Indian Institute of Technology Bombay, the second IIT to be set up in 1958, is recognised worldwide as a leader in the field of engineering education and research. It is reputed for the quality of its faculty and the outstanding calibre of students graduating from its undergraduate and postgraduate programmes.

The institute has a total of 15 academic departments, 16 centres, one school and four Interdisciplinary programmes. Over the last five decades, more than 48,000 engineers and scientists have graduated from the institute. It is served by more than 600 faculty members considered not only amongst the best within the country, but are also highly recognised in the world for achievements in the field of education and research. The Institute is recognized as one of the top centres of academic excellence in the country. Over the years, there has been dynamic progress at IIT Bombay in both academic and research activities, including a parallel improvement in facilities and infrastructure to keep it on par with the best institutions in the world.

Visit: www.iitb.ac.in
Introduction

CHAIR PROFESSORS

Chair is the term given to endowed professorships. It has a rich history and prestige that has remained unchanged over the years. The first endowed professorships in basic science and medicine were established in 1546 by Henry VIII. Later private individuals began donating the funds for chairs, with one of the firsts being the Lucasian Chair in Mathematics, given to Sir Isaac Newton in 1669.

The honor of being appointed to an endowed chair has not changed through the years. It is one of the highest honors awarded in the academic arena and is reserved for the top faculty members at IIT Bombay as an acknowledgement of their contributions to research and teaching.

The prestige of an endowed chair also lends an additional cachet to the departments. It helps to attract the best and brightest young students and investigators thus securing the future of the institution. It is clear why endowed Chairs are an essential constituent of IIT Bombay. This is what would be seen in many other outstanding educational institutions worldwide.

HOW IT WORKS

Appointments to the Chairs are made by various committees headed by the Director of IIT Bombay, with field experts and institute functionaries as members and a nominee of the donor as an observer. Selection is based on peer reviews of the overall research achievements and other achievements in the recent past. Contributions made to the growth of the institute are given due weightage.
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<th>Donors' Information</th>
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<td>1. Prof. Bijnan Bandyopadhyay <strong>SYST &amp; CTRL</strong></td>
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<td>5. Prof. Jayesh Bellare <strong>CL</strong></td>
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<td>12. Prof. Subhasis Chaudhuri <strong>EE</strong></td>
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<td>13. Prof. A.Q. Contractor <strong>CHEM</strong></td>
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<td>14. Prof. M. C. Deo <strong>CE</strong></td>
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<td>15. Prof. Yogesh M. Desai <strong>CE</strong></td>
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<td>16. Prof. T. I. Eldho <strong>CE</strong></td>
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<td>17. Prof. B. G. Fernandes <strong>EE</strong></td>
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<td>18. Prof. Sudhir Ghorpade <strong>MATHS</strong></td>
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<td>19. Prof. Kannan Iyer <strong>ME</strong></td>
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<td>20. Prof. Suhas S. Joshi <strong>ME</strong></td>
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<td>21. Prof. Vinay Anant Juvekar <strong>CL</strong></td>
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<td>22. Prof. Krishna P. Kaliappan <strong>CHEM</strong></td>
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<td>23. Prof. Tarun Kant <strong>CE</strong></td>
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<td>24. Prof. K.P. Karunakaran <strong>ME</strong></td>
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<td>25. Prof. Sambasivarao Kotha <strong>CHEM</strong></td>
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<td>26. Prof. Ajit Kulkarni <strong>MET ENG. &amp; MAT. SC.</strong></td>
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<td>27. Prof. Goutam Kumar Lahiri <strong>CHEM</strong></td>
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<td>28. Prof. Surjya Kumar Maiti <strong>ME</strong></td>
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<td>29. Prof. D. Manjunath <strong>EE</strong></td>
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<td>Prof. Anurag Mehra</td>
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<td>Prof. Shabbir N. Merchant</td>
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<td>Prof. Ramaswamy Murugavel</td>
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<td>Prof. Dulal Panda</td>
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<td>Prof. Amiya Kumar Pani</td>
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<td>Prof. D. Parthasarathy</td>
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<td>Prof. G. G. Ray</td>
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<td>Prof. Indradev Samajdar</td>
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<td>Prof. Pratul Kumar Saraswati</td>
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<td>Prof. Virendra Sethi</td>
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<td>Prof. Vishnu Dutt Sharma</td>
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<td>Prof. Harkesh B. Singh</td>
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<td>Prof. T. N. Singh</td>
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<td>Prof. Milind Sohoni</td>
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<td>Prof. S. Sudarshan</td>
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<td>Prof. Akkihebbal K. Suresh</td>
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<td>58</td>
<td>Prof. Urjit A. Yajnik</td>
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IIT Bombay has 77 Chairs. Of these, 58 have already been filled. 24 Chairs have been established with generous donations from alumni and other friends of the institute. In addition, IIT Bombay has also created Institute Chairs.
J.R. ISSAC ASSISTANT CHAIR

The J.R. Issac Assistant Chair was set up with a donation from Mr. Vincent Fernandes, a 1975 batch graduate of Electrical Engineering from IIT Bombay, to honour his teacher and mentor, Prof J.R Issac, who retired from IIT Bombay in 1990. A renowned academic leader, Prof. Issac was instrumental in setting up the Computer Center and later the Department of Computer Science and Engineering at the Institute. The goal of this Chair is to recognize a young faculty member in Computer Science and Engineering department for his achievements at a young age and support his R&D activities.

G.K. DEVARAJULU CHAIR

The late Cavaliar Dr. G.K. Devarajulu, Founder Chairman of Lakshmi Machine Works (LMW) Group, was a legend in his own lifetime. At the age of 21, he succeeded in establishing Lakshmi Mills in the city of Coimbatore. In 1962, he established LMW and proved that well-equipped cotton ginning machines can be manufactured in Indian industries as well. Today, LMW is a leading textile machinery manufacturer in India and one among the top three in the world, for producing the entire range of spinning machinery. In the loving memory of late Dr. Devarajulu, the Chair was instituted with donation from Textile Machinery Manufacturer’s Association (India). The Chair is awarded to a renowned professor in specialization relevant to textile industry.

P. K. KELKAR CHAIR FOR NANO TECHNOLOGY

Dr. Purushottam Kashinath Kelkar is widely known as the Founder-Director and architect of Indian Institute of Technology in Kanpur, India, which was established in 1959. He was also responsible in the planning process for the establishment of IIT Bombay and later served as its
third Director. In recognition of his contribution to technical education, the Government of India conferred the title of Padma Bhushan on him in 1969. The P.K. Kelkar Chair was instituted through a donation by the alumni of 1962 batch of IIT Bombay, which was also the first batch to graduate from the Institute. The Chair is awarded to a professor who has been doing outstanding work in the field of Nanotechnology.

**FORBES MARSHALL CHAIR**

Internationally renowned, Forbes Marshall Group is a leader in process efficiency and energy conservation for Process Industry, with over seven decades of experience in building steam engineering and control instrumentation solutions. The company’s expertise lies in engineering customized systems that improve manufacturing processes, conserves energy and is environmentally sustainable. The Chair was instituted by the company for a professor who has been doing pioneering work in the field of Energy Science and Engineering.

**BAJAJ GROUP CHAIR**

Bajaj Group is an Indian conglomerate founded by Mr. Jamnalal Bajaj in the year 1926, at Mumbai. The group comprises 36 companies and its flagship company Bajaj Auto is ranked as the world’s fourth largest two-wheeler and three-wheeler manufacturer. Some of the notable companies of the Group include Bajaj Auto Ltd, Bajaj Finserv Ltd, Hercules Hoists Ltd, Bajaj Electricals, Mukand Ltd, Bajaj Hindusthan Ltd and Bajaj Holding & Investment Ltd. The group has involvement in various industries that include automobiles, home appliances, lighting, iron and steel, insurance, travel and finance. The group is currently headed by Mr. Rahul Bajaj. The Bajaj Group Chair was instituted at IIT Bombay, with financial support from the Group for a professor doing pioneering work in the area of Computer Science and Engineering.

**RAHUL BAJAJ CHAIR**

Mr. Rahul Bajaj is an Indian businessman, politician and philanthropist. He is the Chairman of well-known business conglomerate Bajaj Group. He joined the Bajaj Group in 1965 and since then has taken several initiatives and enabled the Company to achieve greater heights. He has been awarded with the nation’s third highest civilian award Padma Bhushan in 2001. Mr. Bajaj was also the Chairman
of IIT Bombay’s Board of Governors between 2003-2006. The Rahul Bajaj Chair Professor at IIT Bombay has been instituted by the Bajaj Group for a professor in the area of Mechanical Engineering.

**KAMALNAYAN BAJAJ CHAIR**

Mr. Kamalnayan Bajaj, the eldest son of Mr. Jamanalal Bajaj started shouldering family responsibilities from an early age. After completing his education from University of Cambridge, England, he returned to India to assist his father both in business and in social service. With tremendous foresight and a spirit of zestful enterprise, Mr. Kamalnayan Bajaj acquired ailing industrial units and then miraculously turned them around. He went on to expand the business by branching into manufacture of scooter, three-wheeler, cement, alloy casting and electricals. In 1954, he took over the active management of the Bajaj Group of companies. The Chair under his name has been instituted by the Bajaj Group for a professor doing pioneering work in the area of Electrical Engineering.

**RAMKRISHNA BAJAJ CHAIR**

Mr. Ramkrishna Bajaj, the younger son of Mr. Jamanalal Bajaj, took over after the demise of his elder brother Mr. Kamalnayan Bajaj in 1972. The younger Bajaj scion had a flair and panache for working with youth. He was elected as the Chairman of World Assembly for Youth (India) in 1961. He also held the office of the Managing Trustee of the Indian Youth Centers Trust, which conceived and created the Vishwa Yuvak Kendra in 1968, a trail-blazing organisation for youth development. The Chair under his name was instituted by the Bajaj Group for a professor from the Industrial Design Center working in the area of Design.

**D.L. SHAH CHAIR FOR INNOVATION**

Late Mr. D. L. Shah, the Founder of D.L. Shah Trust, was a man of vision, an industrialist of repute and a noted philanthropist. He made significant contributions to the Indian Industry in general, and the Machine Tool Industry in particular. The D.L. Shah Trust promotes and propagates the ideas and visions of its Founder by introducing systems, methods, mechanisms and practices to better the overall quality of life in India. The D.L. Shah Chair for Innovation was instituted with a donation from the Trust for a professor working in the field of quality and doing path breaking research and innovation that will have a positive
impact on the society.

**PRAMOD CHAUDHARI CHAIR FOR GREEN CHEMISTRY & INDUSTRIAL BIOTECHNOLOGY**

The Pramod Chaudhari Chair Professorship for Green Chemistry & Industrial Biotechnology was instituted at IIT Bombay with a donation by Mr. Pramod Madhukar Chaudhari and Mrs. Parimal Pramod Chaudhari, for a professor working in the area of Green Chemistry and Industrial Biotechnology. A distinguished alumnus of the Institute, Mr. Chaudhari graduated from IIT Bombay in the year 1971. He is the Founder-Chairman and Managing Director of Praj Industries Limited, which is a global leader in renewable energies and environmental technologies. Praj has been placed under the Forbes 200 Best Under a Billion Company in Asia, twice. Mr. Chaudhari has been voted amongst ‘Globally Top 100 People in Bio-energy Space’ by Biofuels Digest. His wife, Mrs. Parimal Pramod Chaudhari is the Managing Trustee of Praj Foundation and steers the CSR wing of the company.

**PRAJ INDUSTRIES CHAIR FOR ENERGY SCIENCES AND ENGINEERING**

Founded by IIT Bombay alumnus, Mr. Pramod Madhukar Chaudhari, Praj Industries is considered to be one of India’s most successful biofuels companies, taking bio-based technologies from India to the World. Today, Praj offers innovative solutions for beverage alcohol and bio-ethanol plant, brewery, water and waste-water treatment plant, critical process equipment and systems and bioproducts. A globally leading Company with over 600 references in more than 60 countries across five continents, Praj has acquired an international repute for responsible and reliable solutions. The Praj Industries Chair for Energy Sciences and Engineering was instituted by Praj Industries for a professor carrying out path breaking work in the area of Energy Science and Engineering.

**BISWAS-PALEPU DISTINGUISHED CHAIR IN DEPARTMENT OF CHEMISTRY**

Dr. Nagesh Palepu received his M.Sc. in Chemistry from IIT Bombay in 1972. Later, he obtained his Ph.D. in Pharmacuetics from the University of Iowa. A distinguished alumnus of the Institute, he is the Founder of TherDose Pharma, Hyderabad, and has made outstanding contributions to Global Pharmaceutical Industry as an entrepreneur and
business leader. Over the course of his distinguished career, Dr. Palepu has published over 25 journal articles and has over 50 US patents to his credit. The Biswas-Palepu Distinguished Chair was instituted at IIT Bombay with a donation from the Palepu Foundation for a professor carrying out commendable work in the field of Chemistry.

**CLASS OF 1985 CHAIR IN TECHNOLOGY & SUSTAINABLE DEVELOPMENT**

The alumni of class of 1985 have instituted a Chair Professorship for a professor who has done significant contribution in helping the nation’s sustainable development. The Chair is named as Class of 1985 Chair in Technology & Sustainable Development.

**MAHARASHTRA POLLUTION CONTROL BOARD CHAIR**

The Maharashtra Pollution Control Board (MPCB), established in September 1970, is responsible for implementing a range of environmental legislation in the state of Maharashtra, India. The MPCB functions under the administrative control of Environment Department of the Government of Maharashtra. The Maharashtra Pollution Control Board Chair was instituted by MPCB to support faculty from the Centre for Environmental Science and Engineering. The Chair Professorship is a recognition of the outstanding work being done by the faculty in the area of Environmental Technologies and Pollution Control.

