashanth, L.A.

“Adaptive Feature Pursuit: Online adaptation of features in reinforcement learning”, in *Reinforcement Learning and Approximate Dynamic Programming for Feedback Control* (F. Lewis and D. Liu, eds.), *IEEE Press*, 2012.

“Hamiltonian cycle problem and Markov chains”, with V. Ejov, J. A. Filar, G. Nguyen), Springer Verlag, New York, 2012.

Chakraborty Supratik

Proceedings of the *10th International Symposium on Automated Technologies for Verification and Analysis (ATVA)*, 2012 (published as Lecture Notes in Computer Science by Springer).

Das, D. and Dutta, P.

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Central library

IIT Bombay's Central Library is like IIT Bombay user-focused, innovative, and excellence driven. The library has always benefited from the institutes' culture, is pioneer in adopting new technologies, and is far ahead than many libraries in the country. Central Library manages knowledge, both in print and digital formats, ensures seamless discovery and access to these scholarly resources and provides faculty, students, and staff with professional support to find, evaluate, manage, and use such resources. It provides high-quality ambiance for both reflective and collaborative work and study. Its collection of about 4.40 lakh items were used by more than 11000 members and others who made 330870 visits to the library during the year. In addition, over 10,00,000 downloads were made from the collection of e-journals, e-books, and databases. The library extensively uses social media for improved communication and interaction and has created a blog to post current and interesting information and news items. Users can also follow us on the facebook and

twitter. This is the reflection of library's continuous engagement with its users as a valuable partner in their learning and research.

Collection Development and Access Management

Collection building - a core activity of the library, has been undergoing a transformation. From print-only environment where all our acquisitions were in hard copy format, it has shifted to print-and-online and to online-only formats. The library currently subscribes to over 80% of its journals in online only format and the trend is likely to continue. Although most of books, both text and reference, are still preferred in print-only, the library acquired 1439 e-books during the year. The library collection comprising of books, journals, theses, reports, standards, pamphlets and other reading material as on March 2013 stands as follows :

<i>Collection</i>	<i>Added during 2012-13</i>	<i>Total as on 31 March 2013</i>
Books, theses, CDs, Videos	2545	235354
E-Books	1439	2060
TLL & BC (Book bank) collection	15	11886
Bound volumes of journals	751	118331
Reports, pamphlets, standards	148	67660
Photocopies, films	07	4417
Total	4905	439708
Subscription to journals	—	1409
Online-only	1134	
Print-and-online	68	
Print-only	207	

Acquisition, processing and servicing of material in print-and-online and online-only formats poses several challenges to the library, and requires efficient Internet connectivity, active license agreements, users sensitization, and follow up with publishers and service providers to ensure uninterrupted access. All the e-books can be browsed and accessed through library's Web OPAC. Appropriate links from library's homepage have also been provided to access all e-journals and databases. The library organized an exhibition-cum-display of Hindi books during the HINDI PAKHWADA and a display of relevant books on Women's Day.

2. Library Services

2.1 Membership, Reference, Consultation & Circulation

Central Library is open from 0900 to 2300 hrs on all working days and from 1000 to 1700 hrs on holidays (except three national holidays, Holi, and Deepavali festivals). It remains open till 0100 hrs on all days during examinations. The library membership increased by about 10% to 11000 including students, faculty, staff, alumni, retired faculty and officers, corporates and industrial houses, and educational institutes. The upper limit on borrowing of books for students, faculty and staff was increased by more than 50%. The library allows self check-out of books as well as online renewal of borrowed books. It handled 221327 loan transactions of books and other documents to its members during the year. In addition to members, 546 visitors including students, research scholars, scientists, engineers and faculty members from several academic and R&D institutions used the library. Reference service continued to help users to make full use of library resources and services. It renders necessary assistance to users in locating information or document of their choice. Ask the Librarian link provided from the library home page encourages users to avail the reference service virtually.

2.2 Sharing of Resource and Photocopying service

The library maintains excellent relations with libraries of IITs, IISc, and several other organizations for exchange of books, journals, photocopies and videocassettes for the mutual benefit of the users. It loaned 19 and borrowed 3 books to / from other libraries. It provided 1125 pages of photocopies on payment or on exchange including 48 organizations who maintain deposit account with us. The library also received 125 pages of photocopies from other institution. The library also supplied 1372 pages of photocopies to the institute faculty free of charge, and 65,038 pages to other users / visitors on payment.

2.3 Book Bank (TLL and BC Collections)

The library's book bank comprising mainly of prescribed text books for undergraduate courses, was used by 985 students belonging to Scheduled Castes, Scheduled Tribes and economically weaker sections of the society. They borrowed 4044 books from this collection during the year.

2.4 Information Alert Services

The library continues to alert the users about the latest information of their interest by:

List of Additions, new arrivals
Lest-you-miss
News items display
Useful articles Display
Faculty publications display
Display of Scholarship and fellowship information

Display of Forthcoming conferences, other national and international events, employment opportunities, and prospectus of foreign universities

3. Digital Library

Central Library is a part of the institute-wide network and has adequate computing infrastructure including 80 computers and servers to cater to the needs of the users. The library homepage (<http://www.library.iitb.ac.in>) - a single window to all its resources and services, serves as a popular interface between users and the library. It received over 3,67,000 hits during the year. The library has created a blog to post current and interesting information and news items (<http://iitblibrary.wordpress.com/>). Users can also follow us on the facebook and twitter.

3.1 OPAC (On-line Public Access Catalogue)

The OPAC is one of the most heavily used databases of the library and is accessible 24x7 via library web page. Besides listing all the documents available in the library, it allows on-line renewal and reservation, circulation, fine collection, and indicates status of a particular book. OPAC is searchable by author, title, accession number, subject and several other fields.

3.2 E-Resources

The Central Library provides web-based access to over 12,000 full text journals and 12 databases 24 x 7 on institute-wide network as per the following details :

3.21 Full-text Resources

Full Text E-resources

ABI Inform	- http://proquest.umi.com/pqweb?RQT=302&cf=1
ACM Digital Library	- http://portal.acm.org/portal.cfm
ACS Journals	- pubs.acs.org/journals
ACS Legacy Archives (23 journals 1879-1995)	- http://pubs.acs.org/archives/promo/index.html
AIAA Journals	- http://www.library.iitb.ac.in/dres/AIAA.html
AIP Journals	- http://www.library.iitb.ac.in/dres/AIP.html
American Economic Association	- http://http://www.aeaweb.org
American Geophysical Union	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=157&Itemid=1
AMS Journals	- http://www.ams.org/journals/
Annual Reviews	- http://www.annualreviews.org/
ASBMB (JBC/MCP)	- http://http://www.asbmb.org/
ASCE Journals	- http://www.pubs.asce.org/journals/jrns.html
ASCE Proceedings	- http://www.ascelibrary.org/ascecp
ASME Journals (+ AMR)	- http://www.asme.org/publications/journals
ASTM Journals	- http://journalsip.astm.org
ASTM Standards	- http://enterprise.astm.org
BioOne 1 (82 high impact bioscience journals and 1 book)	http://www.bioone.org
Blackwell/Wiley Journals	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=140&Itemid=1
Cambridge University Press Journals	- http://journals.cambridge.org
Capitaline	- http://www.capitaline.com/user/framepage.asp?id=1
CMIE Databases	- On Intranet
CRIS-INFAC CRISIL Ind. Information -	- http://www.crisil.com
Duke Mathematical Journal (Volume 1 100)	- http://www.projecteuclid.org
EBSCO Databases	- http://search.ebscohost.com/
EdITLib: Education and Information Technology Digital Library	- http://http://www.editlib.org/

Emerald Full text	- http://www.emeraldinsight.com/
Euromonitor GMID	- http://www.euromonitor.com/gmid
GSA Journals	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=174&Itemid=1
Geological Society Journals	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=178&Itemid=1
ICE (24 journals)	- http://www.icevirtuallibrary.com/content/journals
IEEE/IEE Electronic Library Online -	- http://ieeexplore.ieee.org
ICSD Inorg Crystal Str DB	- http://icsd.fiz-karlsruhe.de/icsd/StartActionPath.do
IEC Standards	- http://bis.library.iitb.ac.in/iec/
INFORMS (12 journals package)	- http://journals.informs.org
INSIGHT	- http://www.insight.asiancerc.com/
JSTOR Journals Archive	- http://www.jstor.org
IOP Electronic Journals	- http://www.iop.org/EJ/subs/-view=journal
Journal of Geophysical Research (7 journals)	
Space Physics	http://www.agu.org/journals/ja
Solid Earth	http://www.agu.org/journals/jb
Oceans	http://www.agu.org/journals/jc
Atmospheres	http://www.agu.org/journals/jd
Planets	http://www.agu.org/journals/je
Earth Surface	http://www.agu.org/journals/jf
Biogeosciences	http://www.agu.org/journals/jg
IOM - Maney Journals	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=139&Itemid=1
JoVE : Journal of Visualized Experiments	- http://www.jove.com/
Material Science and Engineering Collection (Trans Tech) -	- http://www.scientific.net
Multi Science Journals	- http://multi-science.metapress.com/home/main.mpx
NGP Journals (Nature 27 Journals)	- http://www.nature.com/nature/index.html
Nature Online (27 journals) -	
Optics Infobase, Optical Society of America (14 journals)	- http://www.opticsinfobase.org
Oxford Subject Collections Humanities & Social Sciences Mathematics & Physical Sciences	- http://www.oxfordjournals.org/
Proceedings of the Royal Society (A)	- http://rspa.royalsocietypublishing.org

Project MUSE	- http://muse.jhu.edu
Psycarticles	- http://csaweb106v.csa.com/ids70/quick_search.php?SID=2qh6a3sa5h775hqbsid1a0eip6
PV-Tech	- http://www.pv-tech.org
RSC Journals + Archives	- http://www.rsc.org/publishing/journals
Sage Subject Collections (with 3 subjects)	- http://online.sagepub.com/
Science Direct	- http://www.sciencedirect.com/
Science of Synthesis	- http://www.science-of-synthesis.com/prod/user/index.html
Science Online (AAAS, USA)	- http://www.sciencemag.org
SIAM Journals Online	- http://epubs.siam.org/
SIAMs Archive (LOCUS)	- http://locus.siam.org/
Springer verlag Link (Lecture Notes Series)	- http://www.springlink.com/
TRB Publications	- http://www.trb.org/Main/Home.aspx
Taylor & Francis Journals	- http://http://www.tandfonline.com/
Wiley Journals	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=140&Itemid=1
World Scientific Journals	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=144&Itemid=1

Addition of New E-resources

CRISIL RESEARCH	- http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=183&Itemid=1 (Registration is required)
Molecular & Cellular Proteomics	- http://www.asmb.org/Page.aspx?id=644
RSC Package A+ is upgraded to RSC Gold consisting of all RSC Titles	- http://www.rsc.org

3.22 Databases

Indian Standards	- http://bis.library.iitb.ac.in
Indian Patents	- On library intranet
Inorganic Crystal Structure Database	- http://icsdweb.fiz-karlsruhe.de/index.php
INSPEC	- http://www.engineeringvillage2.org
J-Gate	- http://j-gate.informindia.co.in
JCCC	- http://jccc-indest.informindia.co.in/
MathSciNet	- http://www.ams.org/mathscinet
Scifinder Scholar	- http://web.scifinder/scholar/index.html
SCOPUS	- http://www.scopus.com
Web of Science and Journals Citation Report	- http://isiknowledge.com/

3.23 Multimedia (intranet, CD-net)

Chemical Abstracts – 12th & 13th Collective Index
Chemical Abstracts on CD (2003-)
Indian Patents
Indian Standards
Power Diffraction Files

3.3 Electronic Theses & Dissertations

(<http://etd.library.iitb.ac.in>)

Central Library supports electronic submission of theses and dissertations by the postgraduate and doctoral students. It maintains a full-text database of over 5000 items submitted since 1999-2000 on Intranet. During the year, 971 M. Tech. dissertations and 176 Ph.D. theses were submitted online.

3.4 Institutional Archive

(<http://dspace.library.iitb.ac.in/jspui/>)

Central Library has been active in supporting open access to the scholarly information and set up an archive of publications brought out by the institute using open source software, DSpace. The archive has over 14075 items and is being updated to cover more publications which are permissible within the copyright regulations. The archive accessible through the library homepage, is the single largest source of IITB publications.

4. Users Education, Conferences, Seminars

In the current situation where increasingly large number of knowledge resources are available in digital form which can be accessed across the campus on the desktops, obviating the need to visit the physical library, User education plays a greater role to inform, alert, educate and train users about various resources of the library. During the year, Central Library organized programmes on IEL Digital Library, ProQuest's Dissertations and Theses Database, and Turnitin (a Plagiarism prevention service). For users

desiring to learn more about any service, database or any resource, the library provides one-on-one training as well as organizes half a day sessions on particular resource. The library also organizes half-a-day interactive sessions for new faculty and research scholars to familiarize them with various resources and services. The library makes good use of various mailing lists, and news groups to interact and communicate with the user community, to inform them about the new activities and services, and to obtain their comments and suggestions. The brochure Know Your Library continues to be a popular medium to give detailed information about activities and services of the library.

5. Staff

Central Library is fortunate to have a team of competent and dedicated officers and staff who perform their duties exceptionally well, and are always appreciated for their intelligence, enthusiasm and honesty. In addition to their regular jobs, most of them are involved in various academic activities like presenting papers in seminars and conferences, delivering lectures in various training programmes, serving on various expert committees, guiding research etc. However, the library has been facing acute short fall in the strength of library staff in administrative and support cadre, and has not been able to widen its services including extended library hours in spite of demand from users.

6. Building

The plan to renovate the library building including addition of a new floor is finally taking a shape and the required formalities are being completed to award the work. The renovated building, it is hoped will create a variety of spaces and ambiance, reorganize the resources and work flows, and attract large number of users. The renovated library building will reflect current trends in ICT and the changing needs of library staff, students and faculty in their use of the library resources and services.



Centre for Distance Engineering Education Programme

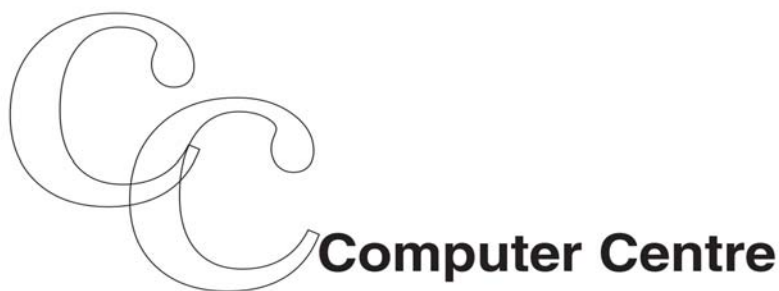
The Centre for Distance Engineering Education Programme (CDEEP) continued its main activity of recording new courses and transmitting them to the participating remote centres. The Centre has a total of 73 Institutions connected as Remote Centers (RCs) including the two, which joined during the year 2012-13. Two CEP courses were recorded through CDEEP during this period. CDEEP also supports several MHRD projects through its infrastructure and expertise. The earlier courses recorded by CDEEP are being made available to individual users at nominal charges. In the period under consideration we gave 107 courses to individuals charging a copying charge amount of Rs. 300/-. CDEEP have an archive of 269 courses of IITB coded courses.

The centre has provided an access of the recorded courses through web to 115 participants by charging Rs. 1000/- per course. Many students and faculty members across the country are making use of this facility.

CDEEP recorded 20 IIT Bombay semester long courses during the period under consideration covering 10 disciplines. Many institutions, teachers and students are using these courses available to them even offline.

CDEEP recorded 79 various events on campus including 50th Convocation, 54th Foundation day, Institute Colloquia, talks by Noble Laureates and other distinguished speakers.

The technology upgradation is continually pursued in the centre. As a result, there is a significant leap in the quality of audio and video through technologies, namely, videoconferencing and web transmission. CDEEP team worked on specific improvements in the visible quality on the courses available through web. Now the display of courses/events available through web bears a much improved look.



Computer Centre (CC) continues to provide computational, network infrastructural facilities and services to the IIT Bombay user community. The Centre manages its Campus Network of IIT Bombay. It is responsible for the availability of intra-campus connectivity of all the departments, hostels, all the residential complexes, and the internet connectivity of IIT Bombay to the outside world. During the year following activities have been undertaken to install, expand and upgrade the network infrastructure at IIT Bombay:

- The network connectivity to the Lecture Hall Complex in the Academic Area, the new Type-C and two Type-B and the new QIP Buildings in the residential area were completed,
- During the year, the total Internet bandwidth for IIT Bombay campus users have been increased from 910 Mbps to 2580 Mbps. The centre is satisfied with the quality of service provided by the empaneled Internet Service Providers.
- Wireless intrusion detection system procured from Airtight Networks has been deployed at new locations to improve the security of the wireless segment of IITB campus network.

High Performance Computing Facility: The old computing cluster CORONA continue to function as before with 130 number of user accounts. Given the space constraint, the cluster continues to be housed in the premise of the Chemistry Department. The cluster Spacetime Supercomputing facility consisting of 380 nodes built using the Intel quad core processors has been operational in the ground floor of the old Computer Science and Engineering Department building. The total number of research groups using the spacetime facility is now 67, among these 33 faculty members have been provided new account in 2012-2013

The installation of building management system (BMS) for the Spacetime HPCC Facility has been undertaken to bring complete automation of the peripheral equipments. It is expected the DG-Set together with automation offered by BMS will provide a better and smoother operation of the HPCC Facility

in terms of reducing the possibility of hardware failures and data being lost due to unexpected power failures. Enhancing of data storage facility is being undertaken now, to improve the SAN device performance and to address increasing number of research groups using the Spacetime resources.

National Knowledge Network (NKN): IIT Bombay continued to be a member of the NKN during the year. This multi-gigabit network initiative started by National Informatics Centre (NIC) is being used by CDEEP to conduct Distance Education Programs. Staff from the Computer Centre represented IIT Bombay in the the National Level meet of the partnets of the GARUDA-NKN initiative organised by NIC and IIT Bombay held at IIT Bombay in 2012 which enabled IIT Bombay to improve and enhance the technologies for fruitful use of the national level infrastructures.

Grid Computing Facility GARUDA: The grid computing facility GARUDA is also supported by the Computer Centre allowing the users of the Institute to access the available resources on the National Grid.

Hardware/Software Infrastructure: All service offerings at the Computer Centre are based on OPEN SOURCE Software Systems. Computer Centre has registered as official mirror for various flavors of Linux Operating Systems on its anonymous FTP server which is available to the user community at large.

The institute continues to be a member of Microsoft Developer Network Academic Alliance (MSDNAA) software licensing program. This allows the user community to use most of the Microsoft software products in a non-production environment. Campus-wide license of AVG anti-virus software has been in operation.

Software packages meant for scientific and technical computation such as ANSYS, MATLAB, MATHEMATICA, MAPLE, Dytran / NasTran / Partan, Tecplot and Libraries from Numerical Algorithm Groups (NAG), AutoCAD etc available through appropriate licenses schemes are procured, upgraded and administered by Computer Centre as per the requirement of the student, faculty, scientists and staff. The Computer Centre encourages and has implemented

the use of Open Source Software Systems for Office Automation in about 800 PCs deployed in the various Administrative sections of the Institute. The use of OpenSource Operating Systems and Softwares has eliminated to a great extent the menace of the spread of computer virus and thus has optimised the IT support overheads required for Network Management and PC maintenance.

The Open Source Operating Systems have also capabilities of word processing applications (namely OpenOffice.org, LibreOffice) also capable of handle various Indian Languages especially Hindi to produce multilingual (bilingual) documents. Documents prepared in OpenOffice.org / LibreOffice (available for Windows as well as Mac OS) can be saved in files compatible (edit/save) with MS-Office.

At regular intervals Computer Centre conducts a two hour training session on the usefulness of the applications under the Open Source Operating Systems in Office Automation and the IT Infrastructure facilities provided by the Computer Centre for the administrative staff of the Institute

The Computer Centre continues to play a secondary role by providing technical support to run the IP based Security Surveillance Systems for the Security Section. The verifocal fixed direction IP (10/100 BaseT ethernet interface) cameras for indoor use only (25 nos) have been installed and functioning at the entry points of various departments, sections of the main building and Convocation Hall to monitor and record the human activities as well as the object movements. Similarly verifocal fixed direction IP based Day and Night cameras (10 nos) with IP66 certified for outdoor use only installed at the Main Gate, Y-Point Gate, Lakeside Gate continue to monitor and record the inward and outward traffic movements of the campus. PTZ IP

Surveillance cameras (5 nos) having automatic Pan, Tilt, Zoom for 24/7 operation, PTZ control over network. minimum 270 degree Pan with auto flip and 180 degree tilt, Day and Night functionality with 0.5 lux in color, minimum 18x optical zoom, 12x digital zoom are installed at the Guest House, Hostel 12 & 13, QIP Building and Ananta to keep an eye over the fencing of the campus. Few other features supported on the surveillance cameras are: Minimum Resolution 640x480 at 30 frames per second with Video Compression JPEG / MPEG4 to work with up to 1.0 lux in color, supporting Motion Detection, progressive scan, password lockout of unauthorized personnel to prevent viewing images or altering the camera configuration, etc.

These cameras are integrated with the VIDEO MANAGEMENT SOFTWARE running on three PCs that enables viewing and recording from up to 24 Cameras over the network. The software also allows

to control the PTZ and Dome Cameras for event driven Recording, scheduled recording and playback management. The system is attached to 8TB of Storage unit to store about 15-20 days of recorded data. A 42" LCD TV at the security control room enables to watch the images captured and accordingly enable to manage the security system.

The computer network set up by the Computer Centre enables the Electric Maintenance Division to monitor the Power Distribution Systems, check the status and operation of various Lifts functioning in the buildings, functioning of UPS Systems, etc in the Institute.

The Telephone Exchange runs few IP telephones (Voice over IP) using the computer network of the Institute.

IIT Hospital displays the schedules of the availability of Doctors on the web site of the Hospital and this information is accessible over the IITB LAN.

Computer Centre staff as members in various selection, purchase and write off committees also help other departments and sections. As a sample case for e-waste disposal the certificate obtained for safe disposal of the written-off materials from the Mechanical Engineering Department is shown in Fig. 1 where the staff from the Computer Centre provided necessary support for the e-waste disposal process.

The Computer Centre runs a Help Desk for all users as a part of its day to day activities.

Projects for the Near Future: The core network of IITB is quite old. The switches are nearly five years old. The underground fibre-optic cable network is operational for more than 13 years. The cable network, as it exists now, is rather adhoc and has seen patched many times because of damages (mostly during construction/repair of roads and new buildings). There is strong case for creating a properly planned fibre-optic cabling infrastructure using single mode fibre with adequate redundancies so as to improve the reliability of network access. The replacements for core network switches is under active consideration. The goal is to have a future-ready network that can be easily migrated to a 10 gigabit infrastructure. The networking of the upcoming Institute classroom complex is also being undertaken.

academic report

Admission offered at IIT Bombay for the following Programmes in 2012-13 are as follows:

Ph.D. (Autumn+Spring)	-	473
M.Tech.	-	810
M.Mgmt.	-	116
M.Des.	-	61
M.Phil.	-	16
M.Sc.- Ph.D. (Dual Degree)	-	57
M.Sc.	-	187
Dual Degree	-	244
5 Yr. Int. M.Sc.	-	31
B.Tech.	-	607
Preparatory Course	-	3
Total		2605

At the 50th Annual Convocation held on 18th August 2012, 2006 degrees were awarded : B.Tech. - 380, Dual Degree: (B.Tech. & M.Tech.)-198, M.Tech. -633, M.Sc. 2 year -200, 5 year Int. M.Sc. -17 , M.Des. - 54, M.Phil. - 12, M.Mgmt. - 119, M.S. (By Research) -01, PGDIIT 10, and Ph.D - 175,

Medals

The President of India Medal was awarded to Kamath Pritish Uday, and Institute Gold Medal went to Yashovardhan Sushil Chati. Silver Medalists under Dual Degree Programme were:- Yashovardhan Suhshil Chati, Aerospace Engg.; Partik Behera, Chemical Engg.; Jha Jhonny Santosh, Civil Engg.; Prashant Sachdeva, Computer Science & Engg; Vidwans Amogh Vishwas, Electrical Engg.; Patil Ojas Madhukar, Mechanical Engg; Devesh Tyagi, Metallurgical Engg. & Materials Science; Jain Sakshi Ratnesh Reena, Engineering Physics. Silver Medalists under Bachelor of Technology Programme were: Raunak Deepak Borkar, Aerospace Engg.; Ankur Kumar, Chemical Engg; Chheda Rinal Komal, Civil Engg; Kamath Pritish Uday, Computer Science & Engg; Indrasen Bhattacharya, Electrical Engineering; John Roy, Mechanical Engg.; Sanghavi Hardik Manoj, Met.Engg. & Mat. Science; Mehta Aditya Umeshchandra, Engineering Physics. Silver Medalists under Master of Science Programme were: Chemistry Garima (2 yr. M.Sc); Dhruv Joshi (5 yr. Int. M.Sc.), Earth Sciences Dhritikanta Gorai (Applied Geology), Poornima Bhushan (Applied Geophysics); School of Bioscience & Bioengineering Gautam Mahavir Runwal (Biotechnology); Mathematics Neha Prabhu (Mathematics), P. Sreedevi Menon (Applied & Stat.& Informatics); and Physics Zoya.