**INDIA VALUE FUND CHAIR FOR HUMANITIES AND SOCIAL SCIENCES**

India Value Fund Chair for Humanities & Social Sciences was instituted at IIT Bombay with a donation by an alumnus from the batch of 1985 for a professor who has a broad and interdisciplinary perspective of any of the core fields of humanities and social sciences particularly in the context of engineering and technology education. The purpose of the Chair is to catalyze the activities in any of the core fields of Humanities and Social Sciences so that there could be tangible progress in the importance given to humanities and social sciences in engineering and technology education.

**JITENDRA K. & MEENA J. MEHTA CHAIR OF STRUCTURAL ENGINEERING**

The Jitendra K. & Meena J. Mehta Chair Professor was in-
stituted at IIT Bombay with a generous donation from Dr. Jitendra Mehta for a professor in the area of Structural Engineering. Dr. Mehta, who graduated from IIT Bombay in 1963, is the founder of Group M Engineers in Los Angeles. He has over 40 years of structural engineering experience in California that covers both commercial and residential facilities of many different types. His residential design experience ranges from single-family homes to multi-story apartments over concrete parking structures, and mixed-use buildings. His commercial design experience includes shopping centers, offices and large industrial buildings.

**HAL R&D Chair**

Hindustan Aeronautics Limited (HAL) is an Indian state-owned aerospace and defence company with headquarters in Bangalore, Karnataka. The government-owned corporation is primarily involved in the operations of the aerospace industry. These include manufacturing and assembling of aircraft, navigation and related communication equipment and airports operation. HAL has established the HAL R&D Chair for a professor of Department of Electrical Engineering in the area of Voice and Data Communication.

**Subrao M. Nilekani Chair**

The Subrao M. Nilekani Chair was instituted at IIT Bombay with a generous donation from Mr. Nandan Nilekani, a distinguished alumnus who graduated from the Department of Electrical Engineering in 1978. Mr. Nandan Nilekani is the Co-founder of Infosys Technologies and former Chairman of Unique Identification Authority of India (UIDAI). The Chair is named after his uncle Mr. Subrao M. Nilekani, for a professor in the area of Information Technology.

**Vijay and Sita Vashee Chair**

Mr. Vijay Vashee is an alumnus of 1975 batch from IIT Bombay. He joined Microsoft Corporation in 1982 as ‘employee number 160’ when Microsoft existed as a $25 million corporation. He is credited with running the first Windows seminar and for setting up the MS ISV program. He was also a major contributor to the 1.0 versions of Windows, Mouse, Works, Win, Excel and other products. He was involved in the successful marketing push for applications like Word, Excel, Works and Flight Stimulator to Mice, as well. Under his leadership, the $5 million business vertical grew into a $100 million enterprise. He was also the General Manager
of PowerPoint, and helped make it the number-one choice from its previous third-in-line status and grew the business from $100 million to $600 million. He instituted the Vijay and Sita Vashee Chair for a professor in the area of Information Technology.

**L&T CHAIR**

Larsen and Toubro or L&T as it is widely known, is one of India’s largest multinationals with offerings that span technology, engineering, construction, manufacturing and financial services. The L&T Chair was instituted by the company for a professor in the Department of Mechanical Engineering or Chemical Engineering.

**N.R. KAMATH CHAIR FOR INSTITUTIONAL EXCELLENCE**

The N.R. Kamath Chair for Institutional Excellence was set up by the alumni who graduated between 1962 and 1973. The Chair is named after late Prof. N. R. Kamath who played a decisive role as an academician and administrator during the formative phase of growth of not only the Chemical Engineering Department of IIT Bombay but also of the Institute. Prof. Kamath was the first Deputy Director of the Institute and is credited with being responsible for setting up the academic systems of IIT Bombay. The NR Kamath Chair is for a visiting professor to spend one semester at the Institute.

**MADHURI SINHA CHAIR PROFESSOR**

Madhuri Sinha Chair Professor was set up with a generous donation from Dr. Krishna Sinha who is a Cardiologist in Denver, Colorado and is affiliated with St. Anthony North Hospital. He received his medical degree from Patna Medical College and has been in practice for nearly 60 years. The Chair is for a professor from the Department of Bioscience and Bioengineering or any other Department working in the field of Bioengineering.
Prof. Bijnan Bandyopadhyay  
SYSTEMS AND CONTROL ENGINEERING  

ACADEMIC BACKGROUND  
B.E., Indian Institute of Engineering Science and Technology (Formerly B.E.College, Shibpur, Calcutta University), 1978  
Ph.D., IIT Delhi, 1986

RESEARCH INTERESTS  
Multi-rate Output feedback Discrete Time Sliding Mode Control  
Continuous and Discrete Time Sliding Mode Control  
Higher Order Sliding Mode Control  
Large Scale Nuclear Reactors Modeling and Control  
Systems Reduction and Large Scale Systems

ABOUT PROF. BANDYOPADHYAY  
Prof. Bandopadhyay has 30 years of experience in Academia in India and Abroad. He has been convener of IDP in Systems and Control Engineering during 2000-2006. He has served as Professor-in-Charge of CE-QIP office during 2012-2015. Presently he is the convener of IDP in Systems and Control Engineering. He is the mentor and performance auditor of 4 institutions in India under the TEQIP programme. He also serves as Academic Assessor of University of Putra, Malaysia.

His work in the area of sliding mode and output feedback control has lead to significant and fundamental contributions to the theory of discrete time sliding mode control using multirate output feedback. These results are breakthroughs as a complete solution for discrete time sliding
mode was not available. His results on discretization show a new research direction on discretization of sliding modes. He developed a novel sliding surface incorporating variable damping. He has made significant contribution in the spatial control of pressurized Heavy Water Reactor. This type of reactor is under operation at Trombay, India. He has for the first time developed a mathematical model represented by 70th order state-space model using nodal technique. He has applied several modern control techniques to this model.

Prof. Bandyopadhyay has published 10 books out of which 7 are monographs in LNCIS and LNEE in Springer Verlag in the area of sliding mode control, model order reduction and fractional order systems. He has published more than 120 articles in refereed international journals including IEEE transactions, Automatica, IET Proceedings etc. He has also authored 200 papers in international conferences and 30 in national conferences. He has been a visiting Professor at the Centre for System Engineering and Applied Mechanics (CESAME) Louvain-la-Neuve, Belgium; Lehrstuhl fur Elektrische Steuerung und Regelung, Ruhr Universitat Bochum, Germany, Okayama University, Japan and many more Universities all around the world.

He was awarded Alexander Von Humboldt Fellowship, Germany, Fellow of INAE, Fellow of IETE and a Senior Member of IEEE. He as one of the team members has also received the U.K. India Education and Research Initiative Major Award in 2007. He was awarded Distinguished Visiting Fellowship by Royal Academy of Engineering, London in 2009 and 2012.
Prof. Santanu Bandyopadhyay
DEPARTMENT OF ENERGY SCIENCE AND ENGINEERING

ACADEMIC BACKGROUND
B.Tech. (Hons.), IIT Kharagpur, 1992
M. Tech., IIT Bombay, 1995
Ph.D., IIT Bombay, 1999

RESEARCH INTERESTS
Pinch analysis and energy integration of different processes and processes equipments
Resource and waste management in process industries through process integration approach
Modelling, analysis and optimization of renewable energy systems

ABOUT PROF. BANDYOPADHYAY
Prof. Bandyopadhyay joined the Department of Energy Science and Engineering in IIT Bombay in 2001. Prior to this, he worked with the Heat and Mass Transfer Division of M/s Engineers India Limited, New Delhi. He was involved with the projects such as process design and development of energy integration techniques for Crude and Vacuum Distillation Unit, establishment of energy benchmarks and identification of energy conservation opportunities for different primary and secondary units in Indian Refineries, detailed energy audit of entire Gujarat Refinery Complex, process design and engineering package of Gas Dehydration Unit, etc.

Prof. Bandyopadhyay has been associated with and contributed significantly towards various developmental, industrial, and research activities involving different structured...
approaches to industrial energy and water conservation as well as optimum design of renewable energy systems. He is an internationally recognized researcher on Pinch Analysis - an analytical tool for industrial resource conservation. He has developed many computationally efficient algebraic methodologies to conserve various resources (for instance, energy, water, hydrogen, raw materials, cooling water, etc.) in process industries. Methodologies developed by Prof. Bandyopadhyay are used in many industrial applications.

Prof. Bandyopadhyay has active collaborations with international researchers in De La Salle University, Philippines; University of Nottingham, Malaysia; and others. He has been an Associate Editor for Clean Technologies and Environmental Policy since 2013 and has been an editorial board member for Frontiers in Energy Research Process and Energy Systems Engineering, International Journal of Renewable Energy Research and Development, Journal of Solar Energy, etc.

He has published more than 90 journal papers, has written four book chapters and is a recipient of Best Professor in Energy Science and Engineering award, Asian Education Leadership Award, and IRCC Research Paper Award for the year 2012.
Prof. Rangan Banerjee
DEPARTMENT OF ENERGY SCIENCE AND ENGINEERING

ACADEMIC BACKGROUND
B.Tech., IIT Bombay, 1986
Ph.D., IIT Bombay, 1991

RESEARCH INTERESTS
Energy Efficiency and Management
Energy Systems Engineering (Energy Modelling, Technology Assessment & Forecasting)
Energy Planning and Policy.

ABOUT PROF. BANERJEE
Prof. Banerjee is the Forbes Marshall Chair Professor in the Department of Energy Science and Engineering at IIT Bombay. He was responsible for creating a new Department of Energy Science and Engineering in 2007 and was appointed as its first Head. He has also been the Associate Dean (R&D) and later Dean (R&D) at the Institute.

Prof. Banerjee has worked on industrial energy efficiency and on creating new methodologies for model based benchmarking. These methodologies have been illustrated for industrial furnaces for the manufacture of glass, dump trucks and water pumping in mining. Another area of his research has been the optimal scheduling of industrial processes, cool storage and co-generation in response to time varying tariffs. He has been involved in developing a 1 MW grid connected solar thermal power plant that combines a parabolic trough field using heat transfer oil and a linear Fresnel reflector field generating steam with buffer
storage. This project includes building a simulator for solar thermal power plants and a test facility for component testing. The power plant and facility have been commissioned and handed over to the National Institute of Solar Energy in March 2015.

Prof. Banerjee is a co-author of four books including the one on Engineering education in India and Demand Side Management in the Power Sector. He has been on the editorial board of International Journals of Thermodynamics, Sustainable Energy & Sustainable Engineering. He was appointed as Convening Lead Analyst (CLA) and Executive Committee Member of the Global Energy Assessment (GEA), International Institute for Applied Systems Analysis (IIASA) (2009-2012). He is a member of the TIFAC Technology Vision 2035 - Apex Committee and Chairman of the Energy Technology Theme. He was a member of the International Panel of RCUK Review of Energy 2010. He has been awarded a patent for porous gas diffusion electrodes for electrochemical applications.
Professor Rinti Banerjee

Department of Biosciences & Bioengineering

Academic Background
MBBS, BJ Medical College, University of Pune, 1996
Ph.D., IIT Bombay, 1999
Post Doctoral, University of California, San Francisco, 2001

Research Interests
Nanomedicine: Nanostructured materials for biomedical applications

Drug delivery: Innovative drug delivery strategies for controlled and trigger responsive drug release, technologies for non-invasive drug delivery through oral, aerosol, intranasal, transdermal routes

Biomaterials, Tissue Engineering and Medical Devices: Low cost technologies for global health

About Prof. Banerjee
Prof. Rinti Banerjee has been a faculty member at the Department of Biosciences & Bioengineering in IIT Bombay since 2001 and is also associated with the Centre for Research in Nanotechnology and Science. She has more than 15 years experience in Biomedical Engineering specifically in the areas of nanostructured materials for biomedical applications, drug delivery, biomaterials, medical implants and tissue engineering.

Her research has led to the development of novel patented technologies in the areas of drug delivery, biomaterials and medical devices. These include surface active nanovesicles as aerosols for therapy in Neonatal Respiratory Distress Syndrome, anti-oxidant and anti-inflammatory drug load-
ed surfactants in Acute Respiratory Distress Syndrome and critical lung injuries, and fluidizing nanoparticles incorporated within cosmetics for transdermal delivery of folic acid as part of the Grand Challenges Exploration Global Research Scheme by the Bill and Melinda Gates Foundation. She has also designed nanobubble complexes that respond to external ultrasound stimuli allowing on demand release of drugs from the nanoparticles for simultaneous imaging and drug delivery using ultrasound as part of the prestigious Samsung Global Research Outreach program. Another contribution of her research has been the development of stimuli responsive smart materials that respond to changes in pH, and enzyme levels for site specific drug delivery in lung and breast cancers. These technologies have been recognized as one of the most innovative healthcare technologies by MIT Technology Review, USA, recipient of the Lockheed Martin India Innovation Award and showcased as a promising Indian invention in the magazine “The Economist”.

Prof. Banerjee is the Associate Editor of the Journal of Biomaterials & Tissue Engineering and is on the editorial board of Scientific Reports, Drug Delivery & Translational Research and many other international journals. She has published nine book chapters/books and more than 100 papers in international journals of repute including Chemical Reviews, Nanomedicine, Nanoletters, Journal of Controlled Release, etc. She has 17 patents filed or granted to her credit. She has authored several editorial articles for international journals including Nanomedicine, Drug Delivery and Translational Research and Chest.

Dr. Banerjee has received several awards in recognition of her work including the prestigious CDRI award for Excellence in Drug Research, DST-Lockheed Martin India Innovation Award, NASI-Reliance Industries Platinum Jubilee Award for Biological Sciences, National Award for Women Bioscientists, Indo-US Frontiers of Engineering, Annual Felicitation Award from the Society for Cancer Research and Communications and several other national and international awards.
Prof. Jayesh Bellare

DEPARTMENT OF CHEMICAL ENGINEERING

ACADEMIC BACKGROUND

B.Tech., IIT Bombay, 1982
Ph.D., University of Minnesota, 1988
Post-doctoral fellow, University of Massachusetts, Amherst, 1989

RESEARCH INTERESTS

Electron microscopy, particularly cryo-electron microscopy of complex liquids and soft solids
Nanostructured materials for healthcare
Biomedical devices

ABOUT PROF. BELLARE

Prof. Bellare focuses on the cross-disciplinary area of nanotechnology for human health care. He has interests and extensive experience in the fields of nanotechnology, cryo-electron microscopy, nanostructured materials, hollow-fiber membranes, biomedical devices, and nanomedicines. Currently, his research group is involved into nanoparticles for drug delivery, biomedical devices, tissue-engineered bone grafts, nanoclay-polymers, hollow-fiber dialysis membranes, complex liquids, soft solids and stem cells, particularly their expansion with 3D scaffolds. Of particular significance is the pioneering work on nano-medicines that spans all three medicinal systems: Allopathic (“modern”), Ayurvedic (“traditional”) and Homeopathic (“alternative”). The nano-carboplatin is the first Indian nanomedicine to reach human trials for retinoblastoma. The research group showed the nanoparticle basis of super-dilute Homeopathic medicines, explaining a century-old controversy relating to super-Avogadro dilution.
Holes in hearts and other defects in newborn babies can be resolved better with the new design of occlusion devices for minimally invasive surgery. The hollow fiber membranes with nano-additives would impact kidney dialysis significantly. The work in nano-bioengineering hopes to have an enduring influence on healthcare technologies.

Prof. Bellare is widely known and appreciated for his work and he is on the Research Advisory Committees or Institute Bodies of several Institutions like the Institute of Life Sciences, Bhubahneshwar; the Central Electrochemical Research Institute, Karaikudi and many more. He is a consultant to several industries, advisor to many Government panels, and has served on the Board of Directors of Haffkine Bio-Pharma and Yash Nanotech.

He has over 130 papers in peer-reviewed journals of national and international repute, to his credit. He has over a dozen patents applied for and six granted. Prof. Bellare is an elected Fellow of the National Academy of Science, India; the Indian National Academy of Engineering; the Maharashtra Academy of Sciences; and the Electron Microscopy Society of India. He has received numerous awards including the Distinguished Visiting Professorship at the University of Minnesota, USA and the National Academy of Sciences India-Reliance Platinum Jubilee Award for application-oriented research.
Prof. Bhargava, Founder Director of Management Institute JKLJ Jaipur, is an Institute Chair Professor and the Head of Shailesh J Mehta School of Management, IIT Bombay. His past teaching and research association has been with IIM Lucknow and IIM Ahmedabad. His major contribution is in the field of cognitive algebra which has shown that people impute missing information in giving their judgement and decision. Depending on the demand of the task people use cognitive rules. In the context of performance, organizational structure has major impact in addition to the ability and motivation of the person. Leadership (supervisory) and organizational support play key role in management of any person’s performance. Recently, it has been demonstrated that value based leadership is the key to sustain the organizational performance and organizations must put effort to develop talent climate. At present, Prof. Bhargava is working on entrepreneurial leadership with

**RESEARCH INTERESTS**

- Performance Management - Psychological Contract, Engagement and Trust
- Talent Management and Skill (Leadership) Development
- Entrepreneurial Learning and Orientation

**ABOUT PROF. BHARGAVA**

Prof. Bhargava, Founder Director of Management Institute JKLJ Jaipur, is an Institute Chair Professor and the Head of Shailesh J Mehta School of Management, IIT Bombay. His past teaching and research association has been with IIM Lucknow and IIM Ahmedabad. His major contribution is in the field of cognitive algebra which has shown that people impute missing information in giving their judgement and decision. Depending on the demand of the task people use cognitive rules. In the context of performance, organizational structure has major impact in addition to the ability and motivation of the person. Leadership (supervisory) and organizational support play key role in management of any person’s performance. Recently, it has been demonstrated that value based leadership is the key to sustain the organizational performance and organizations must put effort to develop talent climate. At present, Prof. Bhargava is working on entrepreneurial leadership with
the assumption that entrepreneurship is the outcome of mind-set.


Prof. Bhargava is the first recipient of VKRV Rao Award by the ICSSR, New Delhi, MPCOST Young Scientist Award by the MP Young Science Congress Association & MP Council of Science and Technology as well as the ISCA Young Scientist Award by the Indian Science Congress Association. Some of his recent recognitions are Best Paper Award (2012) by the Academy of Management, Boston, USA, Best Paper Award (2010) by the International Human Resource Management, Birmingham, Aston, UK, and the prestigious Emerald Literati Network Award for Excellence in 2010.
Prof. Pushpak Bhattacharyya
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC BACKGROUND
B.Tech., IIT Kharagpur, 1984
M.Tech., IIT Kanpur, 1986
Ph.D., IIT Bombay, 1994

RESEARCH INTERESTS
Natural Language Processing (NLP)
Machine Learning (ML)
Artificial Intelligence (AI)

ABOUT PROF. BHATTACHARYYA
Prof. Bhattacharyya is a Vijay and Sita Vashee Chair Professor with the Department of Computer Science and Engineering in IIT Bombay since August, 2014. Since mid-90s, he has been making seminal contributions in Natural Language Processing through his research, by educating, guiding and mentoring, leading national and international projects of importance, providing consultation, organizing international conferences and symposia, rendering service as chair and member of professional bodies. The theme of his research is “Multilingual Computation”, and his work shows that languages of the world can help one another for their computation. Of particular impact has been his research on WordNets and Multilingual Word Sense Disambiguation (WSD), where the idea of “projection” has been picked up in many other areas of NLP. The work by Prof. Bhattacharyya and his research team have resulted in widely used systems, resources and tools, such as Sandhan - Indian language search engine and Shata-Anuvadak - Indian language translation engine. His work on IndoWordNet...
is serving as the foundation and standard-defining document for development of Indian language WordNets as the crucial resource for automatic translation and search.

Prof. Bhattacharyya is a Fellow of the Indian National Academy of Engineering. He is a member of Association of Computational Linguistics, Association of Computing Machinery, and Computer Society of India. He has also been associated with University Joseph Fourier, Stanford University, University of Houston, Kyoto University, Ministry of IT, IBM, Microsoft Research, Google, Yahoo, Facebook, and HP Labs. He is the author of “Machine Translation”, which released on January 22, 2015. In 2016, he will be President of ACL, first time for any Indian.

Prof. Bhattacharyya is a recipient of numerous awards and honours. He has received Dr. P.K. Patwardhan Technology Development Awards by IIT Bombay, ‘Manthan’ by the Ministry of IT and VNMM award by IIT Roorkee. He is recipient of Faculty grant awards from IBM, Microsoft, Yahoo and HP Labs. He has headed projects of national importance on Machine Translation, Search, Information Extraction, and Language Resources funded by MIT, MHRD and DST, Government of India. He has also led high-end projects on Semantic Search, Information Extraction, Linked Open Data, and Text Analytics funded by Microsoft Research, IBM, Tata Consultancy Services, and Media Lab Asia and a project on Deep Semantics from United Nations.
About Prof. Biswal

Prof. T.K. Biswal, started his career as a geologist in Geological Survey of India in the year 1981. He served the Department for 13 long years during which he was assigned field mapping of Aravalli mountain belt, Eastern Ghats Mobile Belt and Himalayas mountain belt. He joined IIT Bombay in the year 1994 went on to serve as the head of the Department of Earth Sciences during the year 2008-2011. He was also, the Organizing Vice Chairman of GATE in 2005 and is currently an Institute Chair Professor with IIT Bombay.

Prof. Biswal has made innovative contributions towards the structural and tectonic study of the terrane margin - thrust belts of the Indian Peninsula. These include analysis of shear kinematics, strain estimation, SHRIMP zircon geochronology and paleomagnetism of dykes that provide major keys to the reconstruction of the Supercontinent.
assembly.

He has been a member of Geological Society of India, Bangalore; Mineralogical Metallurgical Society of India, Calcutta; International Association for Structural and Tectonic Geologist, London; and International Association for Gondwana Research, Japan. He has authored and edited two books and has published more than 30 research papers.

Prof. Biswal has been awarded the Best Paper Medal by the Mineralogical Metallurgical Society of India, Kolkata, National Mineral Award in Basic Geosciences by Ministry of Mines, Government of India and is a three-time recipient of Excellence in Teaching Award of IIT Bombay.
Prof. Borkar is a Professor at the Department of Electrical Engineering in IIT Bombay since 2011. Prior to this, he has worked with TIFR, Mumbai, IISc, Bangalore, TIFR-CAM, Bangalore, and has also been a visiting Scientist at Technische Hogeschool Twente, Holland.

His research has primarily been in the areas of stochastic control which includes Markov chains and diffusions (average cost, risk-sensitive, self-tuning control, control under partial observations); stochastic algorithms which includes convergence and stability analysis and sample complexity of stochastic recursions, multiple time scale and asynchronous schemes, applications to resource allocation in communications, reinforcement learning for approximate dynamic programming, etc.; and network algorithms which includes gossip algorithms for consensus and its variants, algorithms for averaging and ranking, etc has been widely appreciated.

Prof. Borkar has been a Visiting Scientist or Professor at
Institute For Mathematics and its Applications (Minneapolis), MIT, University of Maryland at College Park, University of Illinois at Urbana-Champaign, and University of California at Berkeley. He has been an author or co-author of 6 books.

His research has been recognized with various awards and honours. He has been awarded the Homi Bhabha fellowship, J. C. Bose fellowship, S.S. Bhatnagar Award in Engineering, TWAS award for engineering, IBM SUR Award, Mankar gold medal, Mahalanobis Medal of INSA and many more. He is also the recipient of Best paper awards by IEEE Control Systems Society, VALUETOOLS, IFIP Wireless Days. He is a Fellow of INAE, NASI, IASc, INSA, IEEE, TWAS and AMS.
Prof. Supratik Chakraborty  
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC BACKGROUND
B.Tech., IIT Kharagpur, 1993  
M.S., Stanford University, 1995  
Ph.D., Stanford University, 1998

RESEARCH INTERESTS
Formal verification of software and hardware systems  
Automata theory and its applications  
Logic and finite model theory  
Design and analysis of asynchronous systems  
Applications of formal methods to systems biology

ABOUT PROF. CHAKRABORTY
Prof. Chakraborty is currently the Bajaj Group Chair Professor of Computer Science and Engineering at IIT Bombay. After completing his Ph.D. from Stanford University, Prof. Chakraborty spent a year as a Member of Research Staff in the Advanced CAD Research group at Fujitsu Laboratories of America Inc, USA. Shortly afterwards, he joined the faculty of the Department of Computer Science and Engineering at IIT Bombay, and has been there ever since. He has been a Principal Investigator in the Centre for Formal Design and Verification of Software at IIT Bombay for more than 15 years. Prof. Chakraborty has successfully executed more than 15 sponsored research/consultancy projects for the industry and government organizations, and has conducted in-house training programs for several industrial houses. Currently, he also serves on the Technical Advisory Board of Microsoft Research India Pvt. Ltd, and is a member...
of the Executive Council of ACM (Association for Computing Machinery)-India, and of IARCS (Indian Association for Research in Computing Science). He is also a member of the Scientific Board of the Mysore Park Workshop Series in Computer Science.

Prof. Chakraborty’s research is primarily concerned about the theory and practice of formal methods for analysis and verification of computer systems, and recently, of biological systems. He has worked on designing algorithms for scalable and precise analysis of software as well as hardware systems to check if they satisfy specified properties. He has collaborated extensively with the industry and government research organizations in these areas, and together with his students, has produced tools that are used in these organizations. Recently, in collaboration with cancer cell biologists, he has been exploring the use of formal methods to study complex molecular regulatory processes in biological systems. Prof. Chakraborty also actively works on designing practically efficient algorithms with strong approximation guarantees for combinatorially hard problems, like model counting and almost-uniform sampling of solutions from a system of constraints. He has also worked on the theory of finite automata on infinite words, and proposed several optimizations and improvements to existing algorithms for complementation, determinization and disambiguation of such automata. Prof. Chakraborty’s other active research interests include the study of logic and finite model theory. In this area, he has recently contributed, along with his students and colleagues, to generalizing a classical preservation theorem in first-order logic. Prof. Chakraborty was also actively involved in the design and efficient analysis of asynchronous systems in the past, and continues to maintain an interest in this area.

Prof. Chakraborty has won various accolades since his college days. He was the recipient of the President of India Gold Medal and Institute Silver Medal from IIT Kharagpur in 1993. He has won an Intellectual Property Award by Fujitsu Laboratories of America Inc. and is a proud recipient of the Excellence in Teaching Award by IIT Bombay. He held the James R. Isaac Chair for Assistant Professor in Computer Science and Engineering at IIT Bombay from 2003 to 2005. He was awarded the INAE Young Engineer Award in 2005, and won the IBM Faculty Award in 2007.
Prof. Sharat Chandran

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC BACKGROUND

Ph.D., Computer Science, University of Maryland, 1989

RESEARCH INTERESTS

Computer Vision, Computer Graphics, and Image Processing
Parallel Computation

ABOUT PROF. SHARAT CHANDRAN

Prof. Sharat Chandran is an Institute Chair Professor at the Department of Computer Science and Engineering in IIT Bombay. He has held academic and engineering appointments at IIT Bombay; University of Maryland, College Park (USA); Stanford University (USA); Oracle Corporation (USA); NTT (Japan); and Schlumberger (USA).