STATEMENT SHOWING THE TYPES OF SCHOLARSHIPS, STIPEND AND FINANCIAL ASSISTANCE AWARDED TO THE B.TECH., Dual Degree, M.Sc. (INTEGRATED) STUDENTS FOR THE YEAR 2011-12

Sr. No.	Types of Scholarships	Amount	No. of students
1.	The Institute Merit-cum-Means scholarship with benefit of free tuition	Rs. 1000/- for 10 months Rs. 50,000/- tuition fees per annum.	744
2.	The facilities of free messing (only basic menu) to SC/ST	Basic Menu bill plus pocket allowance of Rs. 250/- p.m. & exemption from payment of Hostel Room Rent	406
3.	Free tuition Facility	only Tuition fee waiver	02
4.	National Talent Search Scholarship (NTS)	Rs. 500/- p.m.	219 approximately

IIT Bombay Heritage Fund Scholarship

Name of Scholarship	Rate
David J Dunn Schp.	Rs.1000/-p.m.
Vidyadhar and Radhika Kulkarni Schp.	Rs.1000/-p.m.
Dr Vijaya Apte Memorial Schp.	Rs.1000/-p.m.
Jagjivan Ujamashi Talsania Schp.	Rs.1000/-p.m.
Vasant Himatlal Talsania Schp.	Rs.1000/-p.m.
Mr Badriddin Sonawalla Schp.	Rs.1000/-p.m.
Prabhakar D Mahajan Schp.	Rs.1000/-p.m.
Lionel J D'luna Schp.	Rs.1000/-p.m.
T R S Anand & Bhanumati Anand Schp.	Rs.1000/-p.m.
Indira Manidhane Schp.	Rs.1000/-p.m.
Prabhakar D Mahajan Schp.	Rs.1000/-p.m.
Kanitkar Schp.	Rs.1000/-p.m.
Mr & Mrs Ranganathan Schp.	Rs.1000/-p.m.
Shri C K Apte Schp.	Rs.1000/-p.m.
Jayant Sathe Schp.	Rs.1000/-p.m.
Balkrishna K Mundhe Schp.	Rs.1000/-p.m.
Anonymous Schp.	Rs.1000/-p.m.
Anonymous Schp.	Rs.1000/-p.m.
Sandra Lee Purkayastha Schp.	Rs.1000/-p.m.
IIT Bombay Heritage Fund Schp.	Rs.1000/-p.m.
IIT Bombay Heritage Fund Schp.	Rs.1000/-p.m.
Abraham Thomas Schp.	Rs.1000/-p.m.
IIT Alumni @ Microsoft Schp.	Rs.1000/-p.m.
IIT Alumni @ Microsoft Schp.	Rs.1000/-p.m.
P K Sheshambal Schp.	Rs.1000/-p.m.
Dina Nath & Gayatri Nath Schp.	Rs.1000/-p.m.
IIT Alumni @ Microsoft Schp.	Rs.1000/-p.m.
Suresh & Varsha Nihalani Schp.	Rs.1000/-p.m.
Anonymous Schp.	Rs.1000/-p.m.
IIT Bombay Heritage Fund Schp.	Rs.1000/-p.m.
Virendra Kumar Scholarship	Rs.1000/-p.m.
Abhay Himatlal Talsania Schp.	Rs.1000/-p.m.
Mrs. Meenakshi Vishwanathan Schp.	Rs.1000/-p.m.
IIT Alumni @ Microsoft Schp.	Rs.1000/-p.m.
Samir Shah and Prakash Peres Memorial Schp.	Rs.1000/-p.m.
Burjor S Dadyburjor Schp.	Rs.1000/-p.m.
Vidyadhar and Radhika Kulkarni Schp.	Rs.1000/-p.m.
Mr Roop Kumar & Mrs Suraj Devi Agarwal Schp.	Rs.1000/-p.m.
Anisbert & Kumarie Sequeria Schp.	Rs.1000/-p.m.
N S Rajaram Schp.	Rs.1000/-p.m.
Nagesh C Chaudhari Schp.	Rs.1000/-p.m.
Mr S J & Mrs S S Kulkarni Schp.	Rs.1000/-p.m.
Gajendra Chandra Malkar Schp.	Rs.1000/-p.m.
Late Shri Gopaldas Duttani Schp.	Rs.1000/-p.m.
IIT Alumni @ Microsoft Schp.	Rs.1000/-p.m.
Mr. Shantilal H Goradia Schp.	Rs.1000/-p.m.
IIT Bombay Heritage Fund Schp.	Rs.1000/-p.m.
IIT Bombay Heritage Fund Schp.	Rs.1000/-p.m.
Prof M V Hariharan Schp.	Rs.1000/-p.m.
Mrs Minaz Sonawalla	Rs.1000/-p.m.
Usha Purkayastha Schp.	Rs.1000/-p.m.
Narendra Joshi Merit Schp.	Rs.1000/-p.m.
Rajesh Radhakrishnan Schp.	Rs.1000/-p.m.
IIT Alumni @ Microsoft Schp.	Rs.1000/-p.m.
IIT Alumni @ Microsoft Schp.	Rs.1000/-p.m.
IIT Alumni @Microsoft Schp.	Rs.1000/-p.m.

Madho and Radha Agarwal Schp.	Rs.1000/-p.m.
Himangshushekhar Purkayastha Schp.	Rs.1000/-p.m.
George Tharkan Schp.	Rs.1000/-p.m.
Prof Mohan M Kulkarni Schp.	Rs.1500/-p.m.
Prof K Shankar Schp.	Rs.1000/-p.m.
Soonu Dadyburjor Schp.	Rs.1000/-p.m.
Lata Vijaykar Schp.	Rs.1000/-p.m.
Mr Kasamali Virani Schp.	Rs.1000/-p.m.
Abbas Bhatia/John A Martin Schp.	Rs.1000/-p.m.
Bijoya Chaudhari Schp.	Rs.1000/-p.m.
Dr. Kishor M Kulkarni Schp.	Rs.1500/-p.m.
Mrs Ila Chandrakant Schp.	Rs.1000/-p.m.
Bibha Nandi Schp.	Rs.1000/-p.m.
Dwarka Nath Shuklo Baidya Schp.	Rs.1000/-p.m.
Anonymous Schp.	Rs.1000/-p.m.
IIT Bombay Heritage Fund Schp.	Rs.1000/-p.m.
R. N. Limaye Scholarship	Rs. 1000/- p.m.
Ruyintan & Monica Mehta Family Foundation Schp	Rs. 1000/- p.m.
M Radhakrishna Kamath Scholarship	Rs. 1000/- p.m.
Manohar & Sunita Kamat Scholarship	Rs. 1500/- p.m.
Mr. S.S. Shiralkar Scholarship	Rs. 1000/- p.m.
Indira Manudhane Scholarship	Rs. 1000/- p.m.
Dr. G.V. Bakore Memorial Scholarship	Rs. 1000/- p.m.
Shri Raman K. Rao Scholarship	Rs. 1000/- p.m.
Miss A. J. Majmundar	Rs. 1000/- p.m.
Chamanlal and Labhkunwar Kothary Schp.	Rs. 1000/- p.m.
Justin Bhansali Memorial Scholarship	Rs. 1000/- p.m.
Lakshmi and Kadayam Srinivasan Scholarship	Rs. 1000/- p.m.
Kumar and Susan Shah Scholarship	Rs. 1000/- p.m.
Vijaya Patil Schp.	Rs. 1000/- p.m.
Subodh Ghonge Scholarship	Rs. 1000/- p.m.
C.Vimala & M.R.K. Menon Scholarship	Rs. 1000/- p.m.
Manohar & Sunita Kamat Scholarship	Rs. 1500/- p.m.
Mr G. M. Nabar Scholarship	Rs. 1000/- p.m.
Mrs. Jyotsna D Pendse Merit Schp.	Rs. 1000/- p.m.
H. J. Talsania Scholarship	Rs. 1000/- p.m.
California Scholarship	Rs. 1000/- p.m.
California Scholarship	Rs. 1000/- p.m.
The Iyer Schp.	Rs. 1000/- p.m.
IIT Alumni@Microsoft Scholarship	Rs. 1000/- p.m.
Electrical Engg. Deptt. Schp.	Rs. 1000/- p.m.
Prabhakar D. Mahajan scholarship	Rs. 1000/- p.m.
Subha & Anand Talwalkar Schp.	Rs. 2000/-p.m.
Dilip R Limaye Schp.	Rs. 2000/-p.m.
Abraham Thomas Schp.	Rs. 1000/- p.m.
Prof. G. N. Revenkar Scholarship	Rs. 1000/- p.m.
Dr. Chandrakant Thanawala Scholarship	Rs. 1000/- p.m.
Ashish Prasad Nandi Majumdar Scholarship	Rs. 1000/- p.m.
Radha Rani Agarwal Merit Scholarship	Rs. 1000/- p.m.
Dr P Remadevi Menon Memorial Schp.	Rs. 1000/- p.m.
Kanitkar scholarship	Rs. 1000/- p.m.
Mrs. Amrutha Iyengar Schp.	Rs. 1000/- p.m.
Electrical Engg. Deptt. Schp.	Rs. 1000/- p.m.
Lalita Ramanathan Schp	Rs. 1000/- p.m.
Aditya Joshi Schp.	Rs. 1000/- p.m.
S. Ramaritam Scholarship	Rs. 1000/- p.m.
IIT Alumni@Microsoft Scholarship	Rs. 1000/- p.m.
IIT Alumni@Microsoft Scholarship	Rs. 1000/- p.m.
IIT Bombay Heritage Fund Scholarship	Rs. 1000/- p.m.

List of Scholarships/Fellowships

Government Fellowships/Scholarships

Sr. No.	Name of Fellowship/Scholarship	No. of Students	Monthly Fellowship
1.	DAE (Board of Research in Nuclear Science BRNS) : M.Tech.	8	Rs. 20,000/-
2.	NBHM (National Board of Higher Mathematics): Ph.D. M.Tech.	10 7	Rs. 18,000/- Rs. 6,000/-
3.	AERB (Atomic Energy Regulatory Board): M.Tech.	5	Rs. 15,000/-
4.	AICTE National Doctoral Fellowship (All India Council for Technical Education): Ph.D	1	Rs. 18,000/-
5.	Ministry of Urban Development & Poverty Alleviation (CPHEEO): M.Tech.	3	Rs. 4,000/-
6.	DBT-JRF (Department of Biotechnology, Jr. Research Fellowship): Ph.D.	5	Rs. 16,000/-
7.	ICMR (Indian Council of Medical Research): Ph.D.	5	Rs. 16,000/-
8.	MERC (Maharashtra Electricity Regulatory Commission): M.Tech.	7	Rs. 8,000/-
9.	ARCI: Ph.D.	1	Rs. 14,000/-
10.	ICPR	1	Rs. 5,000/-

Private Fellowships/Scholarships

Sr. No.	Name of Fellowship/Scholarship	No. of Students	Monthly Fellowship (in Rs)
1	TCS (Tata Consultancy Services): M.Tech. Ph.D.	– 2	9,000/- 19,000/-
2	Forbes Marshall: M.Tech.	2	14,000/-
3	Crompton Greaves: Ph.D.	14	24,000/-
4	Crompton Greaves: M.Tech.	7	10,000/-
5	Microsoft Research India: Ph.D.	5	16,000/-
6	Dr. Gargi Vishnoi Memorial Scholarship: M.Tech.	2	2,000/-
7	Schulmberger Fellowship: M.Tech.	6	8,000/-
8	British Gas (BG) Fellowship: M.Tech	5	8,000/-
9	Eco-Axis Fellowship - M.Tech	2	5,000/-
10	IITB Monash Ph.D	81	23,333/-
11	ATE Fellowship	1	5,000/-
12	CTI (Compatible Technology International) M.Tech	2	8,000/-
13	FES (Foundation for Ecological Security) Ph.D	1	14,000/-
14	IBM Ph.D	1	15,000/-

**Financial Assistance to Postgraduate students Research Scholars/M.Tech./M.Des./M.Phil.
and M.Sc. (2-Year Programme Students)**

Sr. No.	Type of Scholarship	Year/ per month JRF/SRF	Amount	No. of students	
				Institute Scholarship	Other Scholarship (RA)
1.	Institute Teaching Assistantship *(Ph.D) (*Revised w.e.f. 01.04.07)	I & II Year JRF	Rs. 16,000/-	88	06
		III, IV & V Year SRF	Rs. 18,000/-	56	10
		I & II JRF	Rs. 18,000/-	189	02
		III & IV SRF	Rs. 20,000/-	107	01
2.	Postgraduate Assistantship to:-				
	M.Tech. Students (2 yr. programme)	I year	Rs. 8,000/-	424	80
		II year	Rs. 8,000/-	493	84
	M.Des. Students (2 yr. programme)	I year	Rs. 8,000/-	52	---
		II year	Rs. 8,000/-	56	---
	M.Phil. Students (2 yr. programme)	I year	Rs. 8,000/-	07	---
		II year	Rs. 8,000/-	11	---
3.	CSIR Fellowship to:-				
	Ph.D Students	JRF	Rs. 16,000/-	97	---
		SRF	Rs. 18,000/-	119	---
	M.Tech Students	JRF	Rs. 16,000/-	4	---
	M.Sc. + Ph.D. Dual Degree	JRF		4	---
	M.Tech. + Ph.D. Dual Degree	JRF		3	---
	Shyama Prasad Mukherjee Fellowship	JRF	Rs. 20,000/-	1	---
4.	QIP Scholarship to:-				
	M.Tech. Students	I year	Rs. 4,000/-	7	---
		II year		5	---
	Ph.D. Students		Rs. 9,000/-	47	---
5.	UGC Scholarship to:-				
	Ph.D. Students	JRF-HSS	Rs. 16,000/-	67	---
		SRF-HSS	Rs. 18,000/-	33	---
	M.Phil. students	JRF-Engg. & Tech.	Rs. 16,000/-	1	---

Sr. No.	Type of Scholarship	Year/ per month JRF/SRF	Amount	No. of students	
				Institute Scholarship	Other Scholarship (RA)
6.	UGC – Engg. & Tech.	JRF	Rs. 18,000/-	5	---
		SRF	Rs. 20,000/-		
7.	UGC – M.Tech.		Rs. 16,000/-	3	---
8.	UGC – M.Sc + Ph.D		Rs. 16,000/-	1	---
9.	Rajiv Gandhi National Fellowship	SRF	Rs. 14,000/-	2	---

Postgraduate Assistantship

1. Ph.D Teaching Assistantship			
Teaching Assistantship (revised for all disciplines w.e.f. 1.4.2010.)			
1	Assistantship for Ph.D. in Engineering courses after M.E./M.Tech/M.Arch/M.Sc.(Engg.) or equivalent examination. M.B.B.S. with one year internship and qualified in GATE or AIIMS/MCI for MD/MS (for medical graduates) For SOM - BE/B.Tech and M.B.A (for Maximum period of 4 years)	@ Rs. 18,000/- p.m.for 1st two years and Rs. 20,000/- p.m. for subsequent years	354
2	Assistantship for Ph.D. after BE/B.Tech. B.Arch./ B.Sc.(Engg.)/M.Sc./MA or equivalent degree and qualified in the GATE or National Level Test conducted by CSIR, UGC, NBHM, etc. For SOM - B.Sc./B.Com and M.B.A. (maximum period of 5 years).	@ Rs. 16,000/- p.m. for 1st two years and Rs.18,000/- p.m. for subsequent years.	145
Research Assistantship (revised for all disciplines w.e.f. 1.4.2010.)			
1	M.E./M.Tech or equivalent qualification {The amount of Rs. 9,500/- for (first two years) to be paid from the Scholarship Account and additional of Rs. 2000/- to be paid from Institute funds.For fifth year, the entire amount is to be debited to Institute funds} (for Maximum period of 5 years)	@ Rs. 20,000/- p.m.for 1st two years and Rs. 22,000/- p.m. for next three years	11
2	B.Sc. (Tech)/B.E./B.Tech or equivalent qualification {The amount of Rs. 8,000/- for (first two years) and Rs. 9,000/- (for next three years) to be paid from the Scholarship Account and additional of Rs. 2000/- to be paid from Institute funds.} (for Maximum period of 5 years)	@ Rs. 18,000/- p.m. for 1st two years and Rs.20,000/- p.m. for subsequent years.	4
2. M.Tech/M.Phil/M.Des Teaching Assistantship			
M.Tech./ M.Phil/ M.Des students: (revised for all disciplines w.e.f. 1.8.2001)			
1	Teaching Assistantship	Rs.8000/- p.m. (for 2 Years)	1101
2	Research Assistantship	Rs. 9000/- p.m. (for 3 Years) (Rs. 1000/- increment p.a.)	133 (M.Tech)
3. QIP Scholarship Teaching Assistantship			
QIP Scholarship For Ph.D Students			
1	For Ph.D. students	Rs. 6000/- for first 2 years and Rs. 6400/- for 3rd year and Contingency: Rs. 10,000/- p.a.	48
QIP Scholarship For M.Tech Students			
1	For M.Tech. students	Rs. 2500/- p.m. for 24 months and Contingency : Rs. 3000/- p.a.	13

4. CSIR Fellowship (For Ph.D Students) Teaching Assistantship			
1	Junior Research Fellow	Rs. 16,000/- for 2 years and Rs. 18,000/- after 2 years.	202
2	Senior Research Fellow	Rs. 18,000/-	
3	Contingency	Rs. 20,000/- p.a.	
Maximum period of 5 years including JRF and SRF			
5a. UGC (HSS)			
1	Junior Research Fellow	Rs. 16,000/-	98
2	Senior Research Fellow	Rs. 18,000/-	
5b. UGS (Engg. & Tech.)			
1	Junior Research Fellow	Rs. 18,000/-	4
2	Senior Research Fellow	Rs. 20,000/-	
6. CSIR (M.Tech)			
1	Junior Research Fellow	Rs. 16,000/-	5
7. CSIR (M.Sc. + Ph.D) Dual Degree			
1	Junior Research Fellow	Rs. 16,000/-	3
2	Senior Research Fellow	Rs. 18,000/-	
8. CSIR (M.Tech. + Ph.D) Dual Degree			
1	Junior Research Fellow	Rs. 16,000/-	2
2	Senior Research Fellow	Rs. 18,000/-	
9. UGC (M.Tech)			
1	Junior Research Fellow	Rs. 16,000/-	3
2	Senior Research Fellow	Rs. 18,000/-	
10. UGC (M.Sc. + Ph.D) Dual Degree			
1	Junior Research Fellow	Rs. 16,000/-	1
2	Senior Research Fellow	Rs. 18,000/-	
11. UGC Rajiv Gandhi Fellowship			
1	Junior Research Fellow	Rs. 16,000/-	1
2	Senior Research Fellow	Rs. 18,000/-	

Private Scholarship (Postgraduate)

Scholarship for Ph.D. Students				
1.	Microsoft Research India	Ph.D.	Rs. 16,000/- p.m., Plus for purpose of attending conference Rs. 62,000/-, Plus Contingency amount Rs. 5,000/- p.a.	1
2.	Crompton Greaves Fellowship	Ph.D.	Rs. 24,000/- p.m., Contingency grant Rs. 25,000/- per annum. For undergoing Ph.D. programme in Electrical Engg., Mechanical Engg., Metallurgical Engg. & Materials Sc. and Industrial Design Centre (Fellowship amount likely to be revised)	12
3.	SJM School of Management Endowment Scholarship	Ph.D.	Rs. 18,000/- p.m. for the first two year with the provosion of enhancement to Rs. 22,000/- p.m., based on the assesment of the recommendation of the RPC. The Increase in Endowment Fellowship is effective from July 2010. The Scholarships will be awarded on the academic performance which will be determined on the basis of CPI/Progress Seminar performance. The Scholarships are renewable every year. Sponsored candidate will not be eligible for scholarship. Payable for period of 4 years or until the submission of synopsis & thesis which ever is earlier.	2
4.	IITB Monash Scholarship	Ph.D.	Rs. 23,333/- p.m.	82
5.	IBM	Ph.D.	Rs. 25,555/- p.m. Plus. Semester Fees	1
Scholarship for M.Tech. Students				
1	Forbes Marshall	M.Tech.	Rs. 20,000/- p.m. Plus Reimbursement of Tuition Fees paid by students every semester. Plus Contingencies of Rs. 15,000/- during the course towards TA/DA, Report preparation etc. Tuition Fee Rs. 5000/- per semester	2
2	Dr. Gargi Vishnoi Memorial Scholarship	M.Tech.	Rs. 2,000/- p.m. addition to TA	1
3	CTI (Compatible Technology International)	M.Tech.	Rs. 8,000/- p.m. Plus Tuition fees Rs.25,000/- per semester.	2
4	Crompton Greaves	M.Tech (II Year)	Rs. 10,000/- p.m. Contingency Rs. 25000/- p.a.	4

Government Scholarship (Postgraduate)

Scholarship for Ph.D. Students				
1.	NBHM (National Board of Higher Mathematics)	Ph.D.	Rs. 16,000/- p.m. after 2 years, Rs. 18,000, Contingency grant Rs. 20,000/- p.a.	8
2.	DBT-JRF DBT-SRF (Department of Biotechnology Jr. research Fellowship)	Ph.D.	Rs. 16,000/- p.m. (first 2 years) Rs. 18,000/- p.m., plus (next 3 years) Contingency Allowance Rs. 30,000/- p.a., He will be entitled to HRA.	7
3.	ICPR (Indian Council of Philosophical Research)	Ph.D.	Rs. 5000/- p.m. For non-NET Rs. 6,000/-, for NET Plus Contingency grant Rs. 12000/-	1
4.	ICMR (Indian Council of Medical Research)	Ph.D.	Rs. 16,000/- p.m. First 2 years plus Contingency, Rs. 20,000/- per year, Rs. 18,000/- (next 3 years)	5
5.	ARCI (International Advance Research Centre for Power Metallurgy & New Materials)	Ph.D.	First 2 years Rs. 18000/- p.m., Next 2 years Rs. 20,000/- p.m. Contingency Rs. 20,000/-p.a.	1
6.	DST-Inspire	Ph.D.	Rs. 16,000/- p.m. BE, B.Tech after 2 years Rs. 18000/-Rs. 18000/- p.m. ME, M.Tech after 2 years Rs. 20,000/-	10
7.	DBT-Binc	Ph.D.	Rs. 16,000/- p.m. Contingency Rs. 30,000/- p.a.	1
Scholarship for M.Tech. Students				
1.	DAE (DGFS) (BRNS) (Board of Research in Nuclear Sciences)	M.Tech.	Rs. 20,000/- p.m., Plus Reimbursement of Tuition Fees paid by students every semester. Plus Education Material Allowance of Rs. 5000/- (one time payment during entire programme). Plus Contingency expenditure of Rs. 25,000/- to each student.	4
2.	AERB (Atomic Energy Regulatory Board)	M.Tech.	Rs. 20,000/- p.m., Plus reimbursement of total fees paid by the students at the time of admission (one time payment), Plus reimbursement of tuition fee every semester, Plus Book allowance Rs. 5000/- once during the course	3
3.	MERC (Maharashtra Electricity Regulatory Commission)	M.Tech.	Rs. 8,000/- p.m., Plus Tuition fees Rs. 5,000/- per semester, Plus TA/DA, Report preparation, Contingency during the Course Rs. 15,000/- Plus 15% of total for Consumables, miscellaneous and Contingency Plus DDF.	5

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor

RECIPIENTS OF THE DEGREE OF DOCTOR OF PHILOSOPHY

Department: Aerospace Engineering

1.	06401002	Amjad Ali Pasha	Application of Shock-unsteadiness Model to Hypersonic Shock/Turbulent Boundary-layer Interaction.	Prof. Krishnendu Sinha
2	06401002	Parag Jayant Deshpande	Study of Vortex Dislocation by Means of Streamwise Vortices in the Two-Dimensional Wake	Prof. Sharma S.D.
3	07401003	Ram Prasad C.	Estimation of Aerodynamic Angles in a Mini Aerial Vehicle using Sensor Fusion.	Prof. Arya Hemendra

Department : Chemical Engineering

1	05402003	Ramesh Sakham Bhande	Preparation and Characterization of Langmuir Films of Polyethylene Oxide at Air-Water Interface	Prof. Juvekar V.A.
2	5402301	(Ms) Sonia Tikku	Wet Chemical Synthesis of Cobalt Nanoclusters and Zinc Oxide Nanoparticles	Prof. Juvekar V.A.
3	6402001	Bavdekar Vinay Anil	Identification of Discrete Stochastic Unmeasured Disturbance Models for Nonlinear Bayesian Grey Box Observers	Prof. Sachin Patwardhan
4	7402607	Ribu Cherian	A Source Oriented Approach to Aerosol Modelling and Regional Climate Change	Prof. Chandra V
5	5402602	Pramathesh Ramanand Mhaskar	Synthesis Strategies for Discrete-Continuous Adsorptive Separation Systems	Prof. Moharir A.S.
6	5402901	G.Hema Sagar	Microstructure and Microdynamics of AOT Bilayers, Myelins and Vesicles	Prof. Bellare J
7	6402005	(Ms) Anbumathi P.	Mathematical Modeling of Fission Yeast Schizosaccharomyces pombe Cell Cycle Regulation	Prof. Bhartiya S. Prof. Venkatesh K.V.
8	6402701	(Ms) Sumana Chenna	Fault Detection and Diagnosis Using Improved Kernel Based Methods	Prof. Gudi R. Prof. Manibhushan Dr. Ch. Venkateswarlu, Indian Institute of Chemical Technology, Hyderabad.
9	7402604	Hasabnis Amit Chandrakant	Process Intensification Strategies for Glycerol Based Reactions	Prof. Sanjay Mahajani

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
10	8402702	Debapriya Mandal	Hydrodynamics and Heat Transfer in Packed Fluidized Bed	Prof. Vinjamur Madhu Dr. D. Sathiyamoorthy, BARC, Mumbai
Department : Chemistry				
1	05403005	Vittal Seema	Synthetic Approaches to Novel Polycyclics via Olefin Metathesis	Prof. Sambasivarao Kotha
2	6403323	Arindam Indra	Development of Supported Catalysts for Selective Hydrogenation, Reduction and Coupling Processes	Prof. Goutam K. Lahiri
3	6403311	(Ms) Prinaka De	Ruthenium Nitrosyls in {Ru(NO)} ₆ and {Ru(NO)} ₇ Configurations. Synthesis, Electronic Structure and Reactivity Aspects	Prof. Goutam K. Lahiri
4	5403801	Gururaja G. N.	Conjugate Addition of Bromoform to Nitroalkenes and Enones and Studies on Bis-homocubyl Systems	Prof. I.N.N. Namboothiri
5	6403324	(Ms) Dipanwita Das	Electronic Structural Aspects of Ruthenium and Osmium Complexes with Non-innocent Quinonoid Ligands	Prof. Goutam K. Lahiri
6	6403005	Rakesh Kumar Pathak	Calix[4]arene Conjugates : Synthesis, Characterization, Ion Binding and Bio-interaction Studies.	Prof. C. P. Rao
7	4403604	Gopu K.	Synthesis and Antioxidant Studies of Some α -Tocopherol Compounds	Prof. Anil K. Singh
8	6403007	(Ms) Tamanna Shirin Khurshid Ali Khan	Functionalized BODIPYs For The Synthesis Of Covalent And Non-Covalent BODIPY-Chromophore Conjugates	Prof. M. Ravikanth
9	8403316	Surajit Maity	A Combined Experimental and Computational Investigation of Non-covalently Bound Complexes of Phenylacetylene and Its Substituted Analogues	Prof. G. Naresh Patwari
10	6403318	(Ms) Subhasree Banerjee	Preparation, Properties and Potential Applications of Silica Nanostructures	Prof. A. Datta
11	6403308	Pramod Anandu Shanbhag	Rauhut-Currier and Aza-Morita-Baylis-Hillman Reactions of Conjugated Nitroalkenes and Their Applications	Prof. I.N.N. Namboothiri
12	5403311	(Ms) Shilpi Misra	Design and Synthesis of Novel Constrained α - Amino Acid Derivatives	Prof. Sambasivarao Kotha