Prof. Sharat Chandran has made noteworthy contributions in the form of archival journal articles and peer reviewed conference publications in visual computing and high performance computation. He is considered one of the foremost researchers and practitioners in the general area of visual computing, particularly marked by his versatility. Some of his significant contributions are in the emulation of the wave-particle theory of electro-magnetic waves in an algorithmic computer science rendering framework, and in unifying point-based graphics, image based rendering, and traditional polygon based rendering. In computer vision, he has pioneered vision-based applications such as intelligent projectors. In medical imaging, along with his students he has come up with the idea of segmentation...
using heterogeneity rather than homogeneity for tumour detection in histopathological images.

Prof. Sharat Chandran has been a recipient of several best paper awards, Young Scientist Award from the Government of India, and Career Award from AICTE.
Prof. Subhasis Chaudhuri

DEPARTMENT OF ELECTRICAL ENGINEERING

ACADEMIC BACKGROUND

B.Tech., IIT Kharagpur, 1985
M.Sc., University of Calgary, Canada, 1987
Ph.D., University of California, San Diego, USA, 1990

RESEARCH INTERESTS

Motion analysis and tracking
Data clustering and pattern recognition
Super-resolution imaging
Computational photography
Computational Haptics

ABOUT PROF. CHAUDHURI

Prof. Chaudhuri is the Kamlnayan Bajaj Chair Professor, Deputy Director (Academic and Infrastructural Affairs) & Professor at the Department of Electrical Engineering in IIT Bombay. He works in the area of image processing and computer vision. He has also been working in the area of computational haptics. Some of the areas where he has contributed significantly include depth from defocus and image super-resolution. Other areas of contribution include blind deconvolution, hyper-spectral image visualization and classification of land cover maps in remote sensing images. In the area of haptics, his major contribution lies in haptic rendering of point cloud data.

His research work has been recognized with many awards and honours in the country and abroad. He is a recipient of G.D. Birla Award for Scientific Research, NASI-Reliance...
Industries Platinum Jubilee Award for Application Oriented Innovation, J.C. Bose National Fellowship and Prof. H.H. Mathur Excellence in Research Award from IIT Bombay. He is also a winner of Shanti Swarup Bhatnagar Prize in Engineering Sciences, Swarnajayanti Fellowship and Hari Om Prerit, Dr. Vikram Sarabhai Research Award.

Prof. Chaudhuri has been on the editorial boards of IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) during 2006-2008, International Journal of Computer Vision (IJCV) since 2004. He has published over 250 papers in various journals and conferences. He has also been a Visiting Professor at several international universities like the University of Paris Sud, France, Technical University of Munich, Germany, University of Erlangen, Germany and National University of Singapore.
INSTITUTE CHAIR

Prof. A. Q. Contractor
DEPARTMENT OF CHEMISTRY

ACADEMIC BACKGROUND

B.Sc., Bombay University, 1971
M.Sc., IIT Bombay, 1973
Ph.D., IIT Bombay, 1978

RESEARCH INTERESTS

Physical Chemistry, Electrochemistry
Chemical and Bio Sensors
Drinking water quality testing and monitoring

ABOUT PROF. CONTRACTOR

Prof. Contractor is an Institute Chair Professor at the Department of Chemistry in IIT Bombay. Prior to joining IIT Bombay in 1984, he was a Post-Doctoral research fellow at Carleton University, Ottawa, Canada and a Research Associate at Texas A&M University, College Station, USA. He is also the founding member of a company which produces portable sensor-based systems for testing drinking water and soil.
His research work include understanding the electrochemistry of conducting polymers such as polyaniline, polypyrrole and polythiophenes. The application of conducting polymers in sensing and actuation. First report of a biosensor (glucose) based on polyaniline and subsequent work to show proof-of-concept for various biomolecules such as antigen-antibody, ssDNA and whole cell sensing (e.coli).

He has almost 56 journal publications and four patents to his credit.
Prof. M.C. Deo
DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC BACKGROUND
B.E., Pune University, 1975
M.Tech., IIT Bombay, 1979
Ph.D., IIT Bombay, 1983

RESEARCH INTERESTS
Coastal and Ocean Engineering, Hydrology
Climate change Impact on coastal environment
Application of advanced data-driven methods

ABOUT PROF. DEO
Prof. Deo has been in the faculty of IIT Bombay since 1983 and has been involved in teaching, research, consultancy and administration at the Institute. During 1986 and 1989 he was a post-doctoral fellow at University of Liverpool U K. He was the Professor-in-charge, QIP at IIT Bombay during 2002-05, and was also the Head of Civil Engineering Department during 2005-08. He moreover, served as Director, VJTI, Mumbai, during 2011-12.

Through a very large number of applications, Prof. Deo demonstrated the power of various soft computing and artificial intelligence tools to solve engineering problems related to hydrology and coastal engineering. Examples of such problems are enhancing accuracy levels of various design parameters, retrieving missing data, real time prediction of river flows, waves, wind, currents and sediments. Region specific impact of climate change on waves, wind, wind power, shoreline changes has also been specified by him over various locations along the Indian coastline. The
large number of citations received by him indicates that his pioneering works inspired many researchers over the world, who took these leads further.

Prof. Deo has contributed to the growth of hydraulic engineering at the national level by acting as the President of Indian Society for Hydraulics during 2004-2008. He has been associated with several organizations such as Konkan Railways, ONGC, NIOT, CWPRS, NWA, INCH as member of their Board of Directors, Governing Council, Research Advisory Boards, etc. He acts as Editor of two international Journals: ISH Journal of Hydraulic Engineering, and International Journal of Ocean and Climate Systems, Multi-Science, UK. He also serves on editorial boards of four other international Journals. Prof. Deo has published more than 130 research papers so far including around 70 Journal publications. He has authored a 350-page book titled ‘Waves and Structures’, which is available as an open course ware.

Prof. Deo has received Prof. H H Mathur award and IRCC Research Award of IIT Bombay, Jalavigyan Puraskar of Indian Society for Hydraulics and outstanding Associate Editor award of ASCE.
Prof. Yogesh M Desai

DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC BACKGROUND

B.E., M. S. University, Vadodara, 1982
M.Tech., IIT Bombay, 1984
Ph.D., University of Manitoba, Canada, 1991

RESEARCH INTERESTS

Computational Mechanics with Emphasis on Finite Element Methods
Composite Mechanics
Analysis and Control of Wind Induced Vibrations

ABOUT PROF. DESAI

Prof. Desai is the Jitendra K. and Meena J. Mehta Chair Professor of Structural Engineering, Dean of Administrative Affairs and a Professor with the Department of Civil Engineering in IIT Bombay. He was Head of Civil Engineering Department from 2008 to 2011. Before joining IIT Bombay in 1995 as faculty, he was Assistant Professor at the University of Manitoba, Canada.

Prof. Desai has contributed immensely to the better understanding of wind induced vibrations. He has been involved in development of analytical solutions for weakly non-linear time dependent equations. Further, he has formulated computationally efficient methods for detailed analysis of initiation, growth and stability of ensuing limit cycles of vibrations. In the field of computational mechanics, he has devised computationally efficient finite elements and codes for expeditious linear as well as non-linear, static as well as dynamic analyses of a variety of systems. Prof.
Desai has also contributed to better understanding of the behaviour of laminated and sandwich beams and plates under static, dynamic and fatigue loading. His research team has conceived state-of-the-art mixed finite element models for analysis of laminates. Further, analytical solutions have been developed for a variety of composite beams and plates. Wave-propagation in layered media has also been examined for use in material characterization and health monitoring.

He has been a reviewer for more than 20 national and international journals and is serving on the Academic Board and Advisory Committees of various Institutes and Government Bodies. He is also on the editorial board of an International Journal. He has co-authored a book on “Finite Element Method with Applications in Engineering”. Prof. Desai has been the recipient of two Gold Medals (M.S.U.) and Excellence in Teaching Award by IIT Bombay.
About Prof. Eldho

Prof. Eldho has been working as a Faculty at Department of Civil Engineering in IIT Bombay for the last 15 years. Prior to joining the Institute, he worked as a Senior Consultant in Mott-MacDonald Company, Cambridge, UK, for a short period and later as a Senior Research Fellow at National Taiwan University, Taipei, Taiwan, during 1999-2000. In 2000, he returned to India and joined IIT Kharagpur but soon moved to IIT Bombay in 2001.

As an avid researcher for the past 25 years, significant academic and research contributions have been made by Prof. Eldho in various areas of water resources and environmental engineering. His major research contributions are in the areas of: solution of watershed based hydraulic and hydrodynamic problems, flood assessment, develop-
ment of innovative numerical models and groundwater pollution and remediation. He has undertaken more than 12 sponsored research projects in India and abroad. He has completed more than 80 industrial and consultancy projects leading to many innovative solutions and technology developments. He has developed and offered 15 courses and number of short-term courses for college teachers and working professionals. He has also developed two popular video courses on “Fluid Mechanics” and “Watershed Management” under NPTEL. He has been serving as an Editor/Associate Editor and Editorial Board Member of a number of Indian and International Journals and has worked as a reviewer for more than 40 national and international Journals in the recent past. He is a research proposal reviewer for many research organizations and has delivered several invited/keynote lectures at various national and international organizations and conferences. He has supervised 14 PhD theses and 34 Master’s dissertations. He has published more than 350 research papers in reputed International/National Journals and Conferences.

He has co-authored a text book titled “Finite Element Method with Application in Engineering and contributed 6 book chapters in various edited books. Prof. Eldho has been awarded German Research Fellowship, DAAD Fellowship, Taiwan National Science Council Fellowship, Best Poster Award in the 12th Stockholm Water Symposium, “Jal vigyan Puraskar” for best papers by the Indian Society for Hydraulics and many more awards for his research works. He is a Fellow/Member of many professional bodies in India and abroad. Prof. Eldho has been working as Honorary Chairman, BOG, College of Engineering, Adoor, Kerala, since 2013.
Prof. B. G. Fernandes
DEPARTMENT OF ELECTRICAL ENGINEERING

ACADEMIC BACKGROUND
B.Tech., NIT Karnataka, Surathkal, 1984
M.Tech., IIT Kharagpur, 1989
Ph.D., IIT Bombay, 1993

RESEARCH INTERESTS
Power Electronics: Active filters, inverter topologies for VAr compensator, Power electronic interfaces for non-conventional energy sources, Power electronic interfaces and control techniques for DC micro-grids.

Electrical Machines: Permanent magnet machines and switched reluctance machines: design and control.

ABOUT PROF. FERNANDES
Prof. Fernandes has been with IIT Bombay since 1997, where he is now an Institute Chair Professor and Head of the Department of Electrical Engineering. Prior to joining IIT Bombay, he was associated with IIT Kanpur. He is one of the principal investigators for National Center for Photovoltaic Research and Education. He is also a co-principal investigator of an India-UK collaborative research initiative on Stability and Performance of Photovoltaics.

His major contributions include the development of a low cost high efficiency motor for irrigation pumps, high efficiency motor for ceiling fans, and low cost and reliable motor for electric scooters. He works extensively on Solar Photovoltaics and DC distribution, and his team has developed high reliability solar inverter. Not only this, he has also undertaken several consultancy projects and conducted several short-term courses for industries and other
academic institutes.

Prof. Fernandes has published 36 papers in various peer reviewed journals, and has presented 124 papers in reputed conferences. He holds five Indian patents. He has been bestowed the Excellence in Teaching Award by IIT Bombay.
Prof. Sudhir R. Ghorpade
DEPARTMENT OF MATHEMATICS

ACADEMIC BACKGROUND
B.Sc., Bombay University, 1982
M.Sc., IIT Bombay, 1984
Ph.D., Purdue University, West Lafayette, USA, 1989

RESEARCH INTERESTS
Algebraic Geometry: Determinantal varieties, Grassmannians and Schubert varieties, Counting the number of points of algebraic varieties over finite fields

Combinatorics: Enumerative combinatorics of Young tableaux, Nonintersecting lattice paths

Coding Theory: Linear codes, especially codes associated to higher dimensional algebraic varieties, Enumeration of MDS codes, Generalized hamming weights

ABOUT PROF. GHORPADE
Prof. Ghorpade joined IIT Bombay in December 1989 as a Lecturer in the Department of Mathematics. At present, he is an Institute Chair Professor in the Institute. His research works have led to substantive contributions in the field of Mathematics, specially in the areas of: Young tableaux, determinantal varieties and Schubert varieties; Counting points of varieties over finite fields; linear error correcting codes; and Recursive sequences, polynomials, and matrices over finite fields.

He is a Member of the Apex Committee for National Centre for Mathematics, India, since 2013 and a Member, American Mathematical Society since 1985. He is also a member of Indian Mathematical Society and the Bombay Mathemati-
cal Colloquium since 1990. He has authored two textbooks with his colleague Prof. B.V. Limaye namely, “A Course in Calculus and Real Analysis” and “A Course in Multivariable Calculus and Analysis,” besides authoring and editing few other publications and chapters. He has 35 research papers published in international journals and refereed conference proceedings, to his credit.

Prof. Ghorpade is a recipient of AICTE Career Award for Young Teachers, bestowed by the All India Council for Technical Education and Otto Mønsted Professorship, Department of Mathematics by Technical University of Denmark. He has been an Elected Fellow of the National Academy of Sciences and has won the Research Paper Award and Prof. S.C. Bhattacharya Award for Excellence in Pure Sciences by IIT Bombay. Prof. Ghorpade has also received and delivered the 25th V. Ramaswamy Aiyer Memorial Award Lecture at the 80th Annual Conference of the Indian Mathematical Society, in Dhanbad and the Platinum Jubilee Lecture in the Section of Mathematical Sciences at the 102nd Indian Science Congress in the University of Mumbai in January 2015.
Prof. Kannan N. Iyer

DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC BACKGROUND

B.Sc. (Engg), Delhi University, 1976
Postgraduate Training Course, Nuclear Engineering, BARC, 1977
M.S. & Ph.D., Purdue University, USA, 1985

RESEARCH INTERESTS

Nuclear Reactor Thermal Hydraulics and Safety
Computational Fluid Dynamics and System Modelling

ABOUT PROF. IYER

Prof. Iyer has contributed substantially in the field of Thermal Hydraulics in general and Nuclear Technology and its Safety in particular. His experimental contributions in setting up of a facility for addressing various aspects of Advanced Heavy Water Reactor installed at IIT Bombay is recognized as a pioneering effort. His efforts in developing a scaled model for the demonstration of Passive Decay Heat Removal System has paved way for adoption of this system in Indian nuclear reactors. His efforts to computationally demonstrate the Hydrogen Dispersion in Reactor Containment, Modelling of Passive Autocatalytic Recombiners and its simplified representation to integrate with the Containment Dispersion Calculations is unique and has made a clear shift towards approaching a solution of this problem in India. His recent research and development focus has been on Melting, Solidification with material contraction, Stability of boiling systems, Surge mitigation is condenser circuits of super thermal power stations, etc.

He started his career with Indira Gandhi Centre for Atomic Research in 1977. During this time, he evolved the ther-
mal, mechanical and nuclear design of the components of KAMINI reactor as well as the 4 MeV Tandem Accelerator. During his stint at Purdue University (1981-86), he characterized the nuclear reactor response during the high pressure injection phase following small break loss of coolant accident. He developed a procedure along with his professor, which was recommended by Nuclear Regulatory Commission, USA, for the analysis of Pressurized Thermal Shock problem in a pressurized water reactor. After joining IIT Bombay in 1986, he has executed over 22 Sponsored R&D Projects and 18 Industrial Consultancy projects.

Having over 100 publications in National and International Journals and peer reviewed proceedings, he has been the proud recipient of Outstanding Service Award by Indian Nuclear Society in 2014. He has also received the Best Faculty Award for the year 2008-09 awarded by the Department of Mechanical Engineering, IIT Bombay and Excellence in Teaching Award of the Institute in 2012.
About Prof. Joshi

Prof. Joshi has been a faculty member at IIT Bombay since 1999. He has been the Head of Department of Mechanical Engineering at IIT Bombay since 2014. After receiving his Ph.D. from IIT Bombay in 1997, Dr. Joshi worked with the R&D divisions of Tata Motors India, and Kennametal (erstwhile Widia) India. He worked as a post-doctoral researcher at Georgia Institute of Technology, USA in 2002. Prof. Joshi also served as a Visiting Faculty at the Department of Mechanical Engineering Sciences, University of Illinois at Urbana-Champaign, USA during 2005-06.

Prof. Joshi is one of the first researchers in India to undertake extensive research on tool-based micromachining, which involved precise control over positioning and removal energies, to produce micro-components of size less than 500 μm. The main focus of his research is on improving productivity and quality of multi-scale machining.
processes through physics-based modeling and characterization. He developed innovative experimental set-ups and machines to characterize and realize the capability of manufacturing processes.

Prof. Joshi has undertaken over 25 research, consultancy and infrastructure development projects sponsored by aerospace, nuclear, defense and private organizations. He has established excellent research infrastructure for multi-scale machining processes. He contributed majorly to the establishment of ‘National Centre for Aerospace Innovation and Research’, sponsored by the Government of India, The Boeing Company and IIT Bombay as its ‘Principal Investigator’ during 2009-2014.

He has been a recipient of BOYSCAST fellowship of the Government of India (2002) for young researcher, winner of ‘Best Faculty’ award of the Department of Mechanical Engineering (2007) and winner of ‘Dr. P. K. Patwardhan Technology Development Award’ of IIT Bombay (2008).

Prof. Joshi has been involved in several International Editorial Assignments: Associate Editor of J. of Manuf. Sci. and Eng. (ASME, 2007-14), Machining Sci. and Technol. (Taylor and Francis, 2008-) and, the Regional Editor of Int. J. of Mechatronics and Manuf. Sys. (Inderscience, UK, 2010-). He is also an editorial board member of Int. J. of Machine Tools and Manuf. (Elsevier, 2013-) and Indian J. of Eng. and Mater. Sci. (NISCAIR, 2015-).

Prof. Joshi has supervised a post-doctoral fellow, ten doctoral and over 100 masters’ students at IIT Bombay. He has more than 200 research publications to his credit, which include over 96 referred international journal publications, over 100 international conference publications, and five book chapters.
Prof. Vinay Anant Juvekar
DEPARTMENT OF CHEMICAL ENGINEERING

ACADEMIC BACKGROUND
B.Tech., Chemical Engineering, Bombay University, 1970
Ph.D. (Tech), Chemical Engineering, Bombay University, 1976

RESEARCH INTERESTS
- Interfacial Engineering
- Heterogeneous Reaction Engineering
- Electrochemical Engineering

ABOUT PROF. JUVEKAR
Prof. Juvekar is an incumbent of L&T Chair since 2012 and a Professor with the Chemical Engineering Department at IIT Bombay since 1984. He has worked as Consultants with several industries including Herdillia chemicals, Indian Organic Chemicals, Hindustan Organic Chemicals, Aditya-Birla Group of Companies etc. He has completed an overall of 81 consultancy assignments, 23 sponsored projects including those from Unilever Industries Ltd., Hindustan Petroleum, Pidilite Industries, Board of Research in Nuclear Sciences., Department of Science and Technology, 26 PhD projects and 64 Masters projects.

His research works include the development of design methodology for gas-liquid reactors, elucidation of kinetics of interfacial reactions, development of a rational model for ion exchange kinetics, development of a continuum model for polymer adsorption on solid surface, which is more accurate and versatile than the lattice based models, development of a model for open bipolar electrolysis, which
would be useful for design of bipolar cells which are cost effective alternative to conventional cells for electrolysis in dilute and non-aqueous systems and the development of a model for passivation of platinum electrode and development of a technique to keep platinum electrodes under active condition for preparation of hypochlorite bleach. His works have also led to the development of two techniques to measure charge storage characteristics of intrinsically conducting polymers. These techniques provide insight into band structure of charge storage in conducting polymers and would be useful in designing conducting polymer electrodes for energy storage.

He has 3 patents to his credit and has won numerous awards in India and abroad. He is the recipient of Moulton Medal from Institution of Chemical Engineers, UK, Herdil lia Award from the Indian Institute of Chemical Engineers for the excellence in basic research, Prof. G.M. Abhyankar Distinguished Fellow for the year by the University Department of Chemical Technology, Manudhane Applied Research Award by IIT Bombay and Fellowship of the Indian National Academy of Engineers.
Prof. Krishna P. Kaliappan
DEPARTMENT OF CHEMISTRY

ACADEMIC BACKGROUND
B.Sc., Madurai Kamaraj University, 1988
M.Sc., Madurai Kamaraj University, 1990
Ph.D., Indian Institute of Science
Bangalore, 1997

RESEARCH INTERESTS
Total Synthesis of Biologically Active Complex Natural Products
Asymmetric Synthesis of Natural Product like Molecules
Domino Synthetic Strategy to Heterocycles and New Molecular Scaffolds

ABOUT PROF. KALIAPPAN
Prof. Kaliappan, is an Institute Chair Professor, Associate Dean (R&D) and a Professor at the Department of Chemistry in IIT Bombay. His group at IIT Bombay has been working mainly in the area of synthesis of natural products and natural product like molecules and he has made significant contribution in both areas. His work on the total synthesis of complex natural products of contemporary interest like vinigrol, palmerolide A, platensimycin, platencin and angucyclinone antibiotics has drawn considerable visibility both nationally and internationally. In addition, he has ventured beyond the conventional synthesis and designed and synthesized several natural product like scaffolds such as taxasugar hybrids, sugar-oxasteroid quinones, oxatriquinanes, C-aryl glycosides, sugar fused B-lactams, sugar fused triazoles. These carefully designed entities, embodying important pharmacophore could be good starting points for new drug discovery leads in the area of an-
ticancer and antibiotics. His group also has been working on CH-activation/functionalization strategy to synthesize several interesting biologically active heterocycles.

He has published about 65 papers in international journals with about 1000 citations. He has written a book chapter in 2014 and delivered several invited lectures in prestigious national and international conferences. He has been a Visiting Faculty at University of Geneva and University of Massachusetts, Amherst. He has also been a member of the Editorial Advisory Board of Chemistry, An Asian Journal and Organic and Biomolecular Chemistry.

Prof. Kaliappan has been bestowed with many awards and honours including the Prof. C. N. R. Rao National Prize in Science in 2015. He is also the recipient of Swarnajayanti Fellowship from DST, Bronze Medal from Chemical Research Society of India, Excellence in Teaching Award from IIT Bombay and the prestigious B. M. Birla Science Prize, to mention a few.
Prof. Tarun Kant

DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC BACKGROUND

B.Sc., University of Allahabad, 1962
B.Tech., IIT Bombay, 1967
M.Tech., IIT Kanpur, 1969
Ph.D., IIT Bombay, 1977

RESEARCH INTERESTS

Solid and Structural Mechanics
Numerical Methods, Finite Element Method, Numerical Integration Method
Mechanics of Composite Materials and Structures, Applications of Composite Laminates in Civil Construction

ABOUT PROF. KANT

Prof. Tarun Kant is currently an Institute Chair Professor at the Department of Civil Engineering in IIT Bombay. He has teaching and research experience of 48 years. He is on the editorial boards of several international journals. He has contributed very significantly in fundamental research work in the development of Co higher order beam/plate/shell theories and their effective application to modern composite materials including functionally graded and piezoelectric materials. His recent efficient and clever technique to accurately recover inter-laminar stresses (e.g., see “A general partial discretization methodology for inter-laminar stress computation in composite laminates, Computer Modeling in Engineering & Science 17(2), 135-161, 2007”) through the marriage of finite element and numerical integration techniques is considered to be first of its kind in the realm of elasto-statics by his peers. He is responsible for establishing a research school of compu-
tational structural mechanics at IIT-Bombay which has influenced many of his colleagues as well. He was elected President of the Indian Society of Theoretical and Applied Mechanics (ISTAM) for two terms (1999 and 2000), has founded Indian Association for Computational Mechanics (IndACM) and Indian Association for Structural Engineering (IASE) and is responsible for organization of biennial ICCMS (International Congress on Computational Mechanics and Simulation) and SEC (Structural Engineering Convention) scientific conferences in the country. He has been a Visiting Professor at University of Wales, Swansea (1979-’82), University of Cambridge (1993) and University of California, Los Angeles (2005).

He has published more than 147 research papers in refereed journals, 6 chapters in edited books, about 163 papers in conference proceedings, edited 4 books and currently serves on the editorial boards of 5 international journals and in diverse areas of computational structural mechanics. He has supervised 25 PhD theses and over 76 MTech dissertations. He has Research & Citation Standing in terms of h-index of 28 on Web of Science (35 on Google Scholar). His current citations are over 2000 on Web of Science (over 4033 on Google Scholar).

Prof. Kant was elected a Fellow of the Indian National Academy of Engineering (INAE) in 1999, a Fellow of the Indian Academy of Sciences (IASc) in 2004, a Fellow of the Indian National Science Academy (INSA) in 2007 and a Fellow of the National Academy of Sciences, India (NASI) in 2011. He is the first and only civil engineer in the country to get elected to all the four national academies. He was awarded the 1979 Jawaharlal Nehru Memorial Trust (U.K) Scholarship and the 1992-’93 European Commission (EC) Senior Faculty Exchange Fellowship, both by the Government of India. He is the recipient of IIT Bombay Prof. H.H. Mathur Award for Excellence in Research in Applied Sciences (2006), Khosla National Award for his life time achievement in the field of engineering (2009), IIT Bombay Research Paper Award (2010), IIT Bombay Lifetime Achievement Award (2011), ICCS17 legend Award (2013), APACM Senior Scientist Award (2013), and 2015 ICCES Lifetime Achievement Medal for making seminal contributions to composite materials and to the education of generations of students in India.
About Prof. Karunakaran

Prof. Karunakaran has over 30 years of professional experience. After graduating in 1984, he worked in the CNC technology in Hindustan Aeronautics Limited for about nine years. He was later a Senior Project Engineer in the CAD-Project at IIT Kanpur for more than a year. Thereafter, he joined the Mechanical Engineering department of IIT Bombay.

His research is focused on process and product development. In 2002, he launched, Optimization of LOM, a pre-processing software in 3D Printing, in collaboration with Daimler-Benz, Germany and Materialise, Belgium. He developed the Hybrid Layered Manufacturing (HLM), a direct metal 3D printing process. Its 3-axis version using MIG deposition matured during 2004-09. HLM’s commercial viability was proved through industrial trials. It can produce composite dies/molds with conformal cooling channels. Its 5-axis version was completed in 2012, which can produce complex objects such as impellers. He moreover, developed...
Segmented Object Manufacturing (SOM), a 3D printing process for polystyrene with primary applications in Rapid Casting, an indirect way to produce metallic parts quickly. SOM too is hybrid in more than one way - making use of hot wire slicing, CNC machining and gluing.