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
13	6403314	Sudesh Tulshiram Manjare	Studies on Novel Chalcogenone Compounds	Prof. H. B. Singh
14	6403003	Laksheswar Kalita	Synthesis and Structural Studies on Group 1, 2, and 13 Metal Phosphates, Carboxylates, and Alkoxides	Prof. R. Murugavel
15	5403009	(Ms) Pooja Gupta	Molecular Recognition in Proteins and Molecular Folding and Design of Polypeptides: A Computational Study	Prof. Susheel Durani
16	8403601	(Ms) Anu Aravind Thoppil	Biophysical Studies on Protein-Ligand Binding and Protein-Solvent Interactions.	Prof. Nand Kishore
17	6403002	Kinshuk Raj Srivastava	Stereochemistry of Polypeptide Structure : Computational Enquires of the Role in Protein Folding and the Value in Protein Design	Prof. Susheel Durani
18	6403304	Prakul Rakesh	Studies on Organochalcogens : Reactivities of Organoselenium(II) / tellurium(IV) halides and Binding Studies of Diorganochalcogenides	Prof. H. B. Singh
19	6403316	Arjun Shankar Chavan	New Synthetic Strategies to Polycyclics Based on Olefin Metathesis, Diels-Alder Reaction, Suzuki Coupling and Tandem Claisen Rearrangement	Prof. Sambasivarao Kotha
20	7403304	Iqbal Abdul Latif	Theoretical Investigation on Organic Magnetic Molecules	Prof. S. N. Datta
21	6403305	Rana Howlader	Studies on Metal Phosphonates, Metal Phosphates, and Phosphorus and Nitrogen based Cyclodiphosphazane Ligands	Prof. R. Murugavel
22	6403301	Rajeev R.	Investigations on Mechanism, Stereoselectivity, and Small Molecule Activation Using Computational Chemistry Methods	Prof. R. B. Sunoj
23	7403005	(Ms) Tanaya Kundu	Mixed Valence Aspects and Anion Recognition Features of Ruthenium Complexes.	Prof. Goutam K. Lahiri
24	6403319	(Ms) Deepti Goyal	Design of New Synthetic Strategies to Modified Amino Acids and Peptides.	Prof. Sambasivarao Kotha
25	6403006	(Ms) Punam Ghosh	Protein Design: Exploring Folds and Assemblies over an alphabet of Enantiomer Structures	Prof. Susheel Durani
26	7403004	Arun Bapurao Ingle	Development of New Synthetic Strategies for the Synthesis of Bioactive Molecules	Prof. Rodney Fernandes

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
27	6403302	Narasimham Ayyagari	Cascade Reactions Involving Curcumins and Synthesis of 1,3-Bishomocubane Derived Chiral Ligands	Prof. I.N.N. Namboothiri
28	6403317	Pravin Narayanrao Bhalerao	Studies on synthesis of polycyclic ethers, atisanes, maoecrystal V and aza-polyquinanes	Prof. V. K. Singh
29	6403321	Bhupesh Goyal	Protein Folding and Enzyme Catalysis : Computational and Experimental Studies of Peptide Models	Prof. Susheel Durani
30	8403321	Abhishek Dutta Chowdhury	Transition Metal Derived Catalysts for Selective Oxidation and Hydrogenation Processes	Prof. Goutam K. Lahiri
Department : Civil Engineering				
1	7404003	Swapnil Babu Kharmale	Displacement-Based Seismic Design of Steel Plate Shear Walls	Prof. Ghosh Siddhartha
2	7404801	Sumedh Yamaji Mhaske	GIS-GPS Based Geotechnical Studies for Seismic Liquefaction Hazards in Mumbai City.	Prof. Choudhury Deepankar
3	5304403	Sanjay Anil Chikermane	Structural Health Monitoring of Railway Bridges.	Prof. Banerji P.
4	6404702	(Ms) Varsha Vinayak Prof. Banerji P.	Physical and Numerical Model Studies for Aerator on Orifice Spillway	Prof. Jothiprakash V.
5	5404003	Surajit Das	Geometrically and Materially Nonlinear Finite Element Analysis of Shape Memory Alloy Smart Structures	Prof. Bajoria K.M.
6	8404002	(Ms) Meenal Mategaonkar	Simulation-Optimization Model for Groundwater Contamination Remediation using Meshfree Method and Particle Swarm Optimization.	Prof. T I Eldho
7	5404701	Avinash Suryabhan Garudkar	Multi Reservoir System Optimization using Genetic Algorithm for Water Resources Management.	Prof. Rastogi A.K. Prof. T I Eldho Sunil D. Gorantiwar
8	1404303	Jagadeeshappa H. Godihal	A Methodology for Reducing Flooding in Urban Areas Using Fuzzy Control.	Prof. Gupta Kapil
9	8404803	Kame Ganesh Shamrao	Analysis of a Continuou Vertical Plate Anchor Embedded in Cohesionless Soil.	Prof. Dewaikar D.M. Prof. Choudhury Deepankar

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
10	4404805	(Ms) Sanghapriya Harsh K.	Real-World Driving Cycle for Constructing Emission Factor and Inventory Model to Estimate Vehicular Emission for an Urban Region.	Prof. Tom V Mathew
11	8404704	Praveen Kumar	Seismic Response of Piping System with Passive and Semi-active Supplemental Devices.	Prof. Jangid R.S. Dr. G.R. Reddy
12	9404601	(Ms) Divya P.V.	Studies on the Behaviour of Geofiber-Reinforced Clay Barriers of Landfill Covers.	Prof. Viswanadham B.V.S.

Department : Computer Science & Engineering

1	2405002	Patil Preetam Vijay	Load Control Strategies for IEEE 802.11 DCF Wireless LANs.	Prof. Varsha Apte
2	5429801	Azeem Javed Khan	A Distributed Open Software Router : Analysis and Architectures	Prof. Manjunath D. Prof. A.Sahoo
3	4405701	Rajeev Gupta	Executing Continuous Aggregation Queries over Data Aggregators.	Prof. Ramamritham Krithi Dr. Mukesh Mohania
4	6405801	(Ms) Chilukuri Shanti	A Delay-aware Integrated MAC and Routing Protocol for Energy Efficient Communication in Wireless Sensor Networks.	Prof. A.Sahoo
5	9405005	Das Tamal Dinesh	Stochastic Analysis of High-Speed Networks.	Prof. Ashwin A. Gumaste
6	7405004	Jugal Garg	Complementary Pivot Algorithms for Market Equilibria.	Prof. Sohoni Milind Prof. Bharat Adsul
7	7405005	(Ms) Ruta Mehta	Nash Equilibrium Computation in Various Games.	Prof. Sohoni Milind Prof. Bharat Adsul
8	4405301	Arvind Wamanrao Kiwelekar	An Ontological Framework for Software Architecture Modeling.	Prof. Joshi Rushikesh K.

Department : Earth Sciences

1	1406501	(Ms) Shilpa Vinay Netrawali	Geochemistry of Savitri River Basin, Raigad District, Maharashtra : Implications to Chemical Weathering of Deccan Basalt.	Prof. Pandalai H.S.
2	5406003	(Ms) Babita Rani Choudhary	Melt Inclusions Studies Related to Deccan Basaltic Magmatism around Mahabaleshwar, Maharashtra, India.	Prof. Jadhav G.N.
3	5406002	Shovan Lal Chatteraj	Glauconite Formation in Stratigraphic Framework of Palaeogene Succession of Kutch.	Prof. Banerjee Santanu Prof. Saraswati P.K.

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
4	5406004	Nevin C. G.	Geochemistry and Fluid Characteristics of Scheelite Mineralization Associated with Gold in the Hutti Deposit, Karnataka, India.	Prof. Pandalai H.S.
5	8406603	Amit Kumar Verma	Three Dimensional Thermo-Hydro-Mechanical Modeling of the Deep Underground Repository for High Level Nuclear Waste Disposal.	Prof. Singh Trilok Nath
6	7406004	Kamleshwar Ratre	Tectonic Evolution of Eastern Ghats Mobile Belt and Bastar Craton-Interface around Lakhna, Nawapara District of Odisha, India : A Study based on Strain Analysis of Mylonites and Geochemistry and Geochronology of the Dykes.	Prof. Biswal T.K.
7	7406302	(Ms) Monalisa Mallick	Organic Geochemical Characterization of Eocene Surat Lignites, Cambay Basin, Western India.	Prof. Suryendu Dutta
8	7406301	Runcie Paul Mathews	Petrography, Palynology and Organic Geochemistry of Eocene Matanomadh Lignite-Bearing Sequence, Kutch Basin, Western India.	Prof. Suryendu Dutta Prof. Banerjee Santanu
Department : Electrical Engineering				
1	6407601	(Ms) Seena. V	Polymer Nanomechanical Cantilever Sensors with Novel Electrical Transduction Schemes for Bio/Chemical Sensing.	Prof. Rao Ramagopal Prof. Mukherji Soumyo
2	5407804	Ravishankar Suryabhanji Dudhe	Organic Field Effect Transistor Based Electronic Nose Platform for Explosive Detection : Theory, Fabrication and Characterization.	Prof. Rao Ramagopal Prof. Anil Kumar
3	5407702	Jayesh Prabhudas Pabari	Investigation of Wireless Sensor Network for In-Situ Exploration of Water Ice on the Moon	Prof. Desai U.B. Y. B. Acharya
4	6407007	Patel Dhaval Chandubhai	Modeling and Analysis of Induction Machine with Stator Inter-Turn Fault.	Prof. M. Chandorkar
5	7407303	Virani Hasanali Gulamali	Design and Optimization of Tunneling Field Effect Transistors for Low Power Applications.	Prof. Anil K.G.
6	00407007	Nitin Sadashiv Bhagat	Optimal Design of Distribution Systems Using Graph Theory and Combinatorics.	Prof. Sharma Dinesh

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
7	06407003	(Ms) Shweta Deora	Characterization and Modeling of Negative Bias Temperature Instability in Silicon Oxynitride (SiON) and High-k/MG p-MOSFETs	Prof. Souvik Mahapatra Prof. Anil K.G
8	06407603	Ram Asra	Cmos Compatible High Performance Sandwich Tunnel Barrier Field Effect Transistor for Sub-0.5 V Supply Voltage Applications.	Prof. Rao Ramagopal
9	04407703	Malewar Anant Shaligram	Improved Approaches to Rate Control for Video Compression Based on the H.264 Standard and It's Extensions.	Prof. Gadre V.M. Anupama Mrs. Prasad
10	5407008	Manda Somasekara Rao	Fixed Cost Allocation of Transmission System Using Min-Max Fairness Approach.	Prof. Soman S.A. Prof. B. L. Menezes
11	07407003	Mrunal A. Khaderbad	Bottom-up Approaches for Nano-Scale CMOS Scaling.	Prof. Rao Ramagopal Prof. M. Ravikanth
12	70407001	(Ms) Parul Nilesh Shah	Multisensor Multispectral Image and Video Fusion.	Prof. Merchant S N
13	4407005	Dimble Shekhar Shivaji	Fabrication, Testing and Packaging of PEM Fuel Cells.	Prof. S. Duttagupta Prof. Agarwal Vivek
14	6407012	Yemula Pradeep Kumar	Information Architectures for Power Control Centers.	Prof. Khaparde S.A. Prof. Joshi Rushikesh K.
15	8407606	(Ms) Taskeen Ameer Nadkar	Symbiotic Cooperative Relaying for Dynamic Spectrum Access.	Prof. Desai U.B. Prof. Merchant S N
16	8407609	Sanjeev Kumar Mishra	Printed and Parallel Metal Plated UWB Antennas for Wireless Communication.	Prof. J.Mukherjee
17	7407706	Hrishikesh Sharma	Exploration of Projective Geometry-Based New Communication Methods for Many-Core VLSI Systems.	Prof. Patkar Sachin Mr. P. Balamuralidhar
18	6407303	Rajendrakumar Anantrao Patil	On Throughput Performance of Retransmission Protocols with Packet Combining Over Lossy Link.	Prof. Karandikar Abhay Prof. P.Chaporkar
19	6407801	Srinivasan Krishnaswamy	On Multisequences and Applications.	Prof. Pillai Harish
20	06407302	(Ms) Preeti Dinesh Bhamre	Spectral Characteristics and Electrical Modeling of Photonic Crystal Waveguide with Defect.	Prof. Shevgaonkar R.K.

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
Department : Humanities & Social Sciences				
1	5408007	Ashok Kumar Mocherla	Christians of Coastal Andhra Pradesh : A Sociological Study	Prof. Robinson Rowena Prof. Parthasarathy D.
2	6408804	A. Wati Walling	Land, Politics and Conflict : Political Ecology of a Village in Nagaland	Prof. Parthasarathy D. Prof. Robinson Rowena
3	4408702	(Ms) Thanksy F. Thekkekkara	Sustainability and Women's Empowerment in Microfinance Self Help Groups - A Case Study of Dharni Taluka, Melghat, Amravati (Maharashtra)	Prof. Ramanathan A Prof. Parthasarathy D.
4	6408005	Sanjram Premjit Khanganba	Prospective Memory in Programmer Multitasking : An Analysis of Cognitive Workload.	Prof. A. Khan Prof. Gupta Meenakshi
5	6408901	Gyan Prakash	The Concept of Mind in Early Buddhist Philosophy and Gilbert Ryle : A Comparative Study	Prof. C.D. Sebastian
6	2408301		A Comparative Study of Entrepreneurial and Intrapreneurial New Ventures in Indian IT Sector : Examining the Effects of Individual, Team and Organizational Factors on New Venture Performance.	Prof. Bhargava S
7	6408701	Samir Ranjan Behera	Macroeconomic Determinants of Asset Prices in India : An Empirical Investigation	Prof. Trivedi Pushpa Dr. Deba Prasad Rath
8	5408004	(Ms) Barada Laxmi Panda	Rationality and Normativity : A Discourse in Ethics.	Prof. R.K. Panda
9	6408002	(Ms) Sarita Kar	Corporate Social Responsibility : An Analysis of	Prof. C.D. Sebastian
10	5408807	U. K. V. Sarma	Planetary Models Expounded by Bhaskara, Madhava and Nilakantha	Prof. K. Ramasubramanian
11	7408301	(Ms) Nishevita Murthy	History, Fiction and Representation in Select Novels of Umberto Eco and Orhan Pamuk	Prof. Shastri Sudha
Department : Mathematics				
1	6409305	Samrith Ram	Singer Cycles, Coprime Polynomials, Hankel Matrices over Finite Fields and Arithmetic Progressions in Unique Factorization Domains	Prof. Ghorpade S.R.

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
2	5409003	Deepjyoti Goswami	Finite Element Galerkin Approximations to the Equations of Motion Arising in the Oldroyd Model	Prof. Pani A.K
3	6409001	Dhorajia Alpeshkumar Madhubhai	Projective Modules over overrings of Polynomial Rings	Prof. Manoj Kumar keshari
4	05409901	Arun Kumar	Some Subordinated Processes and Their Connections to PDE's	Prof. Vellaisamy P.
5	4409301	Sunil Kumar Gauttam	Constrained Risk-sensitive Control Problems	Prof. K. Sureshkumar
6	5409303	Sajid Mohd. Yunus Memon	Finite Element Methods For Pricing of American Option	Prof. Pani A.K. Prof. Patkar Sachin
7	5409005	Patil Pramod Jagannath Mangala	On Certain Multivariable Subnormal Weighted Shifts and their Duals	Prof. Ameer Athavale
8	6409302	Surinder Pal Singh Kainth	Gauge Integrals on Metric Measure Spaces	Prof. Rana I.K.

Department : Mechanical Engineering

1	5410703	Vikas Kumar Jain	Analytical, Numerical and Experimental Investigations of Higher Order Modes in Accelerator RF Cavities	Prof. Upendra Bhandarkar Dr. Srinivas Krishnagopal
2	3410701	Kausik Nandi	Numerical Study of Two Fluid Systems with Interfaces	Prof. Date A.W. P. K. Vijayan
3	7410006	Degala Venkata Kiran	An Experimental and Numerical Investigation on Two Wire Tandem Submerged Arc Welding Process	Prof. De Amitava
4	8410304	Govindan P.	Process Development and Modeling of Dry Electrical Discharge Machining.	Prof. S. S. Joshi
5	7410001	Bopche Santosh Bhaulal	Evaluation of Moderator Capability as a Heat Sink to remove Decay Heat of Advanced Reactor during an Accident Situation.	Prof. Arunkumar Sridharan
6	07410302	Yogesh S. Padiya	Energy Efficient Small Capacity Desalination Unit.	Prof. Rane Milind
7	3410401	Sant Kedar Damodar	Investigations on Twin Alpha Stirling Cryocoolers Driven by a Novel Compact Drive Mechanism with Preliminary Experimental Results.	Prof. Bapat S.L.

Sr.	Roll No.	Name	Thesis Title	Supervisor / Co-Supervisor / External Supervisor
Department : Metallurgical Engineering & Materials Science :				
1	5411704	P. Ganesh	Studies on Laser Rapid Manufacturing of Inconel-625 and Bi-Metallic Structures with Stellite-21 and Type 316L Stainless Steel and Evaluation of their Fatigue and Fracture Behavior	Prof. Prasad R.C. Dr. C. P. Paul
2	5411701	Supratik Roychowdhury	Effect of Nitrogen Content in Austenitic Stainless Steels on Intergranular Stress Corrosion Crack Growth Rate and Mechanisms in Simulated BWR Environment	Prof. Prasad R.C.
3	5411901	Dileep Kumar Agrahari	Synthesis of Lead Magnesium Niobate-Poly (Vinylidene Fluoride) Nanocomposites by Melt-Mixing and Study of their Structural, Morphological and Dielectric Properties.	Prof. Srinivasa Raman
4	4411006	Abhale Prakash Bansi	Modelling of Iron Blast Furnace	Prof. N.N.Viswanathan Prof. Ballal N.B.
5	7411003	Rama Shanker Mishra	Development of Novel Hydroxyl Terminated Hyperbranched Polyesters Based High Performance Anticorrosive Polyester and Polyurethane Coatings for Mild Steel Applications.	Prof. Khanna A. S.
6	5411702	Ahmedabadi Parag Mahendrabhai	Effect of Various Parameters on Radiation-Induced Segregation in Austenitic Stainless Steels.	Prof. Samajdar I. Prof. Vivekanand Kain
7	5411801	T. Sriharsha	Morphological Control of Selected Transition Metal Nano Magnetic Oxides for Possible Applications.	Prof. Bahadur D. Prof. Vitta Satish
8	6411701	Kamlesh Chandra	Low Temperature Embrittlement of Austenitic Stainless Steel Welds and its Electrochemical Assessment.	Prof. Raja V. S. Dr. V. Kain
9	1411801	Joydeb Nag Chaudhury	Fracture Mechanics Study of Micro-alloyed Steels	Prof. Prasad R.C.
10	4411901	Rajesh Kisni Khatirkar	Strain Localizations in Low Carbon Steels	Prof. Samajdar I.
11	4411003	Prabhakaran S.	Development of Functionalized Magnetic Nanostructures for Biomedical Applications.	Prof. Bahadur D. Prof. Mukherji Soumyo

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Department : Physics				
1	5412602	(Ms) Sunita Kedia	Self-Assembled Photonic Crystals and Heterostructures for Light Control	Prof. Vijaya R. Prof. Senthilkumar M.
2	6412005	Brijesh Kumar	Topological Objects and Vacuum Stability in Quantum Field Theory	Prof. P. Ramadevi Prof. Yajnik Urjit
3	06412006	(Ms) Sasmita Mishra	Accomplishing Parity breaking and Supersymmetry Breaking in the Context of Cosmology	Prof. Yajnik Urjit
4	5412005	(Ms) Himani Bhatt	Study of Rare Decay of $N \rightarrow e+e-\tau$ using WASA-at-COSY	Prof. B Nandi
5	5412701	Biplab Ghosh	Statistical Physics of Bacterial Cell Division	Prof. Anirban Sain Dr. S. V. G. Menon, BARC, Mumbai.
6	5412702	Gundra Kondayya	Electronic Structure and Optical Properties of Graphene Nanoribbons	Prof. Alok Shukla Dr. S. V. G. Menon BARC, Mumbai.
7	7412601	Prabhat Ranjan Pujahari	Po(770) Vector Meson Production and Elliptic Flow Measurement in Cu + Cu and Au + Au Collisions at $\sqrt{s_{NN}} = 200$ GeV in STAR at RHIC	Prof. B Nandi
8	6412902	Pavan Kumar Narayanam	Effect of Post-Sulphidation Treatments on the Structure and Optical Properties of CdS and Cd _x Zn _{1-x} S Nanocrystallites in LB Multilayers and the Growth of Graphene Oxide-CdS Composite LB Monolayers	Prof. Major S.S.
9	6412901	(Ms) Aditi Ghosh	Nonlinear Characteristics of Optical Fiber-Based Amplifiers and Lasers Towards Novel Applications	Prof. Vijaya R. Prof. Senthilkumar M.
10	7412701	Amit Prakash Srivastava	Synthesis, Microstructure and Magnetic Properties Correlation Studies on Some Fe and Fe-Co Based Soft Magnetic Nanocrystalline Materials	Prof. Suresh K.G. Dr. Gautam Kumar Dey, BARC, Mumbai
Department : Industrial Design Centre				
1	6413004	Rajendra Dadaram Patsute	Ergonomic Studies in Design, Development and Evaluation of Sit-down and Stand-up Console	Prof. Ray G.G.
Department : Corrosion Science & Engineering				
1	5416701	(Ms) Geogy Jiju Abraham	Establishing Localized Corrosion Behaviour of Ni-Cr-Fe alloys using Electrochemical Techniques.	Prof. Raja V. S. Dr. G. K. Dey

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Department : Energy Science and Engineering				
1	8417301	Chudasama Mahipalsinh Chandrasinh	Application of Dynamic Phasor Models for the Analysis of Power Systems with Phase Imbalance.	Prof. Kulkarni A.M.
2	5417002	Shendage Dadasaheb Jagannath	Design and Development of Stirling Engine.	Prof. Bapat S.L. Prof. Kedare S B
Department : Centre for Environmental Science & Engineering				
1	8418301	(Ms) Hansa S. Jeswani	Biological Treatment of Biomass Gasification Wastewater	Prof. Suparna Mukherji
2	4418701	Rajesh Kumar Singh	Sustainability Management in Steel Industries	Prof. A.K.Dikshit Mr. H. R. Murty
Department : Reliability Engineering				
1	6422303	Manjunatha P.	Energy Efficient Data Fusion for Event Detection and Optimal Routing Based Reliability Studies in WSN.	Prof. A.K. Verma Prof. (Ms.) A. Srividya
2	4422702	Palasur Ganesan Ramesh	Multi-Objective Maintenance Decision Models for Large Engineering Systems in E-Maintenance Scenario.	Prof. A.K. Verma Prof. (Ms.) A. Srividya Dr. Ankush Gulati
3	5422702	Anil Rana	Multi-Objective Optimisation of Maintenance of Ship Borne Machinery and an Approach to its Analysis using Stochastic Petrinets.	Prof. A.K. Verma Prof. (Ms.) A. Srividya
4	6422801	Suraj Surendra Rane	Crashworthiness, Risk Analysis and Reliability Based Design Optimization of Motorcycle Frame.	Prof. (Ms.) A. Srividya Prof. A.K. Verma
5	5422703	Golakoti Srinivas	Nuclear Power Plant Operations and Maintenance Optimization using a Multi-objective Approach.	Prof. A.K. Verma Prof. (Ms.) A. Srividya
6	7422702	Muruva Hari Prasad	Dynamic Reliability based Risk Analysis of Passive Safety Systems.	Prof. (Ms.) A. Srividya Prof. A.K. Verma
Department : Systems & Control Engineering				
1	4423701	Shimjith S. R.	Modeling and Control of Advanced Heavy Water Reactor	Prof. Bandyopadhyay B. Dr.A. P. Tiwai
Department : SJM School of Management				
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3	6427801	Sanjay Chandrabhan Choudhari	Configuration of Manufacturing Strategy Decisions in Production Systems	Prof. Gajendra Adil Prof. Usha Ananthakumar
4	7427201	Mengist Hailemariam Tadesse	A Dynamic Model for Analyzing the Impacts of Supply Chain Management on Airport Operations	Prof. Karuna Jain Dr. Ing. Daniel Kitaw
5	7427002	Suresh M.	A Study of a Class of Resource Constrained Project Scheduling Problems	Prof. Karuna Jain Prof. Pankaj Dutta

Department : Biosciences & Bioengineering

1	5430602	(Ms) K. Anuradha	Characterization of the Assembly Dynamics of Bacterial Cell Division Protein FtsZ.	Prof. D. Panda Prof. Bellare J.
2	5430004	Rahul Shrivastava	Characterization of Enzymes Involved in the Metabolism of Aromatic Compounds and the Role of Outer Membrane Protein, OprB in the Glucose Transport in Pseudomonas putida CSV86.	Prof. P. S. Phale
3	6430003	(Ms) Jessy John	Computational Studies on Biophysics of Nucleus Accumbens Medium Spiny Neurons : Factors Governing Synaptic Potentials and Dendritic Ca ²⁺ Signaling.	Prof. Manchanda Rohit
4	7430004	Abhijeet Balwantrao Joshi	Nanoengineered Lactate Biosensor.	Prof. R. Srivastava
5	6430006	Amit Prabhakar	Microfabricated SU-8 Optical Waveguide Based Chemical and Biological Sensors.	Prof. Mukherji Soumyo
6	5430005	Apurva Rashmikant Shah	Surfactant for Delivery of Anti-Oxidant and Anti-Inflammatory Drugs in Respiratory Diseases.	Prof. Banerjee Rinti
7	430001	(Ms) Nidhi Maheshwari	Development of Low Cost, Polymeric, Parallel Plate Capacitive Immunosensor.	Prof. Mukherji Soumyo Prof. Anil K.G.
8	05430003	Avinash Sinha	Phenomenological Studies and Metabolic Flux Analysis of Rifamycin Over Producer Strain Amycolatopsis Mediterranei S699	Prof. Wangikar P.
9	5430309	Kamaleshwar Prasad Singh	Optimization of Balhimycin Production and its Correlation with Cellular Morphology.	Prof. Wangikar P. Prof. Sameer Ralph Jadhav

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10	5430007	(Ms) Manju Kumari	Ab Initio Quantum Chemical Investigations on CH... π Interaction Between Saccharides and Aromatic Amino Acids : Implications in Binding and Recognition in Biological System.	Prof. P.V.Balaji Prof. R. B. Sunoj
11	6430901	Thanigaivel S.	Self Assembled Nanocarriers for Oral and Aerosol Delivery of Anticancer Agents.	Prof. Banerjee Rinti
12	4430802	(Ms) Preetha Sasi	Evaluation of Drug-Drug Interactions and Drug Induced Hepatotoxicity using in Vitro Methods.	Prof. Wangikar P.
13	5430302	Navneet Rai	Design and Characterization of Synthetic Transcriptional Feedback Loops.	Prof. Venkatesh K.V.
14	5430601	Reshamwala Shamlan Mohd Shafi	Studies with a Pleiotropic Transcription Factor in Enteric Bacteria	Prof. Santosh Noronha
15	6430302	Parminder Singh	Understanding Assembly Dynamics of FtsZ : A Study using Small Molecule Inhibitors and an Accessory Cell Division Protein FtsA	Prof. D. Panda
16	5430310	Anshul Nigam	Metabolic Capacity and Adaptability of Aromatic Hydrocarbon Degrading Microorganism Pseudomonas putida CSV86 Assessed in Chemostat	Prof. Wangikar P. Prof. P. S. Phale
17	6430602	Manu Tiwari	Nanoparticle Mediated Differentiation of HL-60 Cells.	Prof. Bellare J. Prof. Sarika Mehra
Centre of Studies in Resources Engineering				
1	7431701	Narayan Panigrahi	Multi-Resolution Approach to Change Detection	Prof. Mohan B.Krishna Dr. Gopalaswamy Athithan

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RECIPIENTS OF THE DEGREE OF MASTER OF TECHNOLOGY

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2	10301001	Jubin Tom George	Numerical Simulation And Design of an Axial Compressor Rotor with Low Tip Sensitivity.	Prof. A.M. Pradeep
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4	10301002	Arvind N.	Multidimensional Riemann Solver for Euler Equations	Prof. Mandal J.C.
5	10301006	Naga Praveen Kumar K.	Numerical Analysis of Active and Passive Flow Control Techniques Applied To Contra-rotating Axial Flow Fan	Prof. A.M. Pradeep
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11	10301406	Rameswara Srinivas Gorthi	Modified Curvature Corrected Symmetry Treatment for Solid Walls.	Prof. Mandal J.C.