At present, Prof. Karunakaran is studying ways to eliminate tail rotors, since 86% of helicopter accidents are attributed the failure of tail rotors. Currently he is ground-testing a coaxial contra-rotor helicopter built around a motorbike engine. He plans to develop ramjets and H2O2 rockets for his tipjet helicopters.

He has published over 35 research papers in international journals in addition to several papers and delivered invited lectures in national and international forums. OptiLOM software was copyrighted and has four patents under process. He has won many awards and honours during his professional career including the TeamTech-2009, Award of Excellence for the Integrated use of Advanced Computer-Aided Engineering Technologies in Rapid Manufacturing, Dr. P.K. Patwardhan Technology Development Award 2003, by IIT Bombay, Humboldt Fellowship 2000, INSA-DFG Young Scientist Fellowship, Wilkinson Sword, and many more.
Prof. Sambasivarao Kotha
DEPARTMENT OF CHEMISTRY

ACADEMIC BACKGROUND
B.Sc., Nagarjuna University, Guntur, 1977
M.Sc., University of Hyderabad, 1979
Ph.D., University of Hyderabad, 1985

RESEARCH INTERESTS
Green Chemistry
New Synthetic Methods
Transition Metals in Organic Synthesis

ABOUT PROF. KOTHA
Prof. Kotha has 35 years of research experience and two years of industrial experience to his credit. Currently, he is a Professor at the Department of Chemistry and Pramod Chaudhari Chair Professor in IIT Bombay. Prof. Kotha and his group have made significant contributions in many areas of organic synthesis, particularly towards the design of unnatural amino acids. In these endeavors, his group has devised several new synthetic tactics and made imaginative use of metathesis and Suzuki coupling protocols. In his approach to research, he has shown a flair for entering new and emerging areas and mobilizing his intellectual resources to carve out interesting problems and solving them. His contributions have been widely recognized and during the last 13 years, almost 15 articles from his group have been placed among the highlighted/ most accessed/ most cited list, thereby bringing a great deal of visibility to contributions from India. Impact of his work is evident from the fact that his contributions have figured among the most requested article in CAS spotlight, among the hot
papers in chemistry and Web of Science has classified one of his papers as one of the most influential article. He has published more than 200 papers in peer reviewed journals. So far he has trained 26 Ph.D. students.

Prof. Kotha has received many awards for his research works including the B. M. Birla Science Prize (1996), N. S. Narasimhan Endowment Award (2000), Prof. S.C Battacharya Research Excellence Award (2008), J. C. Bose Fellowship (2010), G. D. Gokhale Endowment Lectureship (2010) and many more. He is also recipient of several fellowships (FASc. FNASc, FRSC). He also received W. U. Mallik Memorial Award by the Indian Council of Chemists in 2014.
Prof. Ajit Kulkarni

DEPARTMENT OF METALLURGICAL ENGINEERING & MATERIALS SCIENCE

ACADEMIC BACKGROUND
B.Sc., Nagpur University, 1977
M.Sc., Nagpur University, 1979
Ph.D., IIT Kharagpur, 1984

RESEARCH INTERESTS
Electrical properties of Materials-synthesis-structure-property-applications in batteries, sensors, fuel cells, speciality Glasses for electrochemical applications, IR windows for strategic applications.

Ferroelectric/Piezoelectric Ceramics and composites, Lead free smart materials.

Impedance Spectroscopy of Materials, Ion dynamics in disordered materials through Mechanical and electrical relaxations.

ABOUT PROF. KULKARNI

Prof. Kulkarni joined IIT Bombay as a Faculty Member in 1987, where he is presently an Institute Chair Professor. He has many original contributions in understanding the electrical transport in several materials viz. inorganic glasses, polymer gels and electrolytes and polymer-CNT nano composites. His contributions to engineering conducting solids are significant. He developed unique approaches for fabricating materials with enhanced electrical conductivity. This new knowledge led to design and development of a novel glass based Fluoride ion sensor, a low cost ammonia sensor and a prototype battery utilising new polymer blends and gels. An economic route for the manufacture of ceramic-to-metal joints has been utilized for the fabrica-
tion of components for medical LINACS for cancer therapy. The discovery of mixed ion conduction in solids resulted in new avenues for theorists for developing models of ion dynamics in solids. This research has led to six patents on materials and devices and one technology transfer on sensors. Recently his group has engineered highly defective ZnO nano particles E-ZnO to make transparent sunscreen masks with high commercial potential.

Prof. Kulkarni’s collaborative research with DRDO, and various National laboratories and Universities/Institutes has been recognized. He was a Panel Chairman on Materials panel for ARMREB (DRDO) and member of Materials panel of NRB and has contributed significantly for the initiation of various engineering research and curricula as a discipline in Materials and electrically conductivity materials for applications in energy conversion and storage devices.

He has Published 130 papers in International referred journals, and contributed to book on Materials Science for IGNOU, Delhi. He has been conferred with Alexander Von Humboldt Fellowship Germany, Fellow of the Maharashtra Academy of Sciences, and many more awards and honours. He has six patents, one technology transfer on sensor and mention of work on ‘mixed mobile ion effect in glasses’ in books of glasses to his credit.
Prof. Goutam Kumar Lahiri
DEPARTMENT OF CHEMISTRY

ACADEMIC BACKGROUND

B.Sc., Burdwan University, West Bengal, 1981
M.Sc., Burdwan University, West Bengal, 1984
Ph.D., IACS, Jadavpur University, West Bengal, 1990
Postdoctoral research, West Virginia University, USA, 1993

COORDINATION CHEMISTRY

Organometallic Chemistry
Catalysis

ABOUT PROF. LAHIRI

Prof. Lahiri is an Institute Chair Professor at the Depart-ment of Chemistry in IIT Bombay. His research team has established a unique record of the development and criti-cal analysis of new kinds of molecules with mixed valency of metal and organic constituents, specifically based on oligonuclear metal complexes with “non-innocent”, i.e. potentially electron-transferring ligands, including biolog-ically relevant coenzyme models such as quinones, nitrosyl function as well as dye-related nitrogen containing sys-tems. In addition to innovative synthetic approaches, the work addresses the fundamental features such as energy aspects, electronic interactions, spin effects. This extends deep insights into the interactions between metal ions and electronically active organic molecules, which are of great significance in energy and information transferring molecular systems. Complementary to this fundamental research activity are achievements in developing industry-connected transition metal derived catalysts for a vari-ety of important organic transformations.
He has had collaborative research interactions with the faculty members in Stuttgart University-Germany, Freie University-Germany, Bristol University-UK, Institute of Chemical Research of Catalona (ICIQ)-Spain, Complutense University of Madrid, Spain, IIT Indore, and NISER-Bhubaneswar. He has published 200 papers in journals and has authored a chapter. He moreover, has a patent to his credit.

Prof. Lahiri has received many honours during his career. Some of these include Prof. S.C. Bhattacharya Award for Excellence in Research by IIT Bombay in 2011; Ramanna Fellowship by DST, New Delhi; Mercator Chair Professorship by DFG, Germany, and B. M. Birla Awards in Chemistry in 1996, among others. He has moreover, been awarded Fellowships by the Indian Academy of Sciences, Bangalore and Maharashtra Academy of Sciences.
Prof. Surjya Kumar Maiti
DEPARTMENT OF MECHANICAL ENGINEERING
ACADEMIC BACKGROUND
B.E., Burdwan University, NIT Durgapur, 1970
M.Sc., Birmingham University, 1973
Ph.D., IIT Bombay, 1980
Postdoctoral, Cambridge University, 1983

RESEARCH INTERESTS
Fracture Mechanics, Stress Analysis
Finite Element, Boundary Element and Meshless Methods
Component Health Monitoring, Composites

ABOUT PROF. MAITI
Prof. Maiti has about 40 years of teaching and research experience. He has completed five Government sponsored and 20 consultancy projects. His research has led to development of methods for detecting crack in variety of engineering components based on changes in its free vibration signals. He has also given ways to tailor-make cellular solids and layered composites with a specific resistance to fracture. His group has given combined analytical and numerical method for faster analysis of crack growth under the combined action of mechanical loading and corrosion. He has authored a book on Fracture Mechanics – Fundamentals and Applications, which will be published by the Cambridge University Press.

Apart from this he has published 118 papers in refereed international journals and 49 papers in archival international conference proceedings. In recognition of his academic/research contributions, he has been awarded Fellowships of two National Academies (INAЕ and NASI) and one In-
international Academy, ASME. He has also received the Best Faculty Award for the year 2013-14 awarded by the Mechanical Engineering Department, the Excellence in Teaching Award of the Institute in 2006, and the Research Paper Awards of the Institute for the year 2013 and 2011.

Prof. Maiti started his career with Tata Motors (earlier TELCO), Jamshedpur, as a graduate trainee and worked there later as a design engineer. He was with the company for about two years before moving over to IIT Bombay in 1975. He has served the Institute as Convener of UGAPEC and the Committee for Financial Support to Students for Attending International Conferences for ten years, and as member of UGPC, IRCC Advisory Committee, and CDEEP Advisory Committee. He has also served as the Chairman for Placements (1998-2001) and the GATE Chairman (2002-2003). He was the Head of the Department of Mechanical Engineering at the Institute, from 2005 to 2008. He was Visiting Professor in the Mechanical Engineering Department, National University of Singapore, from December, 2011 to May, 2012.
Prof. D. Manjunath
DEPARTMENT OF ELECTRICAL ENGINEERING

ACADEMIC BACKGROUND

BE., National Institute of Engineering, Mysore, 1986
M.S., IIT Madras, 1989
Ph.D., Rensselaer Polytechnic Institute, Troy, NY, USA, 1993

RESEARCH INTERESTS

Communication networks and performance analysis
Distributed systems with interests in function computation, router architectures, and over networks
Design and analysis of protocols, traffic measurement, optical networks and packet switch architectures

ABOUT PROF. MANJUNATH

Prof. Manjunath has been with IIT Bombay since July 1998, where he is currently a Professor in the Department of Electrical Engineering and Head of Computer Centre. He was the lead editor of a team of six eminent researchers, of a special issue of IEEE Journal on Selected Areas in Communications on Exploring the Fundamental Limits of In-Network Computation. His recent work has been focused on differentiated service systems for heterogeneous customers in which different servers charge different admission prices much like in the local trains of Mumbai or in the queues at Tirupati. Such systems have applications in many service systems including computer and communication networks. This has led to him analysing various aspects of the economics of networks like pricing of services, network neutrality, spectrum auctions & valuation, and interconnection economics. A second thread has been to analyse the fundamental limits of in-network
computation over wireless and wireline networks with applications to sensor networks, distributed databases and MapReduce like frameworks for distributed computation. A third thread has involved properties of geometric random graphs and coverage processes with applications in wireless networks.

Prof. Manjunath has been a Visiting Scientist/ Faculty at many organizations and Institutions, across the world including the Microsoft Research. He has been a consultant to several public and private sector organizations for their networking and IT projects and also to the TRAI. He has authored about 110 papers in refereed journals and conferences, presented several invited papers and co-authored two textbooks, Communication Networking: An Analytical Approach (May 2004) and Wireless Networking (April 2008).

He has won the Best Paper Award in ACM Sigmetrics, the Benjamin-Meaker Fellowship at the University of Bristol, and the SVC Aiya Memorial Award from IETE. Furthermore, one of his papers was chosen as the spotlight paper of the June 2011 issue of IEEE Transactions on Mobile Computing.
Prof. Anurag Mehra
DEPARTMENT OF CHEMICAL ENGINEERING

ACADEMIC BACKGROUND
B.Tech., IIT Kanpur, 1983
M.Chem. Engg., Bombay University, 1985
Ph.D. (Tech.), Bombay University, 1987

RESEARCH INTERESTS
Public Policy, Sociology of Education, Science & Technology
Formation of Nanostructures & use in Drug Delivery, Hyperthermia
Transport & Reaction Engineering in Multiphase Systems, with special interest in Carbon Capture and Sequestration
Food Foams and Sponges; Baking of Bubbly Foods

ABOUT PROF. MEHRA
Prof. Anurag Mehra is an Institute Chair Professor with the Department of Chemical Engineering in IIT Bombay since October 2014. He has also served the Institute as the Head of the Department from 2008 to 2011, Head of Computer Centre from 2003 to 2008, and as the Professor In-Charge of Administrative Planning and Services from 2009 to 2012. Before joining IIT Bombay in April 1991 as an Assistant Professor, he was on the faculty of Chemical Engineering at the Institute of Chemical Technology, Matungua, Mumbai (previously known as UDCT).

His research interests are in the broad areas of Public Policy, Sociology of Education, Science & Technology; Formation of Nanostructures & use in Drug Delivery, Hyperthermia; Transport & Reaction Engineering in Multiphase Systems, with special interest in Carbon Capture and Sequestration
and Food Foams and Sponges; Baking of Bubbly Foods.

Prof. Mehra’s contributions in the area of reaction engineering and nanomaterials are widely acknowledged. He has more than 60 journal publications and book chapters to his credit. He has been a Visiting Professor at the Massachusetts Institute of Technology, Cambridge. He is a recipient of INSA Medal for Young Scientists, IIChE Amar Dye Chem Award, EC Marie Curie Fellowship and the IIT Bombay Excellence in Teaching Award. He is moreover, a Fellow of Indian National Academy of Engineering and National Academy of Sciences, India.
Prof. Shabbir N Merchant
DEPARTMENT OF ELECTRICAL ENGINEERING

ACADEMIC BACKGROUND
B.Tech., IIT Bombay, 1978
Ph.D., IIT Bombay, 1984

RESEARCH INTERESTS
Signal Processing
Wireless Communications
Wireless Sensor Networks

ABOUT PROF. MERCHANT
Prof. Merchant has more than 30 years of experience in teaching and research. He has made significant contributions in the field of signal processing and its applications. His noteworthy contributions have been in solving state-of-the-art signal and image processing problems faced by Indian defence. He has been a Chief Investigator for a number of sponsored and consultancy projects and has served as a consultant to both private industries and defence organizations. He has moreover, served on Technical Program Committees of many IEEE premier conferences. Currently, he is a Professor and an incumbent of HAL R&D Chair with the Department of Electrical Engineering at IIT Bombay.

His research works have led to designing of novel algorithms for radar signal processing including those for detection and tracking. He has proposed new paradigms based on Symbiotic Cooperative Relaying for Dynamic Spectrum Access and developed a new communication paradigm termed as ‘Green Symbiotic Cloud Communi-
cations’ allowing the usage of all possible communication mediums concomitantly. Technologies and paradigms for broadband communications over the power lines are under investigation and Thermally Unstable Partially Oriented Yarns (TUPOY), a new material for development of electronics and technologies of future is under investigation with his research team.


He is a recipient of IETE Prof. SVC Aiya Memorial Award for contributions in the field of ‘Detection and Tracking’ and IETE Prof. SVC Aiya Memorial Award for ‘Excellence in Telecom Education’. He has furthermore, received the VASWIK Award 2013 for ‘Electrical and Electronics Sciences and Technology‘.
Prof. Ramaswamy Murugavel  
**DEPARTMENT OF CHEMISTRY**

**ACADEMIC BACKGROUND**

B.Sc., University of Madras, 1984  
M.Sc., University of Madras, 1987  
Ph.D., Indian Institute of Science, Bangalore, 1993

**RESEARCH INTERESTS**

Chemistry of Materials  
Synthetic Inorganic Chemistry  
Structure and Bonding in Main Group Elements

**ABOUT PROF. MURUGAVEL**

Prof. Murugavel is an Institute Chair Professor with the Department of Chemistry in IIT Bombay. He has also been the Head of the Department of Chemistry during 2011-2015. Before joining IIT Bombay in December 1997, he worked as a Research Scientist in University of Göttingen, Germany.

He has made significant contributions to inorganic and materials chemistry by synthesizing soluble models for silicate and phosphate materials, realizing designer zeolites, and unraveling coordination behavior of heavier s-block elements. He has reported the only organic soluble silico-phosphonate in the literature and also developed thermally unstable precursors for ceramic phosphates. The reports on benzene tetracarboxylates and systematic studies on group 2 amino/mercaptobenzoates by him were the first publications involving these systems in the literature. The work on the use of hydrolytically and thermally unstable phosphate molecular precursors, developed for the low temperature synthesis of fine particle metal phosphate and silicate
materials, has been well received in the literature. The very recent work on the use of metal-monoaryl phosphate systems in building designer zeolites through covalent and non-covalent approaches has been recognized as a major contribution to chemistry of porous materials. His current research is focused on proton conductivity and magnetic properties of phosphate based transition and lanthanide metal clusters, sensory materials, and covalent organic frameworks, and fundamental main group chemistry.

He has 150 publications and 4000 citations to his credit. He is a fellow of the Indian Academy of Sciences, the Indian National Science Academy, and the Royal Society of Chemistry. He has been conferred with J. C. Bose National Fellowship, DAE-SRC Outstanding Investigator Award, Prof. C.N.R. Rao National Prize in Chemical Sciences, Swarnajayanti Fellowship, Alexander-von-Humboldt Fellowship, Prof. S.C. Bhattacharya Award for Excellence in Research in Basic Sciences, DAE Young Scientist Award, CRSI Bronze Medal, MRSI Medal, JC Ghosh Medal, and many other awards and honours within the country and abroad. He has also been a DFG Mercator Professor at the University of Bochum, Germany during 2009-2010.
Prof. K Narayanan  
**DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES**  
**ACADEMIC BACKGROUND**  
B.A., University of Madras, 1982  
M.A., University of Madras, 1984  
M.Phil., Delhi School of Economics, DU, 1988  
Ph.D., Delhi School of Economics, DU, 2000  
Post-Doctoral Fellow, United Nations University - Institute of Advanced Studies, Tokyo, 2000-1  

**RESEARCH INTERESTS**  
Industrial Economics, Technology Transfer and Competitiveness  
International Business, FDI and Exports  
Energy, Environment, and Socio-Economic Impacts of Climate Change  

**ABOUT PROF. NARAYANAN**  
Prof. Narayanan is an Institute Chair Professor at the Department of Humanities and Social Sciences in IIT Bombay. His research findings based on number of studies which shed light on the interrelationship between policy regime, technological capabilities and competitive efficiency of industrial sector in an emerging economy context have been published in several peer reviewed journals like Research Policy, Oxford Development Studies, Technovation and were appreciated both in India and abroad. His successful research endeavour encouraged him to look into additional dimensions like meeting the environmental regulations, achieving energy efficiency, and meeting the challenges of international trade by the industrial sector of India, during the last six years.  

He has moreover, been focusing on analyzing the type and magnitude of corporate re-structuring that has been tak-
ing place in India since 2000. Here, to begin with, trends in Mergers and Acquisitions (M & A), the factors that explain inter-industry differences in M & A, and the impact of M & A have been focused upon. Secondly, the carbon emissions that emanate from differential energy input mix at the firm level was analyzed and the differential impact of energy inputs on competitive efficiency and productivity has been written about. Thirdly, assessment of vulnerabilities to indicators of climate change was analyzed first at the district level for all the coastal states in India, followed by detailed and in depth analysis of three most vulnerable coastal districts. Further, he has attempted to look at the ICT adoption in small and medium enterprises located in industrial clusters especially in the low-tech industries and also the role of ICT education in providing the skill sets required for better market access to the potential workforce.

Prof. Narayanan is actively engaged in a web-based research group, Forum for Global Knowledge Sharing, which interfaces Scientists, Technologists and Economists. He was also a member of the study team during 2002-12 that helped prepare India’s 1st and 2nd National Communication to the UNFCCC. He has on-going research interaction with Nagoya University and University of Tokyo in the areas of Skill Development and Energy, Environment and Ecosystem respectively. He was President of the Academy of International Business (AIB) India Chapter during 2006-12.

He has a number of publications in the field of industrial competitiveness, technology transfer, ICT, international trade, economics of energy use and socio-economic impacts of Climate Change, to his credit. He has guest edited special issues of 3 journals and edited 3 books. He is a member of the Project Advisory Committee, Solar Expert Group on Enabling R&D (SEER-EG), Department of Science & Technology, Government of India; Member, Sub-Committee to formulate strategy for technology intensive manufacturing exports from India, 12th Five Year Plan, Ministry of Commerce, Government of India, 2011-12; and is actively involved with many other National and International Committees on Climate Change.
Prof. Dulal Panda  
DEPARTMENT OF BIOSCIENCES & BIOENGINEERING

ACADEMIC BACKGROUND
B.Sc., Calcutta University, 1984  
M.Sc., Calcutta University, 1986  
Ph.D., Jadavpur University, Kolkata, 1994

RESEARCH INTERESTS
Molecular cell biology, microtubule dynamics, cell cycle, cell motility, microtubule targeted anticancer drugs

FtsZ assembly dynamics, bacterial cell division, antibacterial drugs

Protein aggregation and neuronal diseases, nano-biotechnology

ABOUT PROF. PANDA

Prof. Panda is an Institute Chair Professor with the Department of Biosciences & Bioengineering in IIT Bombay since 2011. Prior to joining IIT Bombay in the year 2000 as an Assistant Professor, he was working with University of California, Santa Barbara, CA, USA, as an Assistant Research Biologist.

He has made pivotal contribution in understanding microtubule dynamics and its role in mammalian cell division and cell motility. He has discovered several tubulin inhibitors having potent anticancer activity. Prof. Panda has also made immense contributions in understanding the role of a bacterial cell division protein FtsZ in bacterial cell division. He has found that FtsZ assembly is regulated by the combined action of several proteins. He has shown that the assembly dynamics of FtsZ can be used as a screen for finding novel anti-tubercular agents. Several FtsZ-targeted
antibacterial agents have been identified in his lab.

He is an editorial advisory Board member for Biochemical Journal, and an Associate Editor for BMC Cell Biology and a member of the Guha Research Conference. He is a fellow of the Indian Academy of Sciences and National Academy of Sciences, India. For his immense contributions in the field of Bioseciences, he has received the G. N. Ramachandran Gold Medal for Excellence in Biological Sciences and Technology from CSIR, Government of India, DAE-SRC Outstanding Research Investigator Award, Swarnajayanti Fellowship, and the National Bioscience Award from the DBT, Government of India, to mention the prominent ones.
Prof. Amiya Kumar Pani
DEPARTMENT OF MATHEMATICS
ACADEMIC BACKGROUND
B.Sc., Ravenshaw College, Utkal University, 1976
M.Sc., Ravenshaw College, Utkal University, 1978
Ph.D., IIT Kanpur, 1986

RESEARCH INTERESTS
Numerical Analysis and Scientific Computing
Partial Differential Equations
Industrial Mathematics

ABOUT PROF. PANI
Prof. Pani has been a faculty member in the Department of Mathematics at IIT Bombay since 1986. Apart from providing complete solutions to two open problems: One in the area of parabolic free boundary problems and the other in parabolic integro-differential equations with non-smooth initial data, he has introduced a new mixed FE Galerkin method now called H1 mixed Galerkin method and proposed with Thomee and Wahlbin a powerful scheme which incorporates sparse quadrature rules in complete discrete schemes to reduce storage requirements for parabolic and hyperbolic integro–differential equations. With Dr. J. Agrawal and Prof. K. Moudgalya, he has developed a new approach to derive continuous system of Differential Algebraic Equations (DAEs) that is dynamically equivalent to a sliding motion of discontinuous DAEs and proposed a numerical scheme that is more efficient than currently available numerical methods for approximating solutions of discontinuous systems of DAEs. A part from new regularity results for equations of motion in the Oldroyd model...
of visco-elastic fluid flow problems, he along with J. Yuan has introduced a new Stokes-Volterra projection to derive optimal error estimates for FE Galerkin approximations under realistically assumed conditions on initial data. Recently, he in collaboration with G. Fairweather has developed and analyzed ADI methods for the evolution equations with positive memory which open up new avenue in this area. His (with Prof. T. Gudi and Prof. Neela Nataraj) contributions to error analysis of discontinuous Galerkin (DG) approximations to nonlinear elliptic problems constitute a significant advancement of DG methods.

Prof. Pani was a visiting Fellow in CMA, Australian National University, Australia, Isaac Newton Institute for Mathematical Sciences at Cambridge (UK), Mathematics Institute at University of Oxford (UK); and visiting Professor in many Universities abroad.

Prof. Pani is a Fellow of the National Academy of Sciences (FNASc) and also the Fellow of Indian Academy of Sciences. He is a recipient of the Best Young Mathematician Award 2000 by ISIAM for his seminal contributions to PDEs, and Numerical Analysis and Industrial Mathematics and CL Chandna award by Saraswati Vishvas Society, Canada, for his outstanding contributions to mathematical research and teaching. He has also been a member of Editorial Board for four national and international Journals and was a Panel member representing South Asia in the Round Table discussion on ‘Developing Mathematics in the Developing World’ in 2007. Recently, he was one of the members of an International Selection Committee under ICIAM for Maxwell Prize -2015.
About Prof. Parthasarathy

Prof. Parthasarathy has been teaching at the Department of Humanities and Social Sciences, IIT Bombay, since 1997. He has held visiting positions at the Australian National University, National University of Singapore, and Zentrum Moderner Orient, Berlin. He has previously worked at the International Crops Research Institute for the Semi-arid Tropics, the Indian Council of Social Science Research, and the University of Hyderabad. He has carried out over 20 consultancy and sponsored research projects for MMRDA, CIDCO, ICRISAT, MOEF, MAVIM, IDS Sussex, and other national and international organizations.

He is the author of Collective Violence in a Provincial City (Oxford University Press, 1997), and has recently co-edited “Women’s Self Help Groups: Restructuring Socio-Economic Development,” (Dominant, 2011), and “Cleavage, Connection and Conflict in Rural, Urban and Contemporary Asia” (ARI-Springer Series, 2013). He has been involved in research projects and published in national and international...
journals and edited volumes in the areas of urban studies, law and governance, legal pluralism, women and development, climate studies, and disaster risk and vulnerability. He has been a member of editorial boards and advisory committees of journals, book series, and academic organizations in India and abroad.

He has published over 60 journal articles, monographs, and book chapters, and presented over 90 conference papers. He has also delivered several inaugural and valedictory addresses, plenary talks, and invited lectures. Prof. Parthasarathy is the recipient of Panos Media Fellowship, IUCN/Ford Foundation Democratizing Science Grant of the World Conservation Union, and is the winner of Global Development Network Research Medal (2002). His current research interests include urban informality with a focus on urban religion and politics, transnational urbanism, legal pluralism and resource governance, and vulnerability to climate / disaster risks. Prof. Parthasarathy is also an Associate Faculty in the Centre for Urban Science and Engineering and the Inter-disciplinary Programme in Climate Studies at IIT Bombay.
Prof. Sachin C. Patwardhan

DEPARTMENT OF CHEMICAL ENGINEERING

ACADEMIC BACKGROUND

B.Tech., IIT BHU, Varanasi, 1986
M.Tech., IIT Madras, 1989
Ph.D., IIT Bombay, 1994

RESEARCH INTERESTS

Control relevant dynamic modeling of nonlinear systems: Linear and nonlinear black box modeling using orthonormal basis filters, Development of grey box models by combining mechanistic models and stochastic black-box models and Online model parameter estimation.