Department: Aerospace Engineering – Specialization : Aerospace Propulsion

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16	10301022	Darshan Chandramohan Sawant	Development of Combustor for Achieving Flameless Combustion of Liquid Fuels.	Prof. Sudarshan Kumar
17	10301032	Rajkumar K.	Simulation of Turbulent Non - Premixed Lifted Flame under Vitiated Co-Flow Conditions.	Prof. Sudarshan Kumar Prof. Sreedhara Sheshadri
18	10301021	Arun Raj S.	Numerical Simulation of Static Inflow Distortion on an Axial Flow Fan With and Without Tip Injection.	Prof. A.M.Pradeep
19	10301029	Ajit Kumar Dubey	Large Eddy Simulations of Vortical Instabilities in Segmented Solid Rocket Motors.	Prof. Sudarshan Kumar
20	10301034	Md. Saquib Reza	Experimental Investigation of Gas Turbine Exhaust Diffuser with Struts.	Prof. A.M.Pradeep
Department : Aerospace Engineering – Specialization : Aerospace Structures				
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24	10301016	(Ms) Manchu A. K.	Ballistic Impact Behavior of Cross Ply Laminates.	Prof. Naik N.K.
25	10301019	Kondeti Vasudeva Rao	High Strain Rate Behaviour of Materials under Compressive and Shear Loading.	Prof. Naik N.K.
26	10301025	Prasath Kumar J.	Multiscale Modeling of 3D Layer-to-Layer Orthogonal Interlock Woven Composites : Effect of Fiber Distribution.	Prof. Naik N.K.
27	10301036	Nithin S. Nair	Analytical and Experimental Studies on Ballistic Impact Behavior of Woven Fabrics and Composites	Prof. Naik N.K.
28	10301017	Parmeet Singh Chhabra	Effect of Nonlinear Behavior of Piezoelectric Stack Actuators on Active Vibration Control of Structures	Prof. Mujumdar P. M.

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30	10301404	Gottumukkala Ranga Ramanuja Chary	Aeroservoelastic Stability and Dynamic Response Analysis of a Typical Re-Useable Launch Vehicle (RLV) using ADASTAAC Code.	Prof. Joshi Ashok Prof. Mujumdar P. M.
31	10301407	Prem Ranjan	Aeroelastic Design of Morphing Wing MAV with Macro Fiber Composite Actuator	Prof. Mujumdar P. M.

Department : Aerospace Engineering – Specialization : Dynamics and Control

32	10301408	Kumar Surinder	Active Control of Combustion Instabilities in a Notional Gas Turbine Combustor.	Prof. Sudarshan Kumar
33	10301405	Amit Khullar	Design of MAV Autopilot for Analysis of Backlash on Closed Loop Stability.	Prof. Joshi Ashok Prof. Arya Hemendra
34	10301024	Sulakshan R. Arya	Hypersonic Aerothermoelastic Studies over the Lifting Surfaces.	Prof. Joshi Ashok
35	10307039	Sanat Kumar Biswas	Ground Based Navigation of Chandrayaan-2 in Lunar Transfer Trajectory	Prof. Hari B. Hablani
36	10301007	Dileep Krishnan K.	Hardware in Loop Simulator for Cooperative Missions	Prof. Arya Hemendra Prof. Joshi Ashok
37	10301008	Aseem Vivek Borkar	Cooperative Control for Fixed Wing MAVs.	Prof. Arya Hemendra Prof. Sudhakar K.
38	10301028	Vivek G. Padmaji	New Algorithms for Co-Operative Missions.	Prof. Arpita Sinha Prof. Sudhakar K.

Department : Chemical Engineering

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2	10302011	Mohd. Javed	Encapsulation of Nanoparticles by PPRGEL Process Using Subcritical CO ₂	Prof. Vinjamur Madhu
3	10302010	(Ms) Shalini Tripathi	Cracking in Coatings Made of Nano-Particles	Prof. Tirumkudulu Mahesh
4	10302009	Desouza Anish Julius	Molecular Simulation Study of EG+Water Mixtures at Esterification Reactor Conditions for PET Synthesis	Prof. Adhikari J.

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7	10302028	Athawale Pratik Prakashrao	Optimal Operations of Simulated Moving Bed Chromatographic (SMBC) System	Prof. Bhartiya S.
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14	10302039	(Ms) Akancha Pandey	Experiments and Modelling of Drying Process for UCG	Prof. Sanjay Mahajani

Department : Civil Engineering – Specialization : Geotechnical Engineering

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2	10304023	(Ms) Kanchana Menon	Some Studies on Electrical Impedance Spectroscopy of Soils.	Prof. Singh D.N.
3	10304025	(Ms) Soumya Rashmi Pandey	Determination of Active Thrust and Location of its Point of Application on a Retaining Wall Backfilled with Cohesion-less Soil under Surcharge Effect.	Prof. Dewaikar D.M.
4	10304026	Katkar Bharat Hemant	Studies on Behaviour of Back-to-Back Geosynthetic Reinforced Soil Walls.	Prof. Viswanadham B.V.S.
5	10304020	(Ms) Deblina Chatterjee	Embankment Failure in Residual Soils in Nivsar, Ratnagiri, Western Coast of India.	Prof. A. Juneja

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Department : Civil Engineering – Specialization : Remote Sensing

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7	10304046	Jerin Thomas Abraham	Determination of Radius of Buried Pipes from GPR Data Using Modified Hough Transform.	Prof. Venkatachalam G.
8	10304047	(Ms) CH. Jayashree	Assessment Of Earth Observation Data Content based on Data Compression - Applications to Settlements Understanding.	Prof. Venkatachalam G.
9	10304048	(Ms) Greeshma B. Nair	Surface Runoff Modelling and Flood Mapping with HEC HMS, HEC RAS, GIS and Remote Sensing.	Prof. Rao E.P.
10	10304050	Kalesh K.	Determination of Relative Permittivity of Buried Objects from GPR Data Using Modified Hough Transform.	Prof. Venkatachalam G.
11	10304044	Richard Massey	Artificial Neural Networks in Temporal and Spatial Variability Studies and Prediction of Rainfall.	Prof. Gopalrao P Kulkarni
12	10304049	(Ms) Sowmya N.	Artificial Neural Networks in Spatial Resolution Improvement of Multi-Sensor Data.	Prof. Gopalrao P Kulkarni

Department : Civil Engineering – Specialization : Structural Engineering

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17	10304039	Tushar Kanti Mandal	Seismic Fragility Analysis of a Primary Containment Structure using IDA.	Prof. Ghosh Siddhartha
18	10304038	Paresh Vishnoi	GIS - Based Rapid Seismic Risk Assessment of Urban Areas.	Prof. Sinha Ravi
19	10304037	Kotha Shravan	Bending and Free Vibrations of Functionally Graded Plates - Exact and Finite Element Formulations.	Prof. Kant Tarun
20	10304042	Karthick S.	Vibration Control of Structures using Tuned Mass Friction Dampers.	Prof. Jangid R.S.

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		Department : Civil Engineering Specialization : Transportation Systems Engineering		
23	10304017	Chetan Kumar H.	An Improved GIS based Urban Transportation Planning Model for Pune Metropolitan Region.	Prof. K.V.Krishna Rao
24	10304002	A. Pradhan Kumar	Bus Travel and Arrival Prediction under Mixed Traffic Conditions.	Prof. P.Vedagiri
25	10304009	Anuj Kumar Yadav	Time Series Freight Demand Models for Octroi Stations in Mumbai and Developing a Simulation Model for Mankhurd-Panvel Highway Octroi Station.	Prof. Gopal R. Patil
		Department : Civil Engineering Specialization : Structural Engineering		
26	10304018	Amit Kumar	Activity Pattern Choice Model for Mumbai Metropolitan Region.	Prof. K.V.Krishna Rao
27	10304052	Nagraj R.	Modeling Pedestrian Flow & Level-of-Service for Crosswalks at Signalized Intersections.	Prof. P.Vedagiri
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32	10304016	Bandhan Bandhu Majumdar	Comparitive Study on Different Aspects of Sustainability for a Stretch on Thane Belapur Road in Mumbai.	Prof. Dhingra S.L.
		Department : Civil Engineering – Specialization : Water Resources Engineering		
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34	10304031	Siva Naga Venkat Nara	Physical and Numerical Investigation of Local Scour Around Bridge Pier.	Prof. T I Eldho

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36	10304028	(Ms) S. Cini	Real Time Prediction of Current using Artificial Neural Networks and Model Trees.	Prof. Deo M.C. Prof. Subimal Ghosh Prof. Deo M.C.
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39	10304029	(Ms) Vardhini V. P	Groundwater Flow and Contaminant Transport Modelling using Meshfree Method.	Prof. T I Eldho

Department : Computer Science & Engineering

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4	9305084	Rahul Kumar Singh	Cost Model Internals of Vectorizer in GCC – 4.5.2.	Prof. Biswas S.
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9	10305037	Ravi Sagar P.	Spatial Models for Groundwater Behavioral Analysis in Regions of Maharashtra.	Prof. Sohoni Milind Prof. Purushottam Kulkarni
10	10305073	Lalit Kumar	Temporal Models for Groundwater Level Prediction in Regions of Maharashtra.	Prof. Sohoni Milind Prof. Purushottam Kulkarni

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12	9305904	Salil Rajeev Supriya Joshi	Unsupervised Word Sense Disambiguation.	Prof. Bhattacharya P.
13	10305002	Arindam Bhattacharya	Recognition of Textual Entailment Using Deep Semantic and Shallow Syntactic Graphs.	Prof. Bhattacharya P.
14	10305029	Krishna Teja V.	Implementation of Next Generation Attacks on Web Applications.	Prof. B. L. Menezes
15	10305035	Kanapata Sudhakara Rao	Evaluating and Enhancing Browser Defenses against Cross Site Scripting.	Prof. B. L. Menezes
16	10305061	Subhabrata Mukherjee	Adaptation of Sentiment Analysis to New Linguistic Features, Informal Language Form and World Knowledge.	Prof. Bhattacharya P.
17	10305067	Singh Janardhan Ramdeo Malti	Semantics Extraction from English Text	Prof. Bhattacharya P.
18	09305911	Shailendra Shrivastav	Minimization and Simulation of Finite State Machine.	Prof. Bhujade M.R.
19	10305053	Abhilash Sahu	Offline Signature Recognition using Hidden Markov Model.	Prof. Bhujade M.R.
20	10305089	(Ms) Monika Yadav	Load Scheduling in Grid Computing.	Prof. Bhujade M.R.
21	09305918	Chinmay Vaishampayan	Adapting OpenFlow for High Speed Networks.	Prof. Ashwin A. Gumaste
22	09305920	(Ms) Anjana Shankar	Virtualization over High Speed Networks.	Prof. Ashwin A. Gumaste
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24	10305402	Umang Kumar	Simulation of Algorithms for Spectrum Assignment in Flexi Grid.	Prof. Ashwin A. Gumaste
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75	09307936	(Ms) Kabara Priyanka Rajendra	Signal Conditioning Chip with “Differential Resistance to Frequency” Converter for Resistive Bridge Sensor.	Prof. M.Shojaei Baghini
76	09307R02	Rajath Bhat P. S.	Development of An Impedance Glottograph.	Prof. Pandey P.C.
77	10307014	Kamani Deepesh Hasmukhbhai	High Gain Complementary Current Reuse Low Noise Amplifier.	Prof. M.Shojaei Baghini
78	10307070	Suresh Chilumuri	Power Conditioning Circuit for Solar PV-Fuel Cell Based Hybrid Power Source.	Prof. S. Duttagupta
79	10307204	Dessie Fentaw Mihretie	Dynamic Boundary Tracking of Moving Cloud and Its Shading Effect on Solar Photovoltaic System.	Prof. S. Duttagupta
80	10307406	Sajeesh Kumar K.	Digital Controller Implementation for Non-Inverting Buck-Boost Converter Using Run-Time Partial	Prof. Agarwal Vivek

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81	10323010	Shafeeq E	Reconfiguration of FPGA. 3D Reconstruction from Stereo Images.	Prof. Agarwal Vivek
82	10323016	Rupendra Singh	A low cost Ultrasound Scanning Technique for Inspection of Cracks in Steel Rods and Pipes.	Prof. Agarwal Vivek
Department : Electrical Engineering			Specialization : Microelectronics	
83	09307044	Darla Santhi Swaroop	High Frequency (GHz) Capacitance Measurement for Ultrathin Oxide MOS Capaitors.	Prof. S. Duttagupta
84	09307601	Anvesha A.	Constant Resistance, Transconductances, Gm/C, PTAT Current References and their Applications.	Prof. M.Shojaei Baghini
85	09307914	Rohit Venkatachalam	Multi Octave High Frequency PLL.	Prof. S.Gupta
86	10307031	(Ms) Megha Bose	Design and Analysis of Driver Pre-Emphasis Based Signaling Schemes for On-Chip Long Interconnects in the Presence of Crosstalk.	Prof. M.Shojaei Baghini
87	10307050	Dhirendra Agrawal	Design of Transceiver for High-Speed Off-Chip Communication.	Prof. Sharma Dinesh
88	10307011	Biplab Sarkar	Study of Spintronic Memory Devices Based on AMR, GMR and TMR	Prof. Ashwin Tulapurkar
89	10307035	Vuddanti Pavan Kishore	Low Resistance Contacts to Germanium for Future CMOS Technologies.	Prof. Saurabh Lodha
90	09307911	Kamath Abhishek Raghuram	Gallium Nitride Based HEMT for High Frequency and High Power Applications.	Prof. Dipankar Saha Prof. Swaroop Ganguly
91	09307918	Prashant Singhal	Study of Gadolinium Based Schottky Contacts on n-Type Gallium Nitride.	Prof. Dipankar Saha Prof. Swaroop Ganguly
92	10307033	Tanmoy Pramanik	Numerical Simulation of Spin Injection in Metal-Semiconductor Spintronic Devices.	Prof. Dipankar Saha Prof. Swaroop Ganguly
93	10307030	Vivek Agrawal	Scaling of NOR Flash Memory Using Back Bias Assisted Band to Band Tunneling Induced Hot Electron Injection Mechanism (B4-Flash).	Prof. Souvik Mahapatra
94	10307034	Naijo Thomas	LSMO Based Resistive Random Access Memory.	Prof. Rao Ramagopal
95	10307303	Ashok Kumar Ray	Plasma Immersion Ion Implantation Process Space Optimization for Semiconductor Device Applications.	Prof. Rao Ramagopal

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96	09307609	Shanky Kumar Jain	Investigation of Advanced E-Beam Techniques for Device Applications.	Prof. Swaroop Ganguly Prof. Anil K.G.
97	09307912	Amrut Devidas Kolhapure	SRAM in Hold-Operation: Modeling the Interaction of Soft-Errors and Switching Power-Supply Noise.	Prof. Animesh Kumar
98	09307913	Srihari Rao Marni	Investigation of Non Classical CMOS Devices for Scaling.	Prof. Swaroop Ganguly Prof. Anil K.G.
99	09307917	Venkata Naveen Kumar N.	Study of Advanced MOS Devices: Fabrication and Characterization.	Prof. Swaroop Ganguly Prof. Anil K.G.
100	10307005	Mohanrao Sattineni	Modeling and Design of DDS Based All Digital PLL.	Prof. S.Gupta
101	10307008	Satya Pavan Prasad Vemuri	A Design of Direct Digital Synthesis Based Offset PLL.	Prof. S.Gupta
102	10307053	Santosh Kumar Thanneeru	Low Power Processor Design for Personal Biomedical Applications.	Prof. M.Shojaei Baghini
103	10307404	Veeranna Paltiya	Design of Data Acquisition System for Avionics Application in 0.18um CMOS Technology.	Prof. Chandorkar A.N.
104	10323002	Chaudhari Mayankkumar Bipinbhai	Design of 60GHz Frequency Divider and VCO in 90nm CMOS Technology.	Prof. S.Gupta
105	09307915	(Ms) Mugdha Uday Neeta Nazare	Automated Test Set Up for CMOS Programable Linear Delay Element Chip Testing.	Prof. M.Shojaei Baghini
106	09307926	Vineeth A.	CMOS Integrated Transceiver Design for Bio-Telemetry Applications in MICS Band.	Prof. M.Shojaei Baghini
107	10307012	(Ms) Mohod Jyotsna Devidas	Reconfiguration Strategy for Solar Photovoltaic (SPV) Based Distributed Generation Systems.	Prof. S. Duttagupta
108	10307057	Murali Golve	Simulation and Fabrication of Novel MOS Device Architectures.	Prof. Anil K.G.
109	10307009	Sujit Kumar	Scalable High Performance Hardware Software Co-design for Galois Field Matrix-Matrix Multiplication.	Prof. Patkar Sachin
110	10307032	Madhusudan Rathi	A Novel Charge Pump Circuit for Energy Harvesting Using STBFET.	Prof. Rao Ramagopal Prof. M.Shojaei Baghini
111	09307916	Waikar Mayur Kishor	Fabrication and Electrical Characterization of Floating Gate NAND Flash Memory.	Prof. Anil K.G.

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112	09307611	Amit Gour	Development and Characterization of Dry Etch Process for Flash Memory and CMOS Application.	Prof. Anil K.G. Prof. Swaroop Ganguly
Department : Electrical Engineering Specialization : Power Electronics & Power Systems				
113	10317005	Gawai Dipakkumar Dharma	Characterization of a Vegetable Oil for its Use in Transformers.	Prof. Kulkarni S V
114	10307029	Kottapalli Kiran Kumar	A Grid Interactive Hybrid Power Supply for Telecom Applications.	Prof. Fernandes B.G.
115	10317007	Ashish Kumar	Cascade H-Bridge Multilevel Converter for Grid Connected Photovoltaic System.	Prof. Anshuman Shukla
116	07307502	Biswakesan Sahoo	Feasibility Study of Generating 100% Solar Electricity for the Distribution Transformer of CAD Substation at IIT Bombay.	Prof. Soman S.A. Prof. C.S. Solanki
117	09317601	Royden Santosh Savio Fernandes	Some Studies on Short-Term Forecasting for Electricity Markets.	Prof. Soman S.A.
118	10307202	Gedion Solomon Gebretsadik	Design and Development of Switched Mode Power Supplies for DC System.	Prof. Fernandes B.G.
119	10307007	Chitare Prasad Bhagwat	Online Voltage Stability Assessment Using Synchronized Phasor Measurements.	Prof. Khaparde S.A.
120	10307027	Ankush Laddha	Electrical Load Emulation Using Multilevel Inverter.	Prof. Anshuman Shukla Prof. M. Chandorkar
121	09307910	(Ms) Archana Tendulkar	Control of Quasi Z-Source Inverter for Photovoltaic Pumping Application.	Prof. Chatterjee Kishore
122	10307203	Kiros Debretsion Hailu	Single Stage Boost Inverter with Reduced Losses and Electromagnetic Interference (EMI)	Prof. Chatterjee Kishore
123	10307024	Lakshmi pathi Naidu D.	Modelling, Simulation and Implementation of Five-Level Inverted Based STATCOM	Prof. Chatterjee Kishore
124	10307042	Ritwik Chattopadhyay	Stand Alone PV Based Single Phase Power Generating Unit for Rural Household Application.	Prof. Chatterjee Kishore
125	09307929	Mayank Sinha	Ultracapacitor Driven Short Distance Electric Vehicle.	Prof. Agarwal Vivek

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Department : Mechanical Engineering			Specialization : Design Engineering	
1	09310302	(Ms) Madhumita Dutta	Reduction of Computational Complexity for Transient Non-Linear Heat Transfer in an Axisymmetric Body.	Prof. Salil Kulkarni
2	09310036	Himanshu Verma	Digital Image Correlation for 2D full field Deformation Measurement	Prof. Krishna Jonnalagadda
3	09310905	Warad Nilesh Ramling	Development and Applications of Simple First-Order Shear Deformation Theory for Plates.	Prof. Shimpi R.P. Prof. Jog S.D.
4	09310908	Tamhane Tanmay Satish	A Study on Parameters Affecting Impact Simulation using Finite Element Analysis.	Prof. Guha Anirban Prof. D.N. Pawaskar
5	10310016	Khandare Yogesh Kishor	Structural Health Monitoring using Support Vector Machine.	Prof. Guha Anirban
6	10310004	Raut Harshal Ramrao	Development of a Staggered Algorithm for Fluid Structure Interaction Problem.	Prof. Salil Kulkarni
7	10310043	Patanwala Naved Javed	Development of 3D Micro-Printer.	Prof. Gandhi Prasanna S.
8	10310002	Ashish Kumar Khemka	Acoustics of Microperforated Plates.	Prof. Manik Dhanesh
9	10310011	Lokesh G	Vibration and Noise Control of Industrial Axial Flow Fans.	Prof. Manik Dhanesh
10	10310019	Pol Aniruddha Mahendra	Finite Element Analysis of Electrostatic Micromirror Actuators.	Prof. D.N. Pawaskar
11	10310026	Badkas Ajinkya Anil	Nonlinear Dynamics of Flexible Vibro-Impacting Cantilever Beam.	Prof. Gandhi Prasanna S.
12	10310052	Prateek Motwani	Suppression of Structural Vibration Using Dynamic Vibration Absorber.	Prof. Manik Dhanesh
13	09310907	Kapdi Siddesh Madhav	A Study on Topology and Size Optimisation Techniques for Impact Simulations Using Finite Element Methods.	Prof. Guha Anirban Prof. D.N. Pawaskar
14	10310012	Chaudhari Rakesh Ashok	Modelling of Beam Vibrations Involving Breathing Crack.	Prof. Salil Kulkarni
15	10310013	Ankur Mishra	Efficient Steam Expander for 1 to 5 kw.	Prof. Amarnath C. Prof. Rane Milind
16	10310005	Shaikh Wasim Akram Abdul Karim	Development of Finite Element for Analysis of Plates Using New First Order Shear Deformation Theory.	Prof. Shimpi R.P. Prof. Jog S.D.

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17	10310008	Yashwant Kumar Yadav	Optimization of Trusses Using Particle Swarm Optimization.	Prof. Shimpi R.P. Prof. Jog S.D.
18	10310015	T Chandrakiran Kumar	Finite Element for Modelling of I-Beam by Adapting Refined Plate Theory.	Prof. Shimpi R.P. Prof. Jog S.D.
19	10337001	Kolekar Navnath Pandurang	Analysis of Beam and Finite Element Formulation by Adapting New First-Order Shear Deformation Plate Theory.	Prof. Shimpi R. P. Prof. Jog S.D.
20	09310406	Nilesh Kamala Prasad	Development of Planar Manipulator.	Prof. Amarnath C. S. Varma
21	09310914	Tim John Joseph	Design and Construction of a RHEX Type Hexapedal Robot.	Prof. Amarnath C.
22	10310001	Argade Salil Shrikant	Fabrication of Micro-components by Constraint Surface Microstereolithography.	Prof. Gandhi Prasanna S.
23	10310006	Shet Brijesh Krishna	Deformation and Strain Measurement in Two Dimensions with Sub-Pixel Accuracy using Digital Image Correlation.	Prof. Krishna Jonnalagadda
24	10310048	Vasani Ketankumar Madhubhai	A Study on the Mechanical behaviour of single and Polycrystal FCC Metals using Crystal Plasticity Finite Element.	Prof. Krishna Jonnalagadda Prof. P J Guruprasad
25	10310018	Kamble Shital Deepak	Development and Characterization of Diaphragm Micromirror.	Prof. Gandhi Prasanna S.
26	10310044	Chaudhari Naresh Ashok	Analytical and Experimental Investigation into Pull-off of High Aspect Ratio PDMS Structures.	Prof. Gandhi Prasanna S.
27	10310401	Sumit Vishnu Prasad	Dyanmic Behaviour of Stainless Steel 304LN.	Prof. Krishna Jonnalagadda
28	10310021	Rajaraman S	Dynamic Mechanical behaviour of Poly Crystalline Nickel under Compression.	Prof. Krishna Jonnalagadda
Department : Mechanical Engineering			Specialization : Manufacturing Engineering	
29	10310020	Avik Samanta	Characterization of Residual Stresses in Laser Assisted Mechanical Micromachining (LMM) of Inconel 625.	Prof. R.K.Singh
30	09310911	M Jagdishwar	Casting Feeder Design Optimization Based on Feed Path and Temperature Analysis.	Prof. Ravi B.
31	10310069	Chavan Akash Maruti	Experimental Research and Simulation Studies on Flow in Gating System and	Prof. Ravi B.

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32	10310065	Chaudhari Parag Dnyandeo	Mold Cavity. Design and Implementation of Virtual Prototyping System for SLS Process.	Prof. Pande S.S.
33	09310053	Syamala Srinivas	Reengineering a Production System - A Case Study	Prof. Babu A. Subash
34	10310060	Kaunain Ashraf	Thermo Mechanical Modeling of Laser Surface Cladding.	Prof. R.K.Singh
35	10310061	B. Yashwanth Kumar	5-Axis Hybrid Manufacturing for Metallic Objects.	Prof. Karunakaran K.P.
36	10310201	Tadesse Billo Reta	Characterization and Improvement of Additive Manufacturing.	Prof. Karunakaran K.P. Prof. Asim Tewari
37	10310301	Beeranur Ravikumar Shivappa	Characterization and Determination of Mechanical Properties of Alumina Ceramic and Metal Brazed Joint.	Prof. R.K.Singh
38	09310909	Lakhani Harnish Devendra	Modelling of Microstructural change during Machining of Ti6Al4V.	Prof. S. S. Joshi Prof. Asim Tewari
39	10310047	Bhalerao Nitin Balasaheb	High Strain Rate Behavior of Ti-6Al-4V Alloy and Machining Characteristics.	Prof. S. S. Joshi Prof. Naik N.K.
40	09310912	Patil Nitin Raghunath	Numerical Modeling of Laser Sintering Process	Prof. S. S. Joshi Prof. Upendra Bhandarkar
41	10310055	Ratendra Kumar	Experimental Investigation on Electro-Chemical Buffing Process.	Prof. S. S. Joshi Prof. Amit Agrawal
42	10310059	Aswin. P	Modeling of Wire-EDM Slicing of Silicon Ingots	Prof. S. S. Joshi
43	10310025	Raushan Kumar Jha	Fully Coupled Temperature-Displacement Simulation of Chip Formation in Machining of Titanium Alloy Ti-6Al-4V.	Prof. De Amitava
Department : Mechanical Engineering			Specialization : Thermal & Fluids Engineering	
44	10310054	Sain Ajajahmed Ibrahim	Numerical and Experimental Investigations on Open Pool Fires.	Prof. Prabhu S V
45	09310903	Patil Sudarshan Appaso	Stability Analysis of Natural Circulation Loop Operating at Supercritical Pressure.	Prof. Iyer Kannan N.
46	10310009	Kale Vivek Ambadas	Deflagration and Detonation Issues in Nuclear Reactor Containment.	Prof. Iyer Kannan N.
47	10310010	Saigaonkar Girish Arun	Numerical Investigation of Supercavitation	Prof. Iyer Kannan N.

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49	09310910	Saket Singh	Investigations on Thermal Performance of Fire Retardant Materials.	Prof. Prabhu S V
50	10310024	Mondkar Harsh Ramesh	Heat Transfer Measurements for Curved and Flat Surfaces with Air Jet Impingement.	Prof. Vedula R.P.
51	10310404	Navjeet Sharma	Design of Shell and Coil Evaporator and Assessment of Drop in Replacement Refrigerants for R22 in 3TR Water Chiller.	Prof. M.D.Atrey
52	10310405	Jinoy Joseph	Enclosure Pool Fires with Water Mist Suppression System.	Prof. Prabhu S V
53	10310406	Bharat Pande	Performance of Diesel Engine against Varying Exhaust Backpressure.	Prof. Sreedhara Sheshadri
54	10310407	Pawandeep Singh	Mathematical Modelling and Simulation of Gas Turbine Fuel System Components.	Prof. Vedula R.P.
55	09310904	Gokhale Subodh Dilip	Numerical Investigation of Viscous Transient Compressible Flow in Small Channels.	Prof. Bhalchandra Puranik
56	10310036	Y V Bala Varun Kumar	Compact and Efficient Micro Fluidic Device for Blood Plasma Separation.	Prof. Amit Agrawal
57	10310050	Sourabh Tiwari	Generation of Iron-Based Non-Precious Metal Catalyst for Fuel Cell Applications.	Prof. Upendra Bhandarkar Prof. M.Neergat
58	10310053	Patel Ravi Prahladbhai	Near Isothermal Air Compressor.	Prof. Rane Milind
59	09310913	S Jagan Mohan	Theoretical & Experimental Investigation on High Frequency Pulse Tube Cryocoolers.	Prof. M.D.Atrey Prof. Bhalchandra Puranik
60	10310042	Chechare Rakesh Baliram	CFD Development of an Incompressible Navier-Stokes Solver on a Multi-Level Adaptive Cartesian Grid.	Prof. Sharma Atul
61	10310066	Babu Rao Mondithoka	CFD Analysis of Fish-Like Locomotion.	Prof. Sharma Atul Prof. Amit Agrawal
62	09310915	Kedar Sudhir Joshi	Spray Characterization and Performance Optimization of Karanja SVO Fueled Engine.	Prof. Arindrajit Chaudhari

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63	10310034	Alex Chollackal	Experimental and Numerical Investigation of Heat Transfer Distribution on Smooth Wedge Surface due to Impinging Air Jet.	Prof. Prabhu S V
64	10310035	Rahul Verma	Simulation of Unsteady Compressible Flows Using the Pressure-Correction Approach.	Prof. Bhalchandra Puranik
65	09310906	Intesaaf Ashraf	PIV Based Measurements in Pitching and Heaving of NACA0015.	Prof. Amit Agrawal Prof. Atul Srivastava
66	10310049	Jitendra Kumar Shukla	Numerical Simulation of Combined Radiation and Natural Convection Heat Transfer in Vertical Annular Gaps.	Prof. Arunkumar Sridharan
67	10310408	Pankaj Kumar Mahato	Numerical Investigation of Decay Heat Removal of Advanced Reactor Core during Accident Condition.	Prof. Arunkumar Sridharan
68	10310070	Rahul Singh Choudhari	Performance Evaluation of Bishomocubane based Fuels.	Prof. Arindrajit Chaudhari
Department : Metallurgical Engineering & Materials Science Specialization : Materials Science				
1	10311035	Nene Saurabh Sanjay	High Temperature Deformation Behavior and Concurrent Microstructural Evolution in an Annealed Zr-2.5Nb Pressure Tube Material.	Prof. Kashyap B.P.
2	10311010	Soumya Chatterjee	Investigation of Magnetostriction in CRGO Materials for Noise Estimation.	Prof. N. Venkataramani Prof. Prasad Shiva
3	10311033	Rao Gurudatt Alias Vinayak Jagdish	Complex Oxide Based Resistance RAM	Prof. N. Venkataramani Prof. Udayan Ganguli
4	10311008	(Ms) Divya Kohli	Direct Observation of Recovery and Bond Strength Variation During Post Heat Treatment of Plate Type Fuel.	Prof. Samajdar I.
5	10311011	(Ms) Lavanya Sanagavarapu	Fabrication of Piezoresistive Device for MEMS Application using Poly Silicon Thin Films obtained by Aluminium Induced Crystallization.	Prof. Dusane Rajiv O.
6	10311012	(Ms) Sudha Dhakar	Synthesis of Silicon Nanowires for the Application of Piezoresistive Sensors.	Prof. Dusane Rajiv O.
7	10311029	Soumilya Nayak	Development of Technology to Fabricate a-Si:H Based Thin Film Solar Cells on Steel Substrates.	Prof. Dusane Rajiv O.

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8	10311032	Singh Chetan Chandan	Processing and Characterization of Fly Ash Cenosphere Reinforced Epoxy Matrix and Fly Ash Cenosphere Reinforced Epoxy Matrix Glass Fiber Laminated Composite.	Prof. Prasad R.C.
9	10311013	Tembhekar Apoorv Nishikant	Sealing Methodology and Long Term Stability of Liquid Electrolyte based Dye Sensitized Solar Cells.	Prof. Parag Bhargava
10	10311007	Debabrata Ghosh	Effect of Yttria Stabilized Zirconia Particulate Additional on Grain Growth and Mechanical Properties of Alumina.	Prof. Parag Bhargava
11	10311015	Jugade Hrishikesh Rajiv	Synthesis of Hydrothermal Degradation Resistant Nano Yttria Stabilized Zirconia.	Prof. Parag Bhargava
12	10311031	Shyam Shankar Pandey	Modeling and Microstructure Evolution During Flow Forming Process.	Prof. Narsimhan K.
13	10311038	Kambale Kaustubh Ramesh	Synthesis of Barium Titanate Using Nano Sized Starting Materials.	Prof. Kulkarni Ajit R. Prof. N. Venkataramani
14	10311047	Raja Sekhar Baddula	Synthesis of PVDF Composites with PMN-PT and study of Dielectric Properties.	Prof. Kulkarni Ajit R. Prof. Srinivasa Raman
15	10311009	Joshi Shripad Sanjay	Effect of Twinning on Mechanical Properties and Electrical Conductivity of Pure Copper.	Prof. Prita Pant
16	10311014	Srivatsa Kulkarni	Grain Refinement by Multistep Rolling and Friction Stir Processing of Brass and its Effect on Mechanical Properties.	Prof. Kashyap B.P. Prof. Prabhu N.
17	10311030	(Ms) Aroba Saleem	Development of Fine Grains in Two-phase Pb-Sn Alloys and Evaluation of Flow Properties.	Prof. Kashyap B.P. Prof. Prabhu N.
18	10311006	Rohit Bajaj	Photo-Oxidative Removal of Organic Dyes using Nanocomposite BiVO ₄ /CuCr ₂ O ₄ .	Prof. Bahadur D.
19	10311002	Niteen Kumar	Fabrication and Characterization of Anode Supported IT-SOFC based on GDC Electrolyte.	Prof. Gopalan Prakash
20	10311005	Pawankumar Patil	Metallization of Alumina and its Brazing to Metal.	Prof. Parag Bhargava
Department : Metallurgical Engineering & Materials Science Specialization : Process Engineering				
21	10311018	Gyanaranjan Mishra	Orientation Dependence of Oxidation	Prof. Samajdar I.

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22	10311019	(Ms) Soma Ghosh	of Niobium Single Crystals. Formability Analysis of ULC Steel Using Miniature Forming Setup and Direct Observation to Microstructural Changes and Shear Behaviour.	Prof. Samajdar I.
23	10311020	Shomick Roy	Direct Observation of Microstructure for Zircaloy under Pilgering like Strain Mode.	Prof. Samajdar I.
24	10311034	Parimi Sandeep	Bendability and Formability of AA 3104 Alloy.	Prof. Narsimhan K.
25	10311021	Love Kishor Maurya	Tool Design and Closed Die Forging of Aluminum.	Prof. Narsimhan K. Prof. Date P.P.
26	10316015	Rahul Kumar	Fabrication of Transparent Tools for Forging.	Prof. Narsimhan K. Prof. Date P.P.
27	10311017	Dhakate Swapnil Nandkishor	Fatigue Behaviour Studies of NiTi Shape Memory Alloys using Bulge Test.	Prof. Prita Pant
28	10311037	Ashwani Kumar	Experimental and Analytical Investigation of P-GMAW Process.	Prof. M.P. Gururajan Prof. De Amitava
29	10311039	P. Srinivas	Evolution of Microstructure and Deformation Behaviour of AZ91 Magnesium Alloy.	Prof. Kashyap B.P. Prof. Prabhu N.
Department : Metallurgical Engineering & Materials Science Specialization : Steel Technology				
30	10311402	Yogendra	Mechanical Properties of Intercritically Rolled and Annealed C-Mn-Si Dual Phase Steel.	Prof. Kashyap B.P. Prof. Prabhu N.
31	10316009	Rongali Tirumalarao	Deformation Induced Martensite in Type 316 Stainless Steel.	Prof. Kashyap B.P. Prof. Prabhu N.
32	10311403	Abhay Marchattiwar	Kinetics of Dynamic Recrystallization in 304 and Ti-Modified 15Cr-15Ni-2Mo Austenitic Stainless Steels.	Prof. Kashyap B.P.
33	10311405	Nitin Goel	Study of Deformation Behavior of Fe-C-Mn Rail Steel.	Prof. Kashyap B.P. Prof. Prabhu N.
34	10311406	Amit Dwivedi	Study of Phase Transformations in Rail Steel under Continuous Cooling Conditions.	Prof. Kashyap B.P. Prof. Prabhu N.
35	09311029	(Ms) P. S. Kannaki	Tribological Studies of Bearing Steels.	Prof. Raja V. S.
36	10311022	Pramod Gupta	Dynamic Modeling of LD Converter Steelmaking.	Prof. Ballal N.B.

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37	10311407	Irfan Kadri	Modelling Studies of Lower Part of Iron Blast Furnace.	Prof. Ballal N.B.
38	10311408	Adarsh Gupta	Studies on Sintering of Iron Ore.	Prof. Ballal N.B.
39	10311409	(Ms) Sudeshna Roy	Modelling of the Reduction Zone of Midrex Shaft Furnance.	Prof. Ballal N.B.
40	10311412	Ohol Sandeep Sambhaji	Mass and Heat Balance Analysis in Electric Arc Furnace for Process Improvement.	Prof. Ballal N.B.
41	10311401	Ravi Dashottar	Effect of Thermomechanical Processing on Microstructure and Mechanical Properties of Microalloyed Steel.	Prof. Kashyap B.P. Prof. Prabhu N.
42	10311410	Abhijit Vikas Kale	Analysis of Indutrial Sheet Metal Component.	Prof. Narsimhan K.
43	10311411	Rohit Mathews	A Comparative Analysis on Different Methods to Plot a FLD Based on Various Parameters.	Prof. Narsimhan K.
Department : Corrosion Science & Engineering				
1	10316010	Satyapal M.	Plasma Nitriding of Duplex Stainless Steel Grade 2205 for Hardness & Corrosion Improvement.	Prof. Khanna A. S.
2	10316011	(Ms) Neha Nagar	Weathering of Polyurethane Coating.	Prof. Khanna A. S.
3	10316402	Sunit Mehrotra	Study of Hot Corrosion Behaviour of IN718 Alloy for Marine Gas Turbine Engine.	Prof. Khanna A. S.
4	10316003	Ashwin Kumar	Development of Conducting Polymer Based Coatings for Electromagnetic Interference (EMI) Shielding and Corrosion Prevention.	Prof. Khanna A. S.
5	10316013	Shailesh Kumar Singh	Characterization of Laser Melted Zone of WC/Co in Ni-25%Cr Matrix using FIB Tomography.	Prof. Khanna A. S.
6	10316014	Rajiv Kumar Meel	Development of Rust Primer.	Prof. Khanna A. S.
7	10316012	Vijay Bhan Sharma	Development and Characterization of Thin Film Composites of Carbon Nanotube and Polymers.	Prof. Ajay Singh Panwar Prof. Arup R. Bhattacharyya
8	10316006	Rajan Bhambroo	Effect of Ageing Treatment on Stress Corrosion Cracking Susceptibility of Precipitation Hardenable 17-4 Stainless Steel.	Prof. Raja V. S.

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9	10316401	Bijayanand Padhi	Study of Environmentally Assisted Cracking Behavior of S80 Steel in Marine Gas Turbine Environment.	Prof. Raja V. S.
10	10316002	Bhave Kedar Shashikant	Mathematical Modelling of Cathodic Protection.	Prof. M.P. Gururajan
11	10316007	Vivek Chourasiya	Phase Field Modelling of Martensitic Transformation	Prof. M.P. Gururajan
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2	10633001	(Ms) Shweta Verma	Social Media for Disappearing Communities	Prof. Poovaiah Ravi
3	10633003	Sachin Tanwar	A Support System for TB Patients in India, Alert, Monitor, Awareness and Support	Prof. Poovaiah Ravi
4	10633011	Deepak Singh	m-Marketing for Agriculture	Prof. Poovaiah Ravi
5	10633002	(Ms) Vidhya Appu	Social Media for Agriculture : Sarv Samridhi	Prof. Poovaiah Ravi
6	10613012	Jyotirmaya Mahapatra	Application Access Management for High Scale Visualisations for Stock Trading Floor	Prof. Pramod Khambete
7	10633009	Dhaumya Vihang Mehta	Design of Eyes-free Interfaces	Prof. Poovaiah Ravi
8	10633012	(Ms) Sanjukta Das	Social Media Solutions for Disappearing Community Identities in India	Prof. Poovaiah Ravi
9	10633005	(Ms) Surbhi Bindlish	Educational Kit to Teach Differential Calculus	Prof. Joshi Anirudha
10	10633007	(Ms) Gohad Chitra Madhav	Design of Social Media Network for Healthcare System in Cities-malaria	Prof. Poovaiah Ravi
Industrial Design Centre – Specialization : Animation				
1	10634001	Piyush Kumar Verma	Image making and Animation Design	Prof. Nina Sabnani
2	10634004	(Ms) Akshata Prabhu	Runanubandh	Prof. Shilpa Ranade
3	10634005	(Ms) Swati Agarwal	Gajar ka Halwa	Prof. Sumant Rao
4	10634007	Sachin Madan Meshram	Monster Slick and the Magic Umbrella	Prof. Sumant Rao
5	10634008	Nitin Anand	Trials and Tribulation of a Smoker	Prof. Phani Tetali
6	10634009	Vijay Kumar Sonkar	MRITYUVANCHAK Interactive Story Telling through the Medium of Gaming	Prof. Phani Tetali
7	10634002	Dharmarao Balaga	Rotelling the Folklore of Andhra Pradesh (Nandi.O..Nandee!!)	Prof. Phani Tetali
8	10634003	Siddhant Kumar	JAA' Interpretation of a Folktale in Animation	Prof. Nina Sabnani

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9	10634006	Phidi Pulu	Meko	Prof. Nina Sabnani
10	10634010	(Ms) Sukriti Nigam	Smile-Animation short film	Prof. Shilpa Ranade

Department : Mobility & Vehicle Design

1	10639006	Kulkarni Aashutosh Anil	Frugal innovation Approach towards Enhancing the Driver Space Environment for Volvo 9400	Prof. K.Ramchandran Prof. Nishant Sharma
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SJM School of Management

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7	10927928	Abhinav Agrawal	A Study of Sourcing Strategy in	Prof. Atul Kanyalkar Prof. Gajendra Adi
8	9927843	Pashupatinath Pratap Singh	NO PROJECT	

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12	10927803	Ashwin Kumar B.		
13	10927804	Nikhil Arora		
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15	10927806	Rohit Dilip Deepa Nerurkar		
16	10927807	Raj Mohan M.	Evaluating Technological and Overall Competitiveness of Sales Solar Firms	
17	10927808	Abhishek Mishra	Establishment of Khadi Plaza in Different Parts of the Country	Prof. Dinesh Sharma
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21	10927813	Rakesh V.		
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29	10927831	Agrawal Amit Ramakant		
30	10927832	Abhishek Kapoor		
31	10927834	Ankur Choraria		
32	10927836	Probal Biswas		

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50	10927865	Surana Saurabh Sudarshan Sunita	Exchange Rate Undervaluation and its impact on GDP growth	Prof. Vinish Kathuria
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66	10927889	Aakash		
67	10927890	Potdar Prathamesh Suhas		
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69	10927892	Akshay Dubey	Establishment of Khadi Plaza in Different Parts of the Country	Prof. Dinesh Sharma Prof. Arati Kalro
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71	10927894	Anurag Mishra		
72	10927895	Laveen Ramrakhiyani		
73	10927896	Dhiraj Barnwal		
74	10927897	Sandeep Prakashrao Borkar		
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79	10927909	Sharath Banoth		
80	10927911	Indranil Biswas		
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91	10927925	Himanshu Agarwal		
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93	10927927	Ashutosh Jain		
94	10927929	Sudhanshu Ravindranath Saroj Pandey		
95	10927930	Anant Goenka		
96	10927931	Oswal Chetan Ramesh		
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98	10927934	Kshitij Kumar Rikh		
99	10927935	Neerad Agarwal		
100	10927936	Rupen Kohli		
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103	10927830	Sonam Wangchuk	Assessment and Analysis of corporate performance in response to CII code for Ecologically Sustainable Business Growth	Prof. Anand Patwardh Prof. Trupti Mishra
104	10927845	Girish Vishwanath Manisha Joshi	Assessment and Analysis of corporate performance in response to CII code for Ecologically Sustainable Business Growth	Prof. Anand Patwardh Prof. Trupti Mishra

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106	10927877	Virendra Goliya	Assessment and Analysis of corporate performance of Godrej & Boyce and Mahindra & Mahindra in response to CII code of Ecologically Sustainable Business Growth	Prof. Anand Patwardhan Prof. Trupti Mishra
107	10927908	Aditya Mandal	Assessment of corporate sustainability	Prof. Anand Patwardhan Prof. Trupti Mishra
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118	10927907	Amit Kumar	Study of Differwntial Services that exit across METS & Implementation of Mobile Banking in Suryoday MFI	Prof. Varadraj B. Bapat
119	10927861	Paldiwal Bharat Dinesh	No Project	

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RECIPIENTS OF THE DEGREE OF MASTER OF PHILOSOPHY

Department: Humanities & Social Sciences Specialization : Planning and Development

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3	10808014	(Ms) Nikita Kaul	Natural Resource Shifts and Crafts: Study of Wood Carving Industry in Saharanpur	Prof. Parthasarathy D. Prof. Sarmistha Pattanaik
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5	10808012	(Ms) Pournnami Davy	A Comparative Study on the use of Endosulan Between Sprayed and Non Sprayed Regions in Kasargod (Kerala)	Prof. Sarmistha Pattanaik
6	10808003	Sanjay Kumar	Dalits, Poverty, Development Projects: A Study of Two Villages in Bihar	Prof. Ramesh bairy
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9	10808011	Bhuvaneswaran N. C.	Envisioning the individual: Reading Two Development Policies of the Indian State	Prof. Ramesh bairy
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RECIPIENTS OF THE DEGREE OF MASTER OF PHILOSOPHY (EXIT DEGREE)

Department: Chemistry

1	08403333	Mula Brahmaiah	Studies towards the Synthesis of C-Analog of B-Galactosyl Ceramide (B-C-Galcer), A Potential HIV-I Entry Inhibitor	Prof. Suvarn Kulkarni

Sr.	Roll No.	Name	Dissertation Title	Supervisor / Co-Supervisor / External Supervisor
5	07D01016	Abhishek Agarwal	Design of Hybrid of Two-Nature Inspired Metaheuristic Algorithm: Bat and Firefly Algorithm	Prof. Shimpi R.P.
6	07D01004	Pradhan Shantanu Devendra	Experimental and Numerical Investigation of Variation of Drag Co-efficient with Reynolds Number of Missile Shaped Bodin in Hypersonic Flow Regime	Prof. Viren Menezes
7	07D01001	Khalane Shriraj Shivmurti	Application of FDTD Techniques to Computational Electromagnetics	Prof. Shevare G.R. Prof. R.P.R.C.Aiyar
8	07D01009	Arvind Kuldeep	Flow Fields of a Large Angle Spiked Blunt Cone at Hypersonic Mach Numbers	Prof. Viren Menezes
9	07D01011	Yashovardhan Sushil Chati	Experimental Investigation of the Effect of LIP Desentitisation on the Performance of an Axial Compressor Blade	Prof. A.M.Pradeep
10	07D01014	Gaurav Meena	Study of Particle Swarm Optimization and It's Application in Structural Design	Prof. Shimpi R.P.
11	07D01019	Manav Agarwal	Applications of PSO in Aircraft Conceptual Design	Prof. Pant R.K.
12	07D01020	(Ms) Sunita Singh	Adverse Effects of Infrared Suppression Techniques and Estimation of Threshold IRSL	Prof. S. P. Mahulikar Prof. Mira Mitra
13	07D01003	Vaibhav Vasant Unhelkar	Satellite Attitude Estimation Using Sun Sensors, Horizon Sensors and Gyros	Prof. Hari B. Hablani
14	07D01015	Ishan Singh	Lifting Flow Over a Non-spinning Cylinder	Prof. Sharma S.D.
15	07D01005	Patil Harshad Vishwanath	Satellite Attitude Estimation with GPS Phase Measurements	Prof. Hari B. Hablani
16	07D01012	Avinash Arjun Singh	Design of Controller for Gimballed Servo Radar Tracker and its Performance Evaluation	Prof. Hari B. Hablani
Department : Chemical Engineering			Specialization : Process Systems Design & Engineering	
1	07D02018	Shwetabh Rai	A Stability Analysis of Biological Systems: Bacterial Tryptophan System and Cell Division in Yeast	Prof. Bhartiya S.
2	07D02012	Ramanjit Singh Anand	Improving Efficiency of Comminution Through Ball Mill Apparatus	Prof. Khakhar D.V.

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3	07D02008	Apurav Singhi	Studies in Design and Optimization of Reactive Distillation Systems	Prof. Malik R.K. Prof. Sanjay Mahajani
4	7011003	Aishwary Dale	Modeling of Adsorption Wheel	Prof. Moharir A.S.
5	07D02010	Dinesh Goel	Online Fault Identification Using Unknown Input Observers	Prof. Sachin Patwardhan
6	7002058	Varshney Ankur	Determination of Solubility Parameter Using Molecular Simulations	Prof. Adhikari J.
7	07D02002	Devendra Dariya	Improving User Access and Instructor Intervention in Remote Laboratory	Prof. Moudgalya Kannan.
8	07D02003	Nihal Pravin Sarawgi	SNP Detection in P.Falciparum	Prof. Santosh Noronha
9	07D02017	Dhruva Milind Shah	Modeling and Simulation of Drying Polymer Coatings	Prof. Vinjamur Madhu
10	07002054	Pratik Behera	Thermodynamic Property Prediction of Nano-confined Fluids Using Molecular Simulations: Adsorption Isotherms	Prof. Adhikari J.
11	07D02014	Udit Ranjan	Modelling & Control of Water Intrusion in Underground Coal Gasification (UCG) Cavity	Prof. Sanjay Mahajani
12	07D02005	Arpan A Bandyopadhyay	Modelling Formation and Structure of Nanoparticle During Droplet Phase Aerosol Synthesis	Prof. Mehra A. Prof. Chandra V
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15	07D02011	Varun Dalia	Experimental Study of Enhancement of Transport Properties in Nano Fluids	Prof. P.Sunthar
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19	07D02016	Botsa Sriharsha	Steady Friction of Elastomer-Hard Solid Interface	Prof. Juvekar V.A.

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20	07D02007	Shubham Gupta	Modeling Vapor Liquid Equilibrium Using a New Gibbs Free Energy Function	Prof. Shankar H.S. Prof. Suresh A.K.
21	07D02009	Abhishek Banthia	Aerosol Modelling and Satellite Detection	Prof. Chandra V
Department : Civil Engineering – Specialization : Structural Engineering				
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12	07D04007	Jain Pankaj Jitendra	Vibration Based Damage Detection in Complex Structures	Prof. Sauvik Banerjee
13	07D04008	Rishi Ashok Sharma	Detection of Voids in Concrete Using Inject-Echo Method	Prof. Sauvik Banerjee
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18	07D04009	Aakil Mehta	Vibration Control Using Tuned Mass Dampers	Prof. Jangid R.S.
19	07D04020	Jatinderjit Singh	Semi-Active Tuned Mass Dampers	Prof. Jangid R.S.
Department : Computer Science & Engineering				
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Department : Computer Science & Engineering				
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17	07D05021	Abhishek Kumar	Network Discovery Model for Piped Water Supply Systems	Prof. Sohoni Milind
18	07D05013	Ashish Paliwal	Analysis and Optimization of Linear Algebra Computations on Multi-Core Processor Architecture	Prof. Biswas S.

Department : Electrical Engineering Specialization : Communication & Signal Processing

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2	07D07004	Mustafa Saifee	Devanagari Font Design for Optical Character Recognition	Prof. Poovaiah Ravi
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6	07D07033	Shubham Bansal	Parameter Estimation of Chirp Signals	Prof. Gadre V.M.
7	07D07031	Lochan Meena	Reliability Estimation and Energy Consumption of Wireless Sensor Network	Prof. Merchant S N Prof. A.K. Verma
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9	07D07037	Gaurav Varshney	IPHet: HetNet Architecture and Algorithm for Interference Management	Prof. Karandikar Abhay
10	07D07025	(Ms) Hutokshi E Sethna	Load Balancing in Adaptive Relays in Cellular OFDMA Networks	Prof. Karandikar Abhay
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Senate (Two)	Prof. N.B. Ballal (from 01/01/12) Professor, Department of Met. Engg. & Mat. Sci. IIT Bombay, Mumbai 400 076.	Member
	Prof. D.K. Sharma (from 01/01/12) Professor, Department of Electrical Engg., IIT Bombay, Mumbai – 400 076.	Member
Ex-officio	Shri B.S. Punalkar Registrar, IIT Bombay, Powai, Mumbai – 400 076	Secretary

Members of the Finance Committee

Dr. Anil Kakodkar, Chairman, B-9, IIT Bombay Homi Bhabha Chair Professor, Department of Atomic Energy, 7 th floor, Central Complex, BARC, Trombay, Mumbai – 400 085.	Chairman
Prof. D.V. Khakhar Director, IIT Bombay, Powai, Mumbai – 400 076.	Member (Ex-officio)
Shri Ashok Thakur, IAS Special Secretary, Ministry of Human Resource Development, Deptt. of Higher Education, Government of India, Shastri Bhavan, New Delhi – 110 115.	Member
Shri V. B. Aras, Vice President – Internal Audit, L & T Finance Services, L & T Finance Ltd., The Metropolitan, 4 th Floor, C-26/C-27, E- Block, Bandra Kurla Complex, Bandra (East), Mumbai – 400 051.	Member
Director, Integrated Finance Division, Ministry of Human Resource Development, Deptt. Of Higher Education, Technical Section-1, Government of India, Shastri Bhavan, New Delhi – 110 115.	Member
Prof. H.S. Pandalai (from 15/07/10) Dy. Director (Finance & External Affairs), IIT Bombay, Powai, Mumbai – 400 076.	Member
Shri B.S. Punalkar Registrar, IIT Bombay, Powai, Mumbai – 400 076.	Secretary (Ex-officio)

Building and Works Committee

Prof. D.V. Khakhar Director, IIT Bombay, Powai, Mumbai – 400 076.	Chairman
Superintending Engineer, Office of the Supdt. Engineer, Mumbai Central Circle-1, CPWD, 5 th Floor, Old CGO Building, 101 MK Road, Mumbai – 400 020.	Member
Superintending Engineer, Mumbai (P.W.) Circle 25 Murzban Road, Fort, Mumbai – 400 001.	Member
Shri K. Srinivas, Head, Architectural & Civil Engg. Division, BARC, North Site, Trombay, Mumbai – 400 085.	Member
Shri Vidyadhar K. Phatak Retired Principal Chief, Town and Country Planning Division, Mumbai Metropolitan Region Development Authority 1/304, Kairav, GE Link, Ram Mandir Road, Goregaon (W), Mumbai – 400104.	Member
Prof. N. Venkataramani (from 2/01/12) Dean (Infrastructure Planning & Development), IIT Bombay, Powai, Mumbai – 400 076.	Member
Shri B.S. Punalkar Registrar, IIT Bombay, Powai, Mumbai – 400 076.	Member-Secretary (Ex-officio)

Heads of Departments

Prof. S.D. Sharma
Aerospace Engineering

Prof. N.S. Punekar
Biosciences & Bioengineering

Prof. Sachin Patwardhan
Chemical Engineering

Prof. R. Murugavel
Chemistry

Prof. K.V. Krishna Rao
Civil Engineering

Prof. Amitabha Sanyal
Computer Science & Engineering

Prof. Kanchan Pande
Earth Sciences

Prof. Abhay Karandikar
Electrical Engineering

Prof. K. Narayanan
Humanities & Social Sciences

Prof. M.K. Srinivasan
Prof. Sudhir R. Ghorpade (from 3.12.2012)
Mathematics

Prof. R.P. Vedula
Mechanical Engineering

Prof. R.O. Dusane
Prof. N. Prabhu (from 17.10.2012)
Met. Engg. & Mat. Science

Prof. Prabhakar P. Singh
Physics

Prof. (Ms.) Anuradda Ganesh
Prof. Santanu Bandyopadhyay (from 19.6.2012)
Energy Science and Engineering

Heads of Centres

Prof. G.G. Ray
Industrial Design Centre

Prof. Soumyo Mukherjee (from 10.05.2010)
Centre for Research in Nanotechnology and Science & SAIF

Prof. (Ms.) P. Venkatachalam (from 20.08.2010)
Centre of Studies in Resources Engineering

Prof. Virendra Sethi
Prof. A.K. Dikshit (from 2.05.2012)
Centre for Environmental Science and Engineering

Prof. G. Sivakumar
Centre for Formal Design and Verification of Software

Prof. P. M. Mujumdar
Centre for Aerospace Systems Design and Engineering

Prof. Milind Sohoni
Centre for Technology Alternatives in Rural Areas

Prof. B.L. Tembe
Centre for Distance Engineering Education Programme

Heads of Schools

Prof. (Ms.) Karuna Jain
Prof. G.K. Adil (from 3.12.2012)
Shailesh J. Mehta School of Management

Convenors of Interdisciplinary Programmes

Prof. N. Hemchandra
Industrial Engineering & Operations Research

Prof. Ravi Banavar
Systems & Control Engineering

Prof. B.L. Tembe
Education Technology

Prof. Chandra Venkataraman
Climate Change

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
Annual Report for the year ended 31.03.2012					
1	Abhishek Gupta	Assistant Professor	Ph.D. (Rice University)	Mechanical Engg.	No
2	Adhikari Jhumpa	Associate Professor	Ph.D. (State University of New York at Buffalo)	Chemical Engg	No
3	Adil Gajendra Kumar	Professor	Ph.D. (University of Manitoba)	SJMSOM	Member / HOD – SJMSOM
4	Adinarayana J.	Associate Professor	Ph.D. (BHU, Varanasi)	CSRE	No
5	Adsul Bharat G	Associate Professor	Ph.D (IIT Bombay)	CS & E	No
6	Agarwal Vivek	Professor	Ph.D. (University of Victoria)	Electrical Engg.	Member
7	Agrawal Amit	Associate Professor	Ph.D. (University of Delaware)	Mechanical Engg.	Co-opted Member
8	Alok Porwal	Associate Professor	Ph.D. (ITC & Utrecht University, Netherland)	CSRE	No
9	Aluru Srinivas	Professor	Ph.D. (University of Iowa)	CS & E	Member
10	Anand Ruchi	Assistant Professor	Ph.D (University of Cornell)	Chemistry	No
11	Anandavardhanan U.K.	Associate Professor	Ph.D. (University of Hyderabad)	Mathematics	No
12	Ananthakumar Usha	Associate Professor	Ph.D. (IIT Bombay)	SJMSOM	No
13	Apte Varsha	Associate Professor	Ph.D.(Duke University, USA)	CS & E	No
14	Arindrajit A. Chowdhury	Assistant Professor	Ph.D. (Pennsylvania State University)	Mechanical Engg.	No
15	Arora Amit	Assistant Professor	Ph.D. (University of Illinois at Urbana, Champaign, USA)	CTARA	No
16	Arti D. Kalro	Assistant Professor	Ph.D. (IIT Madras)	SJMSOM	No
17	Arunachalam Arjun	Assistant Professor	Ph.D. (University of Wisconsin-Madison)	Electrical Engg.	No
18	Arya Hemendra	Associate Professor	Ph.D.(IIT Bombay)	Aerospace Engg.	Co-opted Member
19	Arya Kavi J	Associate Professor	Ph.D.(University of Oxford, UK)	CS & E	No
20	Aslam Mohammed	Associate Professor	Ph.D. (University of Pune)	Physics	No
21	Asolekar S. R.	Professor	Ph.D. (University of Iowa)	CESE	Member
22	Athavale Ameer	Professor	Ph.D. (University of Indiana)	Mathematics	Member
23	Atrey Milind D.	Professor	Ph.D. (IIT Bombay)	Mechanical Engg.	Member
24	Baghini Maryam S.	Assistant Professor (Contract)	Ph.D. (Sharif University of Technology)	Electrical Engg.	No
25	Bahadur D.	Professor	Ph.D. (IIT Kanpur)	Met.Engg. & Mat.Sc.	Member
26	Bairy Ramesh T.S.	Assistant Professor	Ph.D. (University of Hyderabad)	H&SS	No
27	Bajoria K.M.	Professor	Ph.D. (University of Cambridge)	Civil Engg	Member
28	Balachandran Niranjana	Assistant Professor	Ph.D. (The Ohio State University)	Mathematics	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
29	Balaji P.V.	Professor	Ph.D. (IISc. Bangalore)	Bio-Science & Bio-Engineering	Member
30	Balaji R.	Assistant Professor	Ph.D. (IIT-Madras)	Civil Engg	No
31	Balakrishna M.S.	Professor	Ph.D. (IISc. Bangalore)	Chemistry	Member
32	Balan Sudesh	Assistant Professor	M.F.A.(Southern Zllnios University)	I.D.C	No
33	Balasubramaniam K. R.	Assistant Professor	Ph.D.(Carnegie Mellon University)	Energy Science & Engg.	No
34	Balasubramanian Sridhar	Assistant Professor	Ph.D. (Arizona State University, USA)	Mathematics	No
35	Ballal N.B.	Professor	Ph.D. (IIT Kanpur)	Met.Engg. & Mat.Sc.	Member
36	Banavar R.N.	Professor	Ph.D. (University of Texas)	Systems & Control	Member / HOD Systems & Control Engg. Group.
37	Bandyopadhyay B.	Professor	Ph.D. (IIT Delhi)	Systems & Control	Member / Prof. In Charge, CEP/QIP
38	Bandyopadhyay Rajdip	Associate Professor	Ph.D. (IISc, Bangalore)	Chemical Engg	No
39	Bandyopadhyay Santanu	Professor	Ph.D. (IIT Bombay)	Energy Science & Engg.	Member / HOD-ES&E
40	Banerjee Anirban	Assistant Professor	Ph.D.(National Institute of Pharmaceutical Education & Research)	Bio-Science & Bio-Engineering	No
41	Banerjee Rangan	Professor, Convener ESE Group	Ph.D. (IIT Bombay)	Energy Science & Engg.	Member
42	Banerjee Rinti	Professor	Ph.D.(IIT Bombay)	Bio-Science & Bio-Engineering	Member
43	Banerjee Santanu S.	Professor	Ph.D. (University of Jadavpur)	Earth Science	Member
44	Banerjee Sauvik	Associate Professor	Ph.D (University of California)	Civil Engg	No
45	Banerji Pradipta	Professor	Ph.D. (University of California)	Civil Engg	Member / Prof. In Charge, IIT Monash Research Academy
46	Bapat S.L.	Professor	Ph.D. (IIT Delhi)	Mechanical Engg.	Member
47	Bapat Varadraj B.	Assistant Professor	Ph.D (IIT Bombay)	SJMSOM	No
48	Bapat Vijay P.	Professor	B.E. (Sangli) DIIT (IIT Bombay)	I.D.C	Member
49	Baskar. S	Assistant Professor	IISc., Bangalore	Mathematics	No
50	Basu Somnath	Assistant Professor	Ph.D. (Royal Institute of Technology)	Met.Engg. & Mat.Sc.	No
51	Bellare Jayesh	Professor	Ph.D. (University of Minnesota)	Chemical Engg	Member
52	Bellur Umesh R.	Professor	Ph.D (Syracuse)	CS & E	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
53	Belur Madhu N.	Associate Professor	Ph.D(Univ. of Groningen)	Electrical Engg.	No
54	Bhandakkar Tanmay K.	Assistant Professor (Contractual Basis)	Ph.D. (Brown University)	Mechanical Engg.	No
55	Bhandarkar Upendra	Associate Professor	Ph.D. (University of Minnesota)	Mechanical Engg.	No
56	Bharatiya Sharad	Professor	Ph.D. (Oklahoma State University)	Chemical Engg	Member
57	Bhardwaj Rajneesh	Assistant Professor	Ph.D. (Columbia University, NY)	Mechanical Engg.	No
58	Bhargava Parag	Professor	Ph.D.(Univ. of Birmingham & Uni. of Alabama in Guntsville)	Met.Engg. & Mat.Sc.	Member
59	Bhargava S.	Professor	Ph.D. (University of Gujarat)	SJMSOM	Member
60	Bhaskaran Murlidharan	Assistant Professor	Ph.D. (Purdue University)	Electrical Engg.	No
61	Bhat P. Jayadeva	Professor	Ph.D. (IISc. Bangalore)	Bio-Science & Bio-Engineering	Member
62	Bhat Parameshwar R.	Professor	Ph.D. (IIT Kanpur)	H&SS	Member
63	Bhattacharya Amitabh	Assistant Professor	Ph.D. (University of Illinois at Urbana Champaign, USA)	Mechanical Engg.	No
64	Bhattacharya Avik M.	Assistant Professor	Ph.D. (Telecom ParisTech, France)	CSRE	No
65	Bhattacharyya Arup R.	Professor	Ph.D. (IIT Delhi)	Met.Engg. & Mat.Sc.	Member
66	Bhattacharyya Pushpak	Professor	Ph.D.(IIT Bombay)	CS & E	Member
67	Bhattacharyya Surajit	Assistant Professor	Ph.D. (IIT Kanpur)	H&SS	No
68	Bhattacharyya Tanmay	Assistant Professor	Ph.D. (Gurukula Kangri Vishwavidyalaya, Haridwar)	H&SS	No
69	Bhaumik Prasenjit	Assistant Professor	Ph.D. University of OULU	Bio-Science & Bio-Engineering	No
70	Bhujade M.R.	Professor	Ph.D.(IIT Bombay)	CS & E	Member
71	Bhushan Mani	Associate Professor	Ph.D.(IIT Bombay)	Chemical Engg	No
72	Biswal T.K.	Professor	Ph.D.(University Rajasthan)	Earth Science	Member
73	Biswas Supratim	Professor	Ph.D.(IIT Kharagpur)	CS & E	Member
74	Bodi Kowsik V R	Assistant Professor	Ph.D. (IIT-Madras)	Aerospace Engg.	No
75	Borkar V. S.	Professor	Ph.D. (University of California)	Electrical Engg.	Member
76	Bose Manaswita	Assistant Professor	Ph.D. (IIT Science Bangalore)	Energy Science & Engg.	No
77	Chakrabarti Rajarshi	Assistant Professor	Ph.D. (IISc.)	Chemistry	No
78	Chakrabarti Soumen	Associate Professor	Ph.D. (University of California)	CS & E	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
79	Chakrabarti Subhananda	Associate Professor	Ph.D (University of Calcutta)	Electrical Engg.	No
80	Chakraborty Debraj	Assistant Professor	Ph.D (University of Florida)	Electrical Engg.	No
81	Chakraborty Paulomi	Assistant Professor (Contractual Basis)	Ph.D. (University of Alberta)	H&SS	No
82	Chakraborty Supratik	Professor	Ph.D. (The Leland Stanford Jr.University)	CS & E	Member
83	Chakravarthy B. K.	Professor	M.Des. (IIT Bombay)	I.D.C	Member
84	Chandiramani N.K.	Professor	Ph.D.(Virginia Tech.)	Civil Engg	No
85	Chandorkar Mukul C.	Professor	Ph.D. (Univ.of Wisconsin Madison)	Electrical Engg.	Member
86	Chandran Sharat	Professor	Ph.D. (Univ.of Maryland)	CS & E	Member
87	Chandrasekharam D.	Professor	Ph.D. (IIT Bombay)	Earth Science	Member
88	Chaporkar Prasanna S.	Associate Professor	Ph.D (University of Pennsylvania – Philadelphia)	Electrical Engg.	No
89	Chatterjee Abhijit	Assistant Professor	Ph.D. (University of Delaware)	Chemical Engg	No
90	Chatterjee Avijit	Professor	Ph.D. (IIT Bombay)	Aerospace Engg.	Member / Prof. In charge (Placement Office)
91	Chatterjee Debasish	Assistant Professor	Ph. D. (University of Illinois at Urbana Champaign, USA)	Systems & Control	No
92	Chatterjee Kishore	Professor	Ph.D. (IIT Kanpur)	Electrical Engg.	Member
93	Chaudhari Sanjeev	Professor	Ph.D (IIT Kanpur)	CESE	Member
94	Chaudhari Subhasis	Professor	Ph.D. (University of California)	Electrical Engg.	Member
95	Chaudhuri Parag Kumar	Assistant Professor	Ph.D. (IIT Delhi)	CS & E	No
96	Chawdhury A.A.	Assistant Professor	Ph.D. (Pennsylvania State University)	Mechanical Engg.	No
97	Chebrolu Kameswari	Assistant Professor	Ph. D (UCSD, California)	CS & E	No
98	Choudhary Deepankar	Associate Professor	Ph.D. (IISc Bangalore)	Civil Engg	No
99	Chowdhury Arindam	Associate Professor	Ph.D (University of Carnegie Mellon)	Chemistry	No
100	Contractor A.Q.	Professor	Ph.D. (IIT Bombay)	Chemistry	Member
101	Damani Om P.	Associate Professor	Ph.D (University of Texas at Austin)	CS & E	No
102	Das Ashish	Professor	Ph.D (I. A.S.R.I)	Mathematics	Member
103	Das Dibyendu	Associate Professor	Ph.D. (University of Bombay)	Physics	No
104	Das Pragya	Associate Professor	Ph.D. (TIFR)	Physics	No
105	Dasaka Satyanarayana M	Assistant Professor	Ph.D. (IISc. Bangalore)	Civil Engg	No
106	Dash Sadhana	Assistant Professor	Ph.D. (Insitute of Physics)	Physics	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
107	Date Prashant P.	Professor	Ph.D. (IIT Madras)	Mechanical Engg.	Member
108	Datta Sambhu N.	Professor	Ph.D. (University of Virginia)	Chemistry	Member
109	De Amitava	Professor	Ph.D. (IIT Kanpur)	Mechanical Engg.	Member
110	Deb Kushal	Professor	Ph.D. (University of Hyderabad)	H&SS	Yes
111	Deo Makrand C.	Professor	Ph.D. (IIT Bombay)	Civil Engg	Member
112	Desai Madhav P.	Professor	Ph.D. (University of IlliNois)	Electrical Engg.	Member
113	Desai Uday B.	Professor	Ph.D. (The John Hopkins Univ.)	Electrical Engg.	Member
114	Desai Yogesh M	Professor	Ph.D. (University of Manitoba)	Civil Engg	Member
115	Dey Bikash Kumar	Associate Professor	Ph.D.(IISc Bangalore)	Electrical Engg.	No
116	Dhamdhare D.M.	Professor	Ph.D. (IIT Bombay)	CS & E	Member
117	Dhar Subhabrata	Associate Professor	Ph.D (M.S. University, Baroda)	Physics	No
118	Dikshit Anil Kumar	Professor	Ph.D. (University of Cornell)	CESE	Member / HOD-CESE
119	Diwan Ajit A.	Professor	Ph.D. (IIT Bombay)	CS & E	Member
120	Doolla Suryanarayana D.	Assistant Professor	Ph.D. (IIT Delhi)	Energy Science & Engg.	No
121	Doshi Jagdeep B.	Professor	Ph.D. (University of California)	Mechanical Engg.	Member
122	Durani Susheel J.	Professor	Ph.D. (Jammu)	Chemistry	Member
123	Durbha Surya	Assistant Professor	Ph.D. (Mississippi State University, Mississippi)	CSRE	No
124	Dusane O. R.	Professor	Ph.D. (University of Pune)	Met.Engg. & Mat.Sc.	Member
125	Dutta Anindya	Professor	Ph.D. (University of Jadavpur)	Chemistry	Member
126	Dutta Pankaj	Assistant Professor	Ph.D (IIT- Kharagpur)	SJMSOM	No
127	Dutta Suryendu	Assistant Professor	Ph.D. (RWTH Aachen University)	Earth Science	No
128	Duttagupta S.P.	Assistant Professor	Ph.D.(University of Rochester)	Electrical Engg.	No
129	Eldho Iype T.	Professor	Ph.D. (IIT Bombay)	Civil Engg	Member
130	Enamundram Chandrasekhar	Associate Professor	Ph.D. (University of Mumbai)	Earth Science	No
131	Fernandes Baylon G.	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
132	Fernandes Rodney A.	Associate Professor	Ph.D. (University of Pune)	Chemistry	No
133	Gadre Vikram M.	Professor	Ph.D. (IIT Delhi)	Electrical Engg.	Member
134	Gaitonde U.N.	Professor	Ph.D. (IIT Bombay)	Mechanical Engg.	Member
135	Gandhi Prasanna S.	Associate Professor	Ph.D.(University of Rice)	Mechanical Engg.	No
136	Ganesh Anuradha	Professor	Ph.D. (IIT Delhi)	Energy Science & Engg.	Member

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
137	Ganguly Swaroop	Assistant Professor	Ph.D. (University of Texas)	Electrical Engg.	No
138	Ganguly Udayan	Assistant Professor	Ph.D. (Cornell University)	Electrical Engg.	No
139	Garg Anurag	Assistant Professor	Ph.D. (IIT, Roorkee)	CESE	No
140	Garge Shripad M.	Assistant Professor	Ph.D (University of Allahabad)	Mathematics	No
141	Gedam Shirishkumar S.	Associate Professor	Ph.D. (IIT Bombay)	CSRE	No
142	George Siby K.	Associate Professor	Ph.D. (NEHU Univ. Shillog)	H&SS	No
143	Gharpure Santosh J.	Associate Professor	Ph.D. (IISc Bangalore)	Chemistry	No
144	Ghorpade S.R.	Professor	Ph.D. (Purdue Univ.)	Mathematics	Member / HOD- Mathematics
145	Ghosh Santanu K.	Assistant Professor	Ph.D (Jadavpur University)	Bio-Science & Bio-Engineering	No
146	Ghosh Atanu	Professor	M.Tech. (IIT Delhi) P.G. Diploma in Mgmt. (IIM Ahemedabad)	SJMSOM	Member
147	Ghosh Prakashchandra	Associate Professor	Ph.D. Technical Univ. of Aachem	Energy Science & Engg.	No
148	Ghosh Prasenjiti	Associate Professor	Ph.D.(University of Columbia)	Chemistry	No
149	Ghosh Siddhartha	Associate Professor	Ph.D. (Univ. of Michigan)	Civil Engg	No
150	Ghosh Subimal	Assistant Professor	Ph.D. (IISc. Bangalore)	Civil Engg	No
151	Golay Pravesh J	Assistant Professor	Ph.D. (Pune University)	H&SS	No
152	Gopal R. Patil	Assistant Professor	Ph.D. (Remsselaer Polytechnic Institute, Troy)	Civil Engg	No
153	Gopalan Prakash	Professor	Ph.D. (Purdue Univ.)	Met.Engg. & Mat.Sc.	Member
154	Gopalan Rajaraman	Assistant Professor	Ph.D. (University of Manchester, UK)	Chemistry	No
155	Goswami Partha S.	Assistant Professor	Ph.D. (IISc Bangalore)	Chemical Engg	No
156	Goyal Alok	Professor	Ph.D. (California)	Civil Engg	Member
157	Guha Anirban	Assistant Professor	Ph.D. (IIT Delhi)	Mechanical Engg.	No
158	Gumaste Ashwin Anil	Associate Professor	Ph.D. (University of Texas)	CS & E	No
159	Gundabala Venkat	Assistant Professor	Ph.D. (University of Sheffield, UK)	Chemical Engg	No
160	Gundimeda Haripriya S.	Associate Professor	Ph.D. (Indira Gandhi Institute of Development)	H&SS	No
161	Gupta Dipti	Assistant Professor	Ph.D. (IIT Kanpur)	Met.Engg. & Mat.Sc.	No
162	Gupta Kapil	Professor	Ph.D. (Univ.of Sheffield)	Civil Engg	Member
163	Gupta Meenakshi S.	Professor	Ph.D. (IIT Kanpur)	H&SS	Member
164	Gupta Rajesh	Assistant Professor	Ph.D (IIT Delhi)	Energy Science & Engg.	No
165	Gupta Shalabh	Assistant Professor	Ph.D. (University of California)	Electrical Engg.	No
166	Guruprasad Padubidri J.	Assistant Professor	Ph.D. (Texas A & M Univ.)	Aerospace Engg.	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
167	Gururajan M.P.	Assistant Professor	Ph.D. (IIT Science Bangalore)	Met.Engg. & Mat.Sc.	No
168	Hablani Hari B.	Professor (Contract)	Ph.D (IISc., Bangalore)	Aerospace Engg.	No
169	Hariharan A.	Assistant Professor	Ph.D. (University of Kansas, Lawrence)	Mathematics	No
170	Hemachandra N.	Professor	Ph.D. (IISc. Bangalore)	I.E. & O.R.	Member / HOD-IE&OR
171	Inamdar Mandar M.	Assistant Professor	Ph.D. (California Institute of Tech.)	Civil Engg	No
172	Innamdar Arun B.	Associate Professor	Ph.D. (IIT Bombay)	CSRE	No
173	Iyer Sridhar R.	Associate Professor	Ph.D. (IIT Bombay)	CS & E	No
174	Iyer Kannan N.	Professor	Ph.D. (University of Purdue)	Mechanical Engg.	Member
175	Jadhav G.N.	Professor	Ph.D. (IIT Bombay)	Earth Science	Member
176	Jadhav Sameer R.	Assistant Professor	Ph.D. (John Hopkins Univ.)	Chemical Engg	No
177	Jagarlapudi Saketha Nath R.	Assistant Professor	Ph.D. (IISc. Bangalore)	CS & E	No
178	Jain Karuna	Professor	Ph.D. (IIT Kharagpur)	SJMSOM	Member
179	Jain Monica	Assistant Professor (Contractual Basis)	Master of Planning (University of Southern California)	C-USE	No
180	Jangid R.S.	Professor	Ph.D. (IIT Delhi)	Civil Engg	Member
181	Jha Shishir Kumar	Associate Professor	Ph.D. (Syracuse Univ.)	SJMSOM	No
182	Jog S.D.	Assistant Professor	Ph.D (IIT Bombay)	Mechanical Engg.	No
183	John Joseph	Professor	Ph.D. (Birmingham, UK)	Electrical Engg.	Member
184	Jonnalagadda Krishna N.	Assistant Professor	Ph.D. (University of Illinois)	Mechanical Engg.	No
185	Joshi Anirudha N.	Professor	M.Tech. (IIT Bombay)	I.D.C	Member
186	Joshi Ashok	Professor	Ph.D. (IIT Bombay)	Aerospace Engg.	Member
187	Joshi Purba	Assistant Professor	M.Des (IIT Bombay)	I.D.C	No
188	Joshi R.K.	Professor	Ph.D. (IIT Madras)	CS & E	Member
189	Joshi R.R	Professor	Ph.D. (IIT Bombay)	Mathematics	Member
190	Joshi Suhas	Professor	Ph.D. (IIT Bombay)	Mechanical Engg.	Member
191	Jothiprakash V.	Associate Professor	Ph.D. (IIT Madras)	Civil Engg	No
192	Juneja Ashish	Associate Professor	Ph.D.(National University of Singapore)	Civil Engg	No
193	Juvekar V.A.	Professor	Ph.D. (IIT Bombay)	Chemical Engg	Member
194	Kabra Dinesh	Assistant Professor	Ph.D. (JNC for Advance Scientific Res., Bangalore)	Physics	No
195	Kaliappan Krishna P.	Professor	Ph.D. (IISc. Bangalore)	Chemistry	Member
196	Kantimay S. Das Gupta	Assistant Professor	Ph.D. (IISc Bangalore)	Physics	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
197	Karandikar Abhay	Professor	Ph.D. (IIT Kanpur)	Electrical Engg.	Member / HOD- Electrical Engg
198	Karmakar Subhankar	Assistant Professor	Ph.D (IISc. Bangalore)	CESE	No
199	Kartik V.	Assistant Professor	Ph. D. (Carnegie Mellan University, USA)	Mechanical Engg.	No
200	Kasbekar S. Gaurav	Assistant Professor	Ph. D. (University of Penmylvania)	Electrical Engg.	No
201	Kashyap B.P.	Professor	Ph.D. (IIT Kanpur)	Met.Engg. & Mat.Sc.	Member
202	Kathuria Vinish Kumar	Associate Professor	Ph.D. (Indira Gandhi Inst. of Development Research)	SJMSOM	No
203	Kaulkarni Ankur	Assistant Professor (Contractual Basis)	Ph.D. (University of Illinois at Urbana Champaign, USA)	Systems & Control	No
204	Kavitha Veeraruna	Assistant Professor	Ph.D. (IISc., Bangalore)	I.E. & O.R.	No
205	Keshari Manoj K.	Associate Professor	Ph.D. (TIFR)	Mathematics	No
206	Khakhar D.V.	Director/ Professor	Ph.D. (University of Massachusetts Amherst)	Chemical Engg	Member
207	Khan Azizuddin	Assistant Professor	Ph.D (IIT Kanpur)	H&SS	No
208	Khanna Anand S.	Professor	Ph.D. (Madras Univ.)	Met.Engg. & Mat.Sc.	Member
209	Khaparde S.A.	Professor	Ph.D. (IIT Kharagpur)	Electrical Engg.	Member
210	Khedkar Uday P.	Professor	Ph.D. (IIT Bombay)	CS & E	Member
211	Khire M.V.	Associate Professor	Ph.D. (IIT Bombay)	CSRE	No
212	Khosla N.K.	Professor	Ph.D. (IIT Kanpur)	Met.Engg. & Mat.Sc.	Member / Incharge – ASC
213	Kiran Kondabagil R.	Assistant Professor	Ph.D.-Biochemistry (University of Mysore)	Bio-Science & Bio-Engineering	No
214	Kotha Sambasivarao	Professor	Ph.D. (University of Hyderabad)	Chemistry	Member
215	Kottantharayil Anil	Associate Professor	Ph.D. (Universitat der Bhundeswehr, Munich Germany)	Electrical Engg.	
216	Kulkarni A. R.	Professor	Ph.D. (IIT Kharagpur)	Met.Engg. & Mat.Sc.	Member
217	Kulkarni A.M.	Professor	Ph.D. (IISc. Bangalore)	Electrical Engg.	Member
218	Kulkarni Malhar A.	Associate Professor	Ph.D. (University of Pune)	H&SS	
219	Kulkarni Mrinmoyi	Assistant Professor	Ph.D.(State Univ.of New York)	H&SS	No
220	Kulkarni Purushottam S.	Assistant Professor	Ph.D. (University of Massachusets)	CS & E	No
221	Kulkarni Rekha P.	Professor	Ph.D. (IIT Bombay)	Mathematics	Member
222	Kulkarni Salil S.	Assistant Professor	Ph.D. (University of Cornell)	Mechanical Engg.	No
223	Kulkarni Srikrishna V.	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
224	Kulkarni Suvarn S.	Associate Professor	Ph.D. (University of Pune)	Chemistry	Co-opted Member

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
225	Kumar Anil	Professor	Ph.D. (IISc. Bangalore)	Chemistry	Member
226	Kumar Animesh N	Assistant Professor	Ph.D. (University of California)	Electrical Engg.	No
227	Kumar Ashutosh	Assistant Professor	Ph.D. (Tata Institute of Fundamental Research)	Bio-Science & Bio-Engineering	No
228	Kumar Girish	Professor	Ph.D. (IIT Kanpur)	Electrical Engg.	Member
229	Kumar Hemant Singh	Associate Professor	Ph.D. (Freie Univ., Berlin)	Earth Science	
230	Kumar Sudarshan	Associate Professor	Ph.D. (IISc Bangalore)	Aerospace Engg.	No
231	Kundu Tapanendu	Professor	Ph.D. (Jadavpur Univ.)	Physics	Member
232	Kunwar Ambarish	Assistant Professor	Ph. D. (IIT Kanpur)	Bio-Science & Bio-Engineering	No
233	Kusre Anand T	Professor (Contract)	M.Tech. (IIT Bombay) / Diploma in Business Finance	SJMSOM	Member
234	Laha Apurba	Assistant Professor	Ph.D. (IISc, Bangalore)	Electrical Engg.	No
235	Lahiri G.K.	Professor	Ph.D. (University of Jadavpur)	Chemistry	Member
236	Leena Vachhani	Assistant Professor	Ph.D (IIT Madras)	Systems & Control	No
237	Limaye Nutan	Assistant Professor	Ph.D. (Homi Bhabha National Institute)	CS & E	No
238	Lodha Saurabh	Assistant Professor	Ph.D. (Purdue University)	Electrical Engg.	No
239	M. V. R. Murti	Associate Professor	Ph.D. (IIT Bombay)	CSRE	No
240	Mahajan A. Ashutosh	Assistant Professor	Ph.D. (Lehigh University)	H&SS	No
241	Mahajan Avinash V.	Professor	Ph.D. (Iowa)	Physics	Member
242	Mahajan Swapneel	Associate Professor	Ph.D (Cornell Univ.)	Mathematics	No
243	Mahajani Sanjay	Professor	Ph.D. (University of Bombay)	Chemical Engg	Member
244	Mahapatra S.	Assistant Professor	Ph.D. (University of Wurzburg, German)	Physics	No
245	Mahapatra Souvik	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
246	Mahulikar S.P.	Professor	Ph.D.(Nanyang Tech. Univ., Singapore)	Aerospace Engg.	Member
247	Maiti Debabrata	Assistant Professor	Ph.D. (The Johns Hopkins University)	Chemistry	No
248	Maiti S.K.	Professor	Ph.D. (IIT Bombay)	Mechanical Engg.	Member
249	Maji Avijit	Assistant Professor	Doctor of Engg. (Morgan State University, USA)	Civil Engg	No
250	Maji Samir K.	Assistant Professor	Ph.D. (Jadavpur University)	Bio-Science & Bio-Engineering	No
251	Major Syed S.	Professor	Ph.D. (IIT Delhi)	Physics	Member
252	Malani Ateeque	Assistant Professor	Ph.D. (IISc Bangalore)	Chemical Engg	No
253	Malik Ranjan K.	Professor	Ph.D. (Wisconsin Madison Univ.)	Chemical Engg	Member
254	Mallick Sudhanshu	Assistant Professor	Ph.D. (Purude University)	Met.Engg. & Mat.Sc.	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
255	Malshe Milind S.	Professor	Ph.D. (Bombay Univ.)	H&SS	Member
256	Manchanda Rohit	Professor	Ph.D. (Oxford Univ.)	Bio-Science & Bio-Engineering	Member
257	Mandal J.C.	Professor	Ph.D. (IISc. Bangalore)	Aerospace Engg.	Member
258	Mandal J.N.	Professor	Ph.D. (IISc. Bangalore)	Civil Engg	Member
259	Manik D.N.	Professor	Ph.D. (Auburn Univ.)	Mechanical Engg.	Member
260	Manjunath D.	Professor	Ph.D. (Rensselaer Polytechnic, New York)	Electrical Engg.	Member / HOD- Computer Centre
261	Mathew George	Associate Professor	Ph.D. (M.S. Univ.)	Earth Science	No
262	Mathew Tom V	Associate Professor	Ph.D. (IIT Madras)	Civil Engg	No
263	Mathur Pradeep	Professor	Ph.D. (University of Keel)	Chemistry	Member
264	Mehra Anurag	Professor	Ph.D. (University of Bombay)	Chemical Engg	Member
265	Mehra Sarika	Assistant Professor	Ph.D.(University of Minessota)	Chemical Engg	No
266	Menezes Viren	Associate Professor	Ph.D. (IISc. Bangalore)	Aerospace Engg.	No
267	Menezes Bernard L	Professor	Ph.D. (University of Texas)	CS & E	Member
268	Merchant S.N.	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
269	Mishra M.K.	Professor	Ph.D. (University of Florida)	Chemistry	Member
270	Mishra Saurabh	Assistant Professor	Ph.D. (Pennsylvania State Univ.	Met.Engg. & Mat.Sc.	No
271	Mishra Trupti	Assistant Professor	Ph.D. (IIT Kharagpur)	SJMSOM	No
272	Misra D.S.	Professor	Ph.D. (IIT Kanpur)	Physics	Member
273	Mitra Mira	Assistant Professor	Ph.D. (IISc. Bangalore)	Aerospace Engg.	No
274	Mitra Sagar	Assistant Professor	Ph.D. (IISc Bangalore)	Energy Science & Engg.	No
275	MJNV Prasad	Assistant Professor	Ph.D. (IISc. Bangalore)	Met.Engg. & Mat.Sc.	No
276	Mohan B.K.	Associate Professor	Ph.D. (IIT Bombay)	CSRE	No
277	Mohan Gollapally	Professor	Ph.D. (ISM Dhanbad)	Earth Science	Member
278	Mohanty Raja	Associate Professor	M.Des. (IIT Bombay)	I.D.C	No
279	Moharir Arun S.	Professor	Ph.D. (IIT Kanpur)	Chemical Engg	Member
280	Momaya Kirankumar S.	Professor	Ph.D. (University of Toronto)	SJMSOM	Member
281	Moudgalya Kannan	Professor	Ph.D. (Rice Univ. Houston)	Chemical Engg	Member
282	Mujumdar P.M.	Professor	Ph.D. (IIT Bombay)	Aerospace Engg.	Member / HOD -CASDE
283	Mukherjee Asmita	Associate Professor	Ph.D. (TIFR)	Physics	No
284	Mukherjee Indrajit	Assistant Professor	Ph.D. (IIT Kaharagpur)	SJMSOM	No
285	Mukherjee Jayanta	Associate Professor	Ph.D. (The Ohio State Univ. Columbus, USA)	Electrical Engg.	No
286	Mukherjee Soumyajit	Assistant Professor	Ph.D. (IIT Roorke)	Earth Science	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
287	Mukherjee Soumyo	Professor	Ph.D.(Univ. Of Colarado) Bio-Engineering	Bio-Science &	Member / HOD CRNTS & SAIF
288	Mukherjee Suparna	Professor	Ph.D. (University of Michigan)	CESE	Member
289	Mukhopadhyay Amartya	Assistant Professor (Contractual Basis)	Ph.D. (University of Oxford, UK)	Met.Engg. & Mat.Sc.	No
290	Mukhopadhyay Siuli	Assistant Professor	Ph.D. (University of Florida)	Mathematics	No
291	Mukul Malay	Associate Professor	Ph.D. (University of Rochester)	Earth Science	No
292	Munshi Kishori lal	Professor	P.G.D. (IIT Bombay)	I.D.C	Member
293	Murthy Sahana	Assistant Professor	Ph.D. (Rutgers University)	C- DEEP	No
294	Nagaraja G.	Professor	Ph.D. (IISc. Bangalore)	CS & E	Member
295	Nagarajan R.	Associate Professor	Ph.D. (IIT Bombay)	CSRE	No
296	Nair Pradeep	Assistant Professor	Ph.D. (Purdue University)	Electrical Engg.	No
297	Namboothiri I.N.N.	Professor	Ph.D. (IISc Bangalore)	Chemistry	Member
298	Nambudiripad N.	Associate Professor	Ph.D. (Oxford Univ.)	Physics	No
299	Nanavati Hemant J.	Professor	Ph.D. (Georgia Institute Technology)	Chemical Engg	Member
300	Nand Kishore	Professor	Ph.D. (IIT Delhi)	Chemistry	Member
301	Nandi Basanta Kumar	Associate Professor	Ph.D. (Utkal University)	Physics	No
302	Nanthagopalan Prakash	Assistant Professor (Contractual Basis)	Ph.D. (IIT-Madras)	Civil Engg	No
303	Narasimhan K	Professor	Ph.D. (Purdue Univ.)	Met.Engg. & Mat.Sc.	Member
304	Narayanan Harihar	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
305	Narayanan Krishna S.	Associate Professor	Ph.D. (IIT Madras)	CS & E	No
306	Narayanan Krishnan	Professor	Ph.D. (Univ. of Delhi)	H&SS	Member / HOD-HSS
307	Narayanan N C.	Associate Professor	Ph.D. (ISS, The Hague, Netherlands)	CTARA	No
308	Narayanan Vishnu	Assistant Professor	Ph.D. (University of California)	I.E. & O.R.	No
309	Nataraj Neela	Associate Professor	Ph.D. (IIT Delhi)	Mathematics	No
310	Nataraj P.S.V.	Professor	Ph.D. (IIT Madras)	Systems & Control	Member
311	Nath Rajakishore	Assistant Professor	Ph.D. (Central Univ. Hyderabad)	H&SS	No
312	Nayak Jayant K.	Professor	Ph.D. (IIT Delhi)	Energy Science & Engg.	Member
313	Neergat Manoj	Associate Professor	Ph.D. (Indian Institute of Science, Bangalore)	Energy Science & Engg.	No
314	Niranjan T.T.	Assistant Professor	Ph.D. (Fellow, Management Development Institute, Gurgaon)	SJMSOM	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
315	Noronha Santosh B.	Assistant Professor	Ph.D. (Univ.of Maryland, Baltimore County)	Chemical Engg	No
316	P. Vedagiri	Assistant Professor	Ph.D. (IIT Madras)	Civil Engg	No
317	P.I. Pradeep Kumar	Associate Professor	Ph.D. (Uppasala University, Sweden)	Chemistry	No
318	Padhi Puja	Assistant Professor	Ph.D. (Univ. of Hyderabad)	H&SS	No
319	Pal Rama	Assistant Professor (Contractual Basis)	Ph.D. (Indira Gandhi Institute of Development Research)	H&SS	No
320	Panda Dulal	Professor	Ph.D. (Jadavpur Univ.)	Bio-Science & Bio-Engineering	Member
321	Panda Ranjan K.	Associate Professor	Ph.D. (University of Hyderabad)	H&SS	No
322	Panda Ratikanta	Assistant Professor	Ph.D. (University of Hyderabad)	H&SS	No
323	Pandalai Hari S.	Professor	Ph.D. (ISM)	Earth Science	Member
324	Pande Kanchan	Professor	Ph.D. (Gujarat Univ)	Earth Science	Member / HOD - Earth Sciences
325	Pande Sanjay S.	Professor	Ph.D. (IIT Bombay)	Mechanical Engg.	Member
326	Pandey Ashish	Assistant Professor	MBA(University Institute of Management)	SJMSOM	No
327	Pandey Prem C.	Professor	Ph.D. (University of Toronto)	Electrical Engg.	Member
328	Pani A.K.	Professor	Ph.D. (IIT Kanpur)	Mathematics	Member
329	Pant Prita	Associate Professor	Ph.D. (Cornell Univ)	Met.Engg. & Mat.Sc.	Co-opted Member
330	Pant R.S.	Professor	Ph.D. (U.K.)	Aerospace Engg.	Yes
331	Panwar Ajay S	Assistant Professor	Ph.D. (University of Minnesota)	Met.Engg. & Mat.Sc.	No
332	Parida Smrutiranjana	Assistant Professor	Ph.D. (University of Saarlandes, Germany)	Met.Engg. & Mat.Sc.	No
333	Parmananda Punit	Associate Professor	Ph.D. (Ohio University)	Physics	No
334	Parthasarathy D.	Professor	Ph.D. (Univ.of Hyderabad)	H&SS	Member
335	Patankar Swati	Professor	Ph.D. (Tufts Univ. Boston)	Bio-Science & Bio-Engineering	Member
336	Patel Suresh C	Professor	Ph.D. (Univ of Wyoming)	Earth Science	Member
337	Patil Mahesh B	Professor	Ph.D. (Univ.of Illinois)	Electrical Engg.	Member
338	Patil Rahul J	Assistant Professor	Ph.D. (University of Colorado)	SJMSOM	No
339	Patkar Sachin B	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
340	Pattanaik Sarmistha	Assistant Professor	Ph.D. (Jawaharlal Nehru University)	H&SS	No
341	Patwardhan Anand P	Professor	Ph.D. (Carnegie Mellon Univ.)	SJMSOM	Member
342	Patwardhan S.C.	Professor	Ph.D. (IIT Bombay)	Chemical Engg	Member / HOD- Chemical Engg.

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
343	Patwari Naresh Ganpathi	Professor	Ph.D. (IIT Bombay)	Chemistry	Member
344	Paul Debjani	Assistant Professor	Ph.D. (IISc Bangalore)	Bio-Science & Bio-Engineering	No
345	Pawaskar Dnyanesh N.	Associate Professor	Ph.D. (Brown Univ., Providence USA)	Mechanical Engg.	No
346	Phale Prashant S.	Professor	Ph.D. (IISc. Bangalore)	Bio-Science & Bio-Engineering	Member
347	Phani Tetali	Associate Professor	M.Des.(IIT Bombay)	I.D.C	No
348	Pillai Harish K	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
349	Pillai Sibi Raj B.	Assistant Professor	Ph.D. (Egole Polytechnic Federale De Lausanne)	Electrical Engg.	No
350	Poopathi K.P.K.	Professor	Ph.D. (IIT Kanpur)	Mechanical Engg.	Member
351	Poovaiah B.A. Ravi	Professor	DIIT (IIT Bombay)	I.D.C	Member
352	Prabhu Nityananda	Professor	Ph.D. (University of Canegie)	Met.Engg. & Mat.Sc.	Member / HOD-Met. Engg. & Mat. Sci. Deptt.
353	Prabhu S.V.	Professor	Ph.D. (IIT Bombay)	Mechanical Engg.	Member
354	Pradeep A.M.	Associate Professor	Ph.D. (IIT Kanpur)	Aerospace Engg.	No
355	Prakash Om	Professor	Ph.D. (IIT Bombay)	Met.Engg. & Mat.Sc.	Member
356	Prasad R.C.	Professor	Ph.D. (IISc. Bangalore)	Met.Engg. & Mat.Sc.	Member
357	Prasad Shiva	Professor	Ph.D.(Delhi)	Physics	Member
358	Prasanna T.R.S.	Assistant Professor	Ph.D.(MIT, Cambridge)	Met.Engg. & Mat.Sc.	No
359	Punekar N.S.	Professor	Ph.D. (IISc. Bangalore)	Bio-Science & Bio-Engineering	Member / HOD-BSBE
360	Puranik Bhalchandra	Associate Professor	Ph.D. (University of Wisconsin Madison)	Mechanical Engg.	No
361	Puthenpurakal Tony J.	Associate Professor	Ph.D. (University of Purdue)	Mathematics	No
362	Radhakrishna M.	Professor	Ph.D (Indian School of Mines, Dhanbad)	Earth Science	Member
363	Radhakrishnan R.	Assistant Professor	Ph.D. (Centre Study of Culture & Society, Bangalore)	H&SS	No
364	Raghunathan Ravi	Associate Professor	Ph.D. (University of Yale)	Mathematics	Co-opted Member
365	Raja S. V.	Professor	Ph.D. (IISc. Bangalore)	Met.Engg. & Mat.Sc.	Member
366	Raje Deepashree	Assistant Professor	Ph.D. (IISc. Bangalore)	Civil Engg	No
367	Rajendran Bipin	Assistant Professor	Ph.D. (Standford University)	Electrical Engg.	No
368	Rama R	Professor	Ph.D.	CS & E	Yes
369	Ramachandran K.	Professor	D.I.I.T (Industrial Design)	I.D.C	Member
370	Ramachandran Prabhu	Assistant Professor	Ph.D. (IIT-Madras)	Aerospace Engg.	No
371	Ramadevi Pichai	Professor	Ph.D. (University of Madras)	Physics	Member
372	Ramkrishnan D	Associate Professor	Ph.D. (M.S. University, Baroda)	Earth Science	No
373	Ramkrishnan Ganesh	Assistant Professor	Ph.D. (IIT Bombay)	CS & E	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
374	Ramamritham K. S.	Professor	Ph.D. (University of Utah)	CS & E	Member
375	Raman Bhaskaran	Associate Professor	Ph.D. (University of California at Berkeley)	CS & E	No
376	Raman Preeti	Assistant Professor	Ph.D. (TIFR)	Mathematics	No
377	Ramasankaran RAAJ	Assistant Professor	Ph.D. (IIT Roorkee)	CS & E	No
378	Ramasubramanian K.	Associate Professor	Ph.D. (University of Madras)	H&SS	No
379	Ramaswamy Murugavel	Professor	Ph.D. (IISc. Bangalore)	Chemistry	Member / HOD-Chemistry
380	Rana Indra K.	Professor	Ph.D. (University of Calcutta)	Mathematics	Member
381	Ranade Abhiram G.	Professor	Ph.D. (University of Yale)	CS & E	Member
382	Ranade Shilpa	Associate Professor	M.Des. (IIT Bombay)	I.D.C	No
383	Rane Milind V.	Professor	Ph.D. (University of Maryland)	Mechanical Engg.	Member
384	Rane Mandar	Assistant Professor	M.Des. (IIT Bombay)	I.D.C	No
385	Rangaraj Narayan	Professor	Ph.D. (John Hopkins Univ.)	I.E. & O.R.	Member
386	Ranjan Akhil	Professor	Ph.D. (University of Bombay)	Mathematics	Member
387	Ranjith Padinhateeri	Assistant Professor	Ph.D. (IIT Madras)	Bio-Science & Bio-Engineering	No
388	Rao Govardhana V.	Professor	Ph.D. (IIT Madras)	Chemical Engg	Member
389	Rao Mallikarjuna K.S.	Assistant Professor	Ph.D. (IISc. Bangalore)	I.E. & O.R.	No
390	Rao Anand B	Associate Professor	Ph.D. (C.M. University, Pittsburgh)	CTARA	No
391	Rao C. Pulla	Professor	Ph.D. (IISc. Bangalore)	Chemistry	Member
392	Rao Emmela P.	Associate Professor	Ph.D. (IIT Bombay)	Civil Engg	No
393	Rao K. Krishnamurthy	Professor	Ph.D. (University of Bombay)	Bio-Science & Bio-Engineering	Member
394	Rao K.V.K	Professor	Ph.D. (IIT Madras)	Civil Engg	Member / HOD –Civil Engg.
395	Rao Kumar	Assistant Professor	Ph.D. (Univ. of Connecticut Storrs, CT)	Physics	No
396	Rao Nageshwara S. V. D.	Associate Professor	Fellow of IIM Ahmedabad	SJMSOM	No
397	Rao Preeti S.	Professor	Ph.D. (University of Florida)	Electrical Engg.	Member
398	Rao Ramgopal V.	Professor	Ph.D. (University of Germany)	Electrical Engg.	Member
399	Rao Sapar Narayan	Professor	Ph.D. (IIT Madras), Dip.in Business Finance	SJMSOM	Member
400	Rao Sumant M.	Associate Professor	M.Des. (Usual Communication)	I.D.C	No
401	Rao Y.S.	Associate Professor	Ph.D. (IIT Bombay)	CSRE	No
402	Rastogi A Kumar	Professor	Ph.D. (University of Birmingham)	Civil Engg	Member
403	Ravi Bhallamudi	Professor	Ph.D. (IISc. Bangalore)	Mechanical Engg.	Member

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
404	Ravikanth M.	Professor	Ph.D. (IIT Kanpur)	Chemistry	Member
405	Ray Gaur G.	Professor	Ph.D. (University of Calcutta)	I.D.C	Member / HOD-IDC
406	Reddy Manne Janga	Assistant Professor	Ph.D. (IISc. Bangalore)	Civil Engg	No
407	Robinson Rowena	Professor	Ph.D. (University of Cambridge)	H&SS	Member
408	Roy Bhaskar	Professor	Ph.D. (IIT Kharagpur)	Aerospace Engg.	Member
409	Roy Sandip	Associate Professor	M.S. (SUNY, Buffalo)	Chemical Engg	No
410	S. Maheswaran	Assistant Professor	Ph.D. (University of Manches)	Chemistry	No
411	Sabnani Nina	Associate Professor	M.A (Syracuse Univ, Newyork,USA)	I.D.C	No
412	Sabnis Sanjeev V.	Professor	Ph.D (University of Madras)	Mathematics	Member
413	Sadhu Nachiketa	Assistant Professor	M.Sc. (University of Calcutta)	I.D.C	No
414	Saha Dipankar	Assistant Professor	Ph.D. (University of Michigan)	Electrical Engg.	No
415	Saha Sandip Kumar	Assistant Professor	Ph.D. (IISc. Bangalore)	Mechanical Engg.	No
416	Sahoo Anirudha	Associate Professor	Ph.D. (Texas A&M Univ.)	CS & E	No
417	Sain Anirban	Associate Professor	Ph.D. (IISc. Bangalore)	Physics	No
418	Saini Supreet	Assistant Professor	Ph.D. (University of Illinois at Urbana Champaign, USA)	Chemical Engg	No
419	Samajdar Indradev	Professor	Ph.D. (University of Drexel)	Met.Engg. & Mat.Sc.	Member
420	Sandesh M. Ramu	Assistant Professor	M.Des. IIT Bombay	I.D.C	No
421	Santanu Dey	Assistant Professor	Ph.D. (Indian Statistical Institute)	Mathematics	No
422	Santhanam Rekha	Assistant Professor	Ph.D. (University of Illinois at Urbana Champaign, USA)	Mathemetics	No
423	Sanyal Amitabha	Professor	Ph.D. (IIT Kanpur)	CS & E	Member / HOD – Comp. Sc. & Engg.
424	Saraph Girish P.	Associate Professor	Ph.D. (University of Maryland)	Electrical Engg.	No
425	Saraswati Pratul K.	Professor	Ph.D. (IIT Bombay)	Earth Science	Member
426	Sarawagi Sunita	Associate Professor	Ph.D. (University of California)	CS & E	No
427	Sarda N.L.	Professor	Ph.D. (IIT Bombay)	CS & E	Member
428	Sarin Pradeep	Assistant Professor	Ph.D. (Massachusetts Instt. of Tech.)	Physics	No
429	Sarkar Arindam	Assistant Professor (Contractual Basis)	Ph.D. (University of Texas at Austin)	Chemical Engg	No
430	Sarkar Shaibal K	Assistant Professor	Ph.D. (Weizmann Instiute of Science)	Energy Science & Engg.	No
431	Sarma Vijayanthi Mala	Associate Professor	Ph.D. (Massachussetts Instt.of Tech.)	H&SS	No
432	Sasidhar Y.U	Professor	Ph.D. (IIT Madras)	Chemistry	Member

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
433	Saxena Sumit	Assistant Professor (Contractual Basis)	Ph.D. (New Jersey Institute of Technology, USA)	Met.Engg. & Mat.Sc.	No
434	Sebastian C.D.	Associate Professor	Ph.D. (Banaras Hindu Univ.)	H&SS	No
435	Sen Shamik R.	Assistant Professor	Ph.D. (University of Philadilphia)	Bio-Science & Bio-Engineering	No
436	Senthil Kumar M.	Professor	Ph.D. (IIT Madras)	Physics	Member
437	Seshu Pasumarthy S	Professor	Ph.D. (IIT Madras)	Mechanical Engg.	Member
438	Sethi Virendra	Professor	Ph.D. (University of Wisconsin, Madison)	CESE	Member
439	Shah Narendra G	Professor	Ph.D. (ATU France)	CTARA	Member
440	Shankar Hariharan S.	Professor	Ph.D (University of Monash)	Chemical Engg	Member
441	Sharma Dinesh	Assistant Professor	Ph.D. (Fellow Program in Management)	SJMSOM	No
442	Sharma Atul	Associate Professor	Ph.D. (IIT Kanpur)	Mechanical Engg.	No
443	Sharma Dinesh K.	Professor	Ph.D. (Bombay Univ.)	Electrical Engg.	Member
444	Sharma Nishant	Associate Professor	Ph.D. (enrolled with IIT Guwahati)	I.D.C	No
445	Sharma Pratibha	Associate Professor	Ph.D (University of Rajastan)	Energy Science & Engg.	No
446	Sharma S.D.	Professor	Ph.D. (IIT Bombay)	Aerospace Engg.	Member / HOD - Aero. Engg.
447	Sharma Vishnu D.	Professor	Ph.D. (BHU)	Mathematics	Member
448	Shastri Anant R.	Professor	Ph.D. (University of Bombay)	Mathematics	Member
449	Shastri Sudha	Associate Professor	Ph.D. (IIT Delhi)	H&SS	No
450	Shastri Yogendra	Assistant Professor	Ph.D. (University of Illinois at Chicago, Chicago IL)	Chemical Engg	No
451	Sheth Hetu C.	Associate Professor	Ph.D. (IIT Bombay)	Earth Science	No
452	Shevgaonkar R.K.	Professor	Ph.D. (IIT Bombay)	Electrical Engg.	Member
453	Shukla Alok	Professor	Ph.D.(Utah State University	Physics	Member
454	Shukla Anshuman	Assistant Professor	Ph.D. IIT Kanpur	Electrical Engg.	No
455	Shukla Shobha	Assistant Professor	Ph.D. (Sunny – Buffal)	Met.Engg. & Mat.Sc.	No
456	Singh Ramesh Kumar	Assistant Professor	Ph.D. (Georgia Institute of Technology)	Mechanical Engg.	No
457	Singh A.K.	Professor	Ph.D. (IIT Kanpur)	Chemistry	Member
458	Singh B.P.	Professor	Ph.D. (IIT Kanpur)	Physics	Member
459	Singh D.N.	Professor	Ph.D. (IIT Kanpur)	Civil Engg	Member
460	Singh Dharamveer	Assistant Professor (Contractual Basis)	Ph.D. (University of Oklahama)	Civil Engg.	No
461	Singh H.B.	Professor	Ph.D.(University of Aston)	Chemistry	Member
462	Singh Prabhakar P.	Professor	Ph.D. (University of North Carolina) USA	Physics	Member / HOD – Physics

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
463	Singh Suneet	Assistant Professor	Ph.D. (University of IlliNois)	Energy Science & Engg.	No
464	Singh Triok Nath	Professor	Ph.D. (BHU)	Earth Science	Member
465	Singh Virendra	Associate Professor	Ph.D. (NARA Institute of Science)	Electrical Engg.	No
466	Singh Vishwakarma H.	Professor	Ph.D. (University of Gorakhpur)	Chemistry	Member
467	Sinha Arpita	Assistant Professor	Ph.D. (IISc. Bangalore)	Systems & Control	No
468	Sinha Krishnendu	Associate Professor	Ph.D. (University of Minnesota)	Aerospace Engg.	No
469	Sinha Pooja Purang	Associate Professor	Ph.D. (IIT Delhi)	H&SS	No
470	Sinha Ravi	Professor	Ph.D. (North Western Univ.)	Civil Engg	Member
471	Sirola Vikram Singh	Associate Professor	Ph.D. (JNU)	H&SS	No
472	Sista Sivaji G.	Assistant Professor	Ph.D. (Indian Institute of science)	Mathematics	No
473	Sivakumar G.	Professor	Ph.D.(University of IlliNois)	CS & E	Member / HOD- CFDVS
474	Sivasubramanian K.	Associate Professor	Ph.D. (TIFR)	Mathematics	No
475	Sohoni Milind Ashok	Professor	Ph.D.(IIT Bombay)	CS & E	Member / HOD – CTARA
476	Solanki Chetan Singh	Associate Professor	Ph.D. (Katholieke Universiteit Leuven)	Energy Science & Engg.	Co-opted Member
477	Soman S.A.	Professor	Ph.D. (IISc. Bangalore)	Electrical Engg.	Member
478	Sonar Rajendra M.	Associate Professor	Ph.D. (University of Pune)	SJMSOM	No
479	Sreedhara Sheshadri	Associate Professor	Ph.D. (Indian Institute of Science, Bangalore)	Mechanical Engg.	No
480	Sreekumar G.V.	Associate Professor	M.Des. (IIT Bombay)	I.D.C	No
481	Sreekumar Sharmila	Associate Professor	Ph.D. (Central Univ. of Hyderabad)	H&SS	No
482	Sridharan Arun Kumar	Associate Professor	Ph.D. (The Pennsylvania state Univ)	Mechanical Engg.	No
483	Srikant Sukumar	Assistant Professor (Contractual Basis)	Ph.D. (University of Texas of Austin)	Systems & Control	No
484	Srinivasa Raman S.	Professor	Ph.D.(University of Toledo)	Met.Engg. & Mat.Sc.	Member
485	Srinivasan G.K.	Professor	Ph.D. (University of Minnesota)	Mathematics	Member
486	Srinivasan Murali K.	Professor	Ph.D.(University of IlliNois)	Mathematics	Member
487	Srinivasan Srikanth	Assistant Professor (Contractual Basis)	Ph.D. (Institute of Maths & Sci., Chennai)	Mathematics	No
488	Srivastava Atul	Assistant Professor	Ph.D. (IIT Kanpur)	Mechanical Engg.	No
489	Srivastava Rohit	Associate Professor	Ph.D. (Louisiana Tech.Univ., Ruston,USA)	Bio-Science & Bio-Engineering	No

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
490	Srivastava Sanjeeva	Assistant Professor	Ph.D (University of Alberta)	Bio-Science & Bio-Engineering	No
491	Srividya A.	Professor	Ph.D. (IIT Bombay)	Civil Engg	Member
492	Subhash A. Babu	Professor	Ph.D. (IIT Delhi)	Mechanical Engg.	Member
493	Subrahmanyam G.	Professor	Ph.D. (Ind.Agri.Res. Inst. Delhi)	Bio-Science & Bio-Engineering	Member
494	Subramanyam A.	Professor	Ph.D.(University of Poona)	Mathematics	Member
495	Subuddhi M. K.	Associate Professor	M.A.(Calcutta) M.A.(J.N.U.)	H&SS	No
496	Sudarshan S.	Professor	Ph.D. (University of Wisconsin)	CS & E	Member
497	Sule Virendra	Associate Professor	Ph.D. (Nara Institute of Science and Technology, Japan)	Electrical Engg.	No
498	Sunoj Raghavan	Associate Professor	Ph.D. (IISc Bangalore)	Chemistry	No
499	Sunthar P.	Associate Professor	Ph.D. (IISc Bangalore)	Chemical Engg	No
500	Suresh A. K.	Professor	Ph.D.(University of Monash)	Chemical Engg	Member
501	Suresh G. K	Professor	Ph.D. (IIT Madras)	Physics	Member
502	Suresh Kumar K.	Associate Professor	Ph.D. (IISc Bangalore)	Mathematics	No
503	Suresh Sumathi	Professor	Ph.D. (IISc Bangalore)	CESE	Member
504	Suryanarayanan Shashikanth	Associate Professor	Ph.D. (University of California)	Mechanical Engg.	No
505	Talwar Neelima	Professor	Ph.D. (University of Baroda)	H&SS	Member
506	Tandalia Parag	Assistant Professor	Ph.D. (IISc. Bangalore)	Mechanical Engg.	No
507	Tathagat A. Tulsi	Assistant Professor	Ph.D. (IISc Bangalore)	Physics	No
508	Tatiparti Sankara S.V.	Assistant Professor	Ph.D. (University of Florida)	Energy Science & Engg.	No
509	Tayalia Prakriti	Assistant Professor (Contractual Basis)	Ph.D. (Harvard University)	Bio-Science & Bio-Engineering	No
510	Tembe Bhalachandra L.	Professor	Ph.D. (SUNY,USA)	Chemistry	Member / HOD – CDEEP
511	Tewari Asim	Associate Professor	Ph.D. (Georgia Institute of Technology, Atlanta, USA)	Mechanical Engg.	No
512	Thaokar Rochish	Associate Professor	Ph.D. (IISc. Bangalore)	Chemical Engg	No
513	Tirumkudulu Mahesh S.	Associate Professor	Ph.D. (City Univ. of New York, USA)	Chemical Engg	No
514	Tomy C.V.	Professor	Ph.D. (TIFR.,Mumbai)	Physics	Member
515	Tripathy Mukta	Assistant Professor (Contractual Basis)	Ph.D. (University of Illinois at Urbana, Champaign, USA)	Chemical Engg	No
516	Trivedi Ashutosh	Assistant Professor	Ph.D. (University of Warwick)	CS & E	No
517	Trivedi K.Kirti	Professor	P.G.D. (IIT Bombay)	I.D.C	Member
518	Trivedi Pushpa L.	Professor	Ph.D. (Mumbai University)	H&SS	Member

Sr. No.	Name	Designation	Qualification	Deptt.	Senate/Remarks
519	Tulapurkar Ashwin	Associate Professor	Ph.D. (Tata Institute of Fundamental Research)	Electrical Engg.	No
520	Umasankar S.	Professor	Ph.D. (IIT Kanpur)	Physics	Member
521	Varma Raghava	Professor	Ph.D. (IIT Kanpur)	Physics	Member
522	Vasa Parinda	Assistant Professor	Ph.D. (TIFR)	Physics	No
523	Vedula Rajendra P.	Professor	Ph.D. (University of Arizona)	Mechanical Engg.	Member / HOD-Mechanical Engineering
524	Velaga Nagendra Rao	Assistant Professor	Ph.D. (Loughborough University)	Civil Engg	No
525	Vellaisamy P.	Professor	Ph.D. (IIT Kanpur)	Mathematics	Member
526	Velmurugan Rajbabu	Assistant Professor	Ph.D. (Georgia Institute of Tech.) USA	Electrical Engg.	No
527	Venkatachalam Parvatham	Professor	Ph.D. (University of Cambridge)	CSRE	Member / HOD-CSRE
528	Venkataraman Chandra	Professor	Ph.D. (University of California)	Chemical Engg	Member
529	Venkataraman G.	Professor	Ph.D. (IIT Bombay)	CSRE	Member
530	Venkataramani N.	Professor	Ph.D. (IIT Bombay)	Met.Engg. & Mat.Sc.	Member
531	Venkatasailanathan R.	Assistant Professor (Contractual Basis)	Ph.D.	Energy Science & Engg.	No
532	Venkatesh K.V.	Professor	Ph.D. (University of Purdue)	Chemical Engg	Member
533	Venkateswaran Jayendran	Assistant Professor	Ph.D. (University of Arizona)	I.E. & O.R.	No
534	Verma A.K.	Professor	Ph.D. (IIT Kharagpur)	Electrical Engg.	Member
535	Verma J.K.	Professor	Ph.D. (University of Purdue)	Mathematics	Member
536	Vijayakumaran Saravanan	Assistant Professor	Ph.D. (University of Florida)	Electrical Engg.	No
537	Vinjamur Madhu	Associate Professor	Ph.D. (University of Drexel)	Chemical Engg	No
538	Viswanadham B.V.S.	Professor	Dr.Ing. (University of Ruhr)	Civil Engg	Member
539	Viswanathan Ganesh A	Assistant Professor	Ph.D. (University of Houston)	Chemical Engg	No
540	Viswanathan N.N.	Associate Professor	Ph.D. (IISc. Bangalore)	Met.Engg. & Mat.Sc.	No
541	Viswanathan S.	Professor	Ph.D. (University of Chicago)	CS & E	Member
542	Vitta Satish	Professor	Ph.D. (University of Cambridge)	Met.Engg. & Mat.Sc.	Member
543	Wangikar Pramod P.	Professor	Ph.D.(University of Iowa)	Chemical Engg	Member
544	Yajnik U.A.	Professor	Ph.D. (University of Texas)	Physics	Member

Sr. No.	Name	Position	Qualification	Department
Group 'A' Officers				
Annual Report from 01/04/2012 to 30/04/2013				
1	Adagale D.B.	Assistant Registrar	B.A., L.L.B., M. A. (History)	Audit Section
2	Ainapure S.V.	CMO (NFSG)	M.D. (Bombay)	IIT Hospital
3	Appaji B.B.	Senior Sports Officer	Ph.D. (Gwalior)	Gymkhana
4	Bajre Kamal Kumar	Deputy Registrar	MPM (Pune University)	Administration
5	Bhagwat Alpana S.	Principal	Diploma in Higher Education (Bombay); M.Sc. (Mumbai University)	Campus School
6	Bhaldar I.H.	Asst.Workshop Supdt. (SG)	B.E. (Shivaji University)	Mechanical Engg.
7	Bhorkade G.K.	Dy. Registrar	M.Sc.(Mangalore Univ.), Dip in Comp.Sc., Amravati Univ., Maha.State Certi in IT MKCL	Materials Management Division
8	Chaurasia Dharmendra S	Senior Programmer	B.E. Electronics (Padmabhushan Vasant Dada Prathishthan)	ASC
9	Chilap Gopal R.	Manager	Diploma in Printing Technology & Graphics Arts (Bombay)	Printing Press
10	Dabholkar Nayan S.	Chief Manager Hospitality	MBA-(Madurai Kamraj University)	Guest House
11	Das Kumar Ranjit	Assistant Librarian	Ph.D. (Dr. B.R.Ambedkar University, Agra)	Central Library
12	Edwin M.	Sports Officer (SG)	Ph.D. (Gwalior)	Gymkhana
13	Engole Laxman P.	Assistant Librarian	M.A. (Mumbai)	Central Library
14	Jena A.K.	Chief Technology Officer	M.E. (IISc. Bangalore)	Computer Centre
15	Jha S.N.	Senior Sports Officer	Ph.D. (Gwalior)	Gymkhana
16	Joglekar C.P.	Co-ordinator, P T & D	B.A.(Pune Univ.), MPM- Pune University	P.T & D Cell
17	Jotwani Daulat	Librarian	M. Lib. Sci. (University of Rajasthan)	Central Library
18	Juwekar Prajakta V.	Assistant Registrar	M.Com(Education Management) Annamalai University	Administration
19	Kairali Dhanya	Senior Programmer	B.Tech. (University of Calicut)	ASC
20	Kale Sheetal N.	Sr. Medical Officer	M.B.B.S. (Nagpur University)	IIT Hospital
21	Korade Umesh R.	Assistant Registrar	B.Sc. (Shivaji Univ.), M.B.A. (Shivaji University)	Academic Section
22	Kowe Vijay G.	Assistant Registrar	MBA (Nagpur University)	Academic Section
23	Kulkarni S.D.	Deputy Librarian	M.Lib.Sc. (SNDT College)	Central Library
24	Maharana Jyoti Prasad	Systems Manager	Ph.D (IIT Bombay)	Computer Centre
25	Mamdapur V.B.	Superintending Engineer	B.E. (Pune) and M.Tech. (IIT Bombay)	Estate Office
26	Mehta Sunil Kumar	Assistant Training & Placement Officer	B.E.(Mech. Engg), Gulbarga University	Placement Office
27	Meshram Arvind	CMO (NFSG)	M.B.B.S. (Delhi),	IIT Hospital

Sr. No.	Name	Position	Qualification	Department
28	Nagwekar Ashish M.	Computer Engineer	M.Phil (BITS Pilani) B.E (Mumbai University)	Computer Centre
29	Naika Manju	Assistant Librarian	M.Phil (Annamalai University)	Central Library
30	Oltikar Rekha S.	Assistant Librarian	M.Lib.Sc. (SNDT, Bombay)	Central Library
31	Patil Arvind S.	Technical Officer	M.Tech. (IIT Kharagpur)	C- DEEP
32	Patil Priyaben	Senior Programmer	B.E. (Gujarat)	ASC
33	Patil S.G.	Sr. Medical Officer	MBBS (Mumbai)	IIT Hospital
34	Patki Savita V.	Assistant Registrar	Diploma in Business Management, The Institute of Financial Analysts of India University, Tripura	Dean R & D Office
35	Punalkar B. S.	Registrar	MA (Mumbai University)	Registrar Office
36	Rachakonda Sheetal	Assistant Nursing Superintendent	P.G.Diploma (Hospital Management), (Madhurai Kamraj University)	IIT Hospital
37	Ramesh P.G.	Dy. Registrar	Ph. D. (Madhurai Kamaraj University)	Accounts Section
38	Rao Raghavendra M.N.	Manager	Diploma in Elect. Engg. (Board of Tech. Education)	Telephone Exchange
39	Reddy P.M.	Sports Officer (SG)	Ph.D. (Gwalior)	Gymkhana
40	Ringnekar Nila D.	Sr. Medical Officer	MBBS (North Maharashtra Univ., Jalgaon)	IIT Hospital
41	Romani Indrajit A.	Assistant Registrar	M.Com (Mumbai University)	Accounts Section
42	Sahoo Biswakesan	Executive Engineer(Elect)	M.E. (Sambalpur University)	Electrical Maintenance
43	Sawalkar D. K.	Assistant Registrar	MBA (Marathwada University)	Estate Office
44	Saxena Indu	Deputy Registrar	Ph.D. (Jamnalal Bajaj Instt.)	Administration
45	Sengupta K.	Sports Officer (SG)	Ph.D. (Gwalior)	Gymkhana
46	Shah Nisha	Incharge (Hospital), CMO (NFSG)	MBBS (Nagpur), MD (Nagpur), Executive Master of Business Administration (EMBA), National Institute of Business Management, Chennai	IIT Hospital
47	Shetye Asmita S.	Project Manager	B.E Electronics (Mumbai University)	ASC (Application Software Cell)
48	Shinde Madhukar P.	Assistant Registrar (Contract)	LLB (Mumbai)	Administration
49	Siriah Pankaj Gopal	Computer Engineer(SG)	M.Tech. (IIT Bombay)	Computer Sc. & Engineering
50	Solanki Manohar R.	Senior Programmer	M.Sc.(Mumbai University)	ASC
51	Sonawane Yogesh	Asstt. Workshop Supdt.	M.Des. (IIT Kanpur)	Mechanical Engg.
52	Srikant Banumathy	Sr. Medical Officer	MBBS (M. S. Ramaiah Medical College, Karnataka)	IIT Hospital
53	Sundaresan Sivakami	Assistant Registrar	P.G.Diploma (Financial Management), (Annamalai University)	Dean R & D Office

Sr. No.	Name	Position	Qualification	Department
54	Tagare Amita A.	Counsellor	M.A. (Pune University)	Dean SA Office
55	Tirmare P.V.	Computer Engineer	M. Tech (Dr. Babasaheb Ambedkar Technological University, Lonere)	Computer Centre
56	Unnithan K.R.P	Executive Engineer	B.E. Civil Engineering (Mumbai University)	Estate Office
57	Varma Narsingh	Executive Engineer	M.Tech. (IIT Bombay)	Estate Office
58	Verma Hari Shankar	Assistant Registrar	M.A. (Kanpur University)	Academic Section
59	Vichare Sunil Y.	Computer Engineer	B.E (Walchand College, Sangli)	Computer Centre
60	Vinjamur Sugandhi	Senior Programmer	MCA (Osmania University)	ASC
61	Vinodkumar R. Prasad	Assistant Registrar (Contract)	Ph. D. (Mumbai)	Administration
62	Waydande Hindurao S.	Dy. Librarian	Ph. D. (Pune University)	Central Library
63	Yadav Pritesh Ghisalal	Asst. Sports Officer	M. Phil (Vinayak Mission University)	Gymkhana
64	Yadav S.S.	Senior Sports Officer	Ph.D. (Gwalior)	Gymkhana

Scientific/Design Staff - In Alphabetical Order

1	Aiyar R.P.R.C.	Prin.Res.Scientist	Ph.D. (IIT Bombay)	CRNTS
2	Gandhi Mayuri	Research Scientist	Ph.D. (IIT Bombay)	CRNTS
3	Kalwankar Arun	Producer-cum-Designer	Dip.in Fine Arts (Drg.&Ptg.)	C-DEEP
4	Mombasawala L. S.	Sr.Research Engineer	M.Tech. (IIT Bombay)	CRNTS
5	Mukherji Shyamalee	Sr.Research Engineer	Ph.D. (IIT Bombay)	CSRE
6	Vijayalakshmi S.	Research Scientist	Ph.D. (IIT Bombay)	CRNTS