Nonlinear Model Based Control: Nonlinear Model Predictive Control (NMPC), Adaptive Model Predictive Control, Fault Tolerant Predictive Control, On-line Optimizing Control, Globally Linearizing Control (GLC) and Control of Batch and Semi-batch Operation.

Nonlinear Bayesian State Estimation: Nonlinear Observer based On-line Fault Diagnosis, Simultaneous State and Parameter Estimation, Constrained Particle Filtering, Noise density Estimation and Moving Horizon Estimation (MHE)

ABOUT PROF. PATWARDHAN

Prof. Sachin Patwardhan is a faculty member in the Department of Chemical Engineering at IIT Bombay since December 2001. He became an Institute Chair Professor in April 2015. He has also been a visiting faculty and researcher at Carnegie Mellon University in USA; University of Alberta in Canada; and Visiting Researcher at the Technical University of Munich, Germany. He has worked on multiple sponsored research projects funded by D.S.T., B.R.N.S.,
D.B.T. and consulting assignments funded by Honeywell, Bangalore.

Prof. Patwardhan has done intensive research on the integration of Bayesian observer based on-line fault diagnosis with linear and nonlinear predictive control to arrive at fault tolerant control schemes. He has also been researching on the development of control relevant linear and nonlinear black box models from open loop and closed loop operating data using orthonormal basis filters (OBF). Synthesis, analysis and experimental verification of nonlinear predictive control schemes, adaptive predictive control schemes and globally linearizing control laws is another major direction of his research. He has worked on the development of a systematic approach for identification of gray-box models from operating data, by merging stochastic black box models with mechanistic dynamic models. He has investigated applicability of various modeling and control approaches developed through simulation and experimental studies on complex nonlinear systems such as reactive distillation, PEM fuel cell, packed bed distillation and dc to dc power converters.

Prof. Patwardhan is an Associate Editor of the Journal of Process Control since January 2014. He has over 50 regular papers in the Journal of Process Control, Industrial and Engineering Chemistry Research, Control Engineering Practice, Journal of Robust and Nonlinear Control etc. and more than 60 papers in the proceedings of reputed international conferences.

He is a proud recipient of Indira Manudhane Best Postgraduate Teacher Award in Chemical Engineering for the academic year 2004-2005 and Manudhane Award for Best Applied Research in Chemical Engineering in the year 2003.
ABOUT PROF. POOVIAIAH

Prof. Poovaiah is a senior faculty member at Industrial Design Centre (IDC) and the incumbent of D.L. Shah Chair for Innovation at IIT Bombay. He is credited for many initiatives including major modifications in the 'Master of Design' curriculum, strengthening the Ph.D. program and co-ordinating the newly introduced Bachelor of Design (B.Des.) program that has led IDC to be ranked in the top 50 design schools in the world by Business World magazine.

Currently, he is involved with building open access digital resources related to ‘Design Learning’, ‘Folk Tales’, ‘Designing for Children’, ‘Design of Way-finding Systems’ and ‘Design in India’ with access to networked collaborative information. In this regard, he has been co-ordinating along with NID and IIT Guwahati, and is involved with the Min-
Programs, Ministry of Human Resource Development’s sponsored project named ‘e-kalpa’, to build an open access digital learning environment for design in India. He is also the Principal Investigator/Co-director of a research project on experimenting with Social Media called ‘The Centre of Social Media Innovations for Communities (COSMIC)’, a collaborative initiative between IIT Bombay and the Universities from Singapore - NUS and NTU.

Professionally, he was involved with developing ‘Collaborative Learning Environments’ and ‘Communications Environment on Television’ for Microsoft Corporation. He was instrumental in designing the corporate vision and retail design for oil major Bharat Petroleum and Indian Oil Corporation, that has been implemented across all its outlets in India. Along with his colleague, he has also designed an electronic voting machine (EVM) for India built by Bharat Electronics Limited.

He has been a proud recipient of many awards and honours including the IBM Faculty Award Grant 2014, Microsoft Faculty Award Grant, 2004 and ‘The most outstanding interface design’ for Jellow and Smokeydote at Design Expo, Seattle, USA. He is also a Visiting Research Professor at the School of Computing, NUS, Singapore since 2010.
Prof. Prasad has been with IIT Bombay since 1980, prior to which he was French Government Fellow at Laboratory of Magnetism Bellevue, France (1977-79) and IBM Research Fellow at California Institute of Technology, USA (1979-80). He has carried out pioneering work in the area of Ferrite Thin Films and Bilayers. His research group succeeded in depositing nano-crystalline Zn ferrite thin films which can show ferrimagnetic order at room temperature. This material is otherwise paramagnetic in bulk form. Thin films of this material also showed a small FMR linewidth. Prof. Prasad’s group also deposited Co Ferrite Thin Films with magnetization significantly exceeding the bulk value. His group also prepared ferrite nano particles for the use of gas sensors and succeeded in depositing very low linewidth polycrystalline garnet thin films which were used for Split Ring Resonant Systems.
Prof. Prasad has been a Chercheur Associe in CNRS, Bellevue (France), Gledden Visiting Senior Fellow in University of Western Australia, Perth, Visiting Professor in University of Illinois, Chicago and has collaborations with laboratories in France, Australia, Japan, Russia and Czech Republic.

He has more than 110 publications in international peer reviewed journals, and many papers in various national and international conferences. He was twice felicitated with the IIT Bombay’s Best Teacher Award in 1999 and 2003. He was also awarded the Officier des Palmes Academiques in 2007 and Chevalier de la Legion d’honneur (Knight of Legion of Honour) by the French Government in 2011.
**About Prof. Raja**

Prof. Raja is an Institute Chair Professor from the Department of Metallurgical Engineering and Materials Science in IIT Bombay. He has been a reviewer for more than two dozen scientific journals and member of editorial boards of five international journals; a member of Research Councils of Central Electrochemical Research Institute (CSIR), Naval Material Research Laboratory (NMRL). He has also served as a Chairman of IIM Mumbai chapter and organized several continuing education courses for industry and solved about 100 industrial problems for about 50 industries.

He has made significant contributions in understanding corrosion mechanisms of alloys at atomic and microscopic levels for development of corrosion resistant alloys. The dissolution mechanisms of aluminium alloy sacrificial anodes and molybdenum and stress corrosion mechanisms of light alloys namely aluminium, magnesium and titanium are not only original but also helped in life assessment of engineering structures such as aircraft fuselage and gas...
turbine engines. Eco-friendly thermally sprayable polyethylene coatings and silane coatings and strontium modified high deep drawing quality zinc coatings for steels and surface modification of stainless steels for high corrosion and wear resistance applications have high technological significance.

He has been a Guest Researcher at the Department of Engineering Metals, Chalmers University of Technology, Gothenburg, Sweden, a Visiting Research Professor at Metallurgical and Materials Engineering, University of Nevada, Reno, USA and many other international institutions. He has published 99 papers in international journals, 10 papers in national journals, 71 in conference proceedings and 11 book chapters. He has moreover, delivered 97 plenary/keynote lectures and invited talks and numerous talks in workshops and training program. In addition, Prof. Raja has edited a book, a conference proceeding and co-authored a book and holds an Indian patent.

He has been a recipient of Mascot National Award of Electrochemical Society of India in 2003; Excellence in Teaching Award 2008 by IIT Bombay; Meritorious Contribution Award by NACE International India Section; and VASVIK Award 2014; besides being a Fellow of NACE International USA; Society for Advancement of Electrochemical Society and Indian Institute of Metals.
Prof. Ramakrishnan began his career in 2004 as a Research Staff member with IBM India Research Lab. During his stint with IBM Research, he contributed in designing a declarative framework for Information Extraction from text called SystemT (http://researcher.watson.ibm.com/researcher/view_group.php?id=1264) and induction in its query language called Annotator Query Language. He joined IIT Bombay in 2009 as an Assistant Professor in Computer Science and Engineering Department. He was awarded the IBM Faculty Award in 2011. Currently, he is an Associate Professor and J.R. Issac Assistant Chair Professor in the Institute.

Since joining IIT Bombay, Ganesh has worked extensively in the area of feature induction and relational learning in machine learning, including algorithms and data structures for scaling them up. Apart from these, Ganesh has made significant contributions to (1) Sandhan, an Indian
Language search engine (www.tdil-dc.in/*sandhan), *(2) Programmable Machine Translation (http://www.cse.iitb.ac.in/~ganesh/kcap.html) (3) search over entities and relationships (http://www.cse.iitb.ac.in/~soumen/doc/CSAW/) and (4) BET, a tool for Inductive Logic Programming that integrates several existing algorithms and induction frameworks (BET stands for Background + Example = Theory).

Beside his contributions in the Department of Computer Science and Engineering, Ganesh works closely with the Centre for Technology Alternatives for Rural Areas (www.ctara.iitb.ac.in). Some of his notable contributions in that area include *(1) *voice and video based solutions for information dissemination for farmers and others in the informal sector (http://ruralict.cse.iitb.ac.in/) and (2) technology alternatives for improving supply chain efficiency for farmers and cottage industries (https://play.google.com/store/apps/details?id=com.mobile.ict.cart).

Ganesh has been serving in the committees of several conferences, which include ACL (Association for Computational Linguistics) 2013 onwards, KDD (ACM conference on Knowledge Discovery and Data Mining) 2013 onwards,, AAAI (Association for the Advancement of Artificial Intelligence) 2016, EMNLP (Conference on Empirical Methods on Natural Language Processing) 2014, VLDB (International Conference on Very Large Databases) 2015 and ISWC (International Semantic Web Conference) 2014 onwards.
Prof. Milind Vishwanath Rane
DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC BACKGROUND

B.E., Maharaja Sayajirao University, Baroda, 1986
M.S., Southern Illinois University Carbondale, USA, 1989
Ph.D., University of Maryland, College Park, USA, 1991

RESEARCH INTERESTS

Energy Conservation
Refrigeration and Air Conditioning
Alternate Energy Resources

ABOUT PROF. RANE

Prof. Rane is an Institute Chair Professor at the Department of Mechanical Engineering in IIT Bombay. He has done consultancy projects for Godrej Appliances, Mahindra and Mahindra, Unidyne, Whirlpool of India Ltd, Hindustan Unilever Ltd, McDonald India, Energy Concepts, USA, En-
erSearch, Germany, and many more.

The Heat Pump Laboratory at IIT Bombay (HPL_IITB), de-
veloped at IIT Bombay under his guidance, has filed over 27 Indian Patents Applications, out of which 14 Indian Patents have been granted. Many new technologies have been developed and demonstrated at HPL_IITB including the Matrix Heat Recovery Units; Super Heat Recovery Wa-
ter Heaters; Multi-Utility Heat Pumps, MU_HP; Diabatic Contacting Device (DCD), as Evaporative Condenser (EC); Solar Air Heaters; Solar Steam Generators; Solar Steam Generator with Storage; Energy Efficient Dryer etc. About 18 Technologies have been transferred and some of them are being commercialized.
He has delivered more than 75 Invited Lectures both at national and international level. He has been a member of the Buildings Sub-Committee of the Reserve Bank of India, member of Expert Committee, Bureau of Energy Efficiency etc. He has published two chapters in books, 25 journal papers and 48 conference papers.

Invention of Matrix Heat Recovery Unit (M_HRU) has been recognized by World Intellectual Property Organisation (WIPO). Apart from this, he has been awarded with Best Teacher Award, Higher Education Forum 2012, Nina Saxena Excellence Award in Technology by IIT Kharagpur, Bry-Air Awards Excellence in HVAC&R 2007-08, Dr. P.K. Patwardhan Technology Development Award 2006 by IIT Bombay and VASVIK Award 2005. He has also won the Eureka 2004 First Prize in Business Plan Competition and most Innovative Product Award, ACREX 2004 for Hybrid Air-Conditioning System.
Prof. Chebrolu Pulla Rao

**DEPARTMENT OF CHEMISTRY**

**ACADEMIC BACKGROUND**

B.Sc., Andhra University, 1975  
M.Sc., IIT Madras, 1977  
Ph.D., IISc., Bangalore, 1982  
Research Associate, IISc., Bangalore, 1983  
Post-Doctoral Fellow, Harvard University, 1985  
Post Doctoral Research Associate, MIT, USA, 1987

**RESEARCH INTERESTS**

Bioinorganic model systems; Metallation of proteins; Bio(nano) materials; Cytotoxicity (anticancer research)

Ion and molecular recognition through supramolecular chemistry using the conjugates of calixarenes and carbohydrates; DFT of small molecular systems and MD of protein systems; Artificial metalloproteins and metalloenzymes; Protein docking by synthetic molecules

**ABOUT PROF. RAO**

Prof. Rao is an Institute Chair Professor with the Department of Chemistry in IIT Bombay. His research work in the broad area of Inorganic Chemistry cuts across coordination, supramolecular, bioinorganic, materials and biological chemistry. Three major challenges of bioinorganic chemistry are - selectivity of metal ion by protein binding core; structural and functional mimicking of metalloproteins; and the role of the replacement of original metal ion by a different one and or mutation of a crucial amino acid (artificial metalloenzymes), which he tried to address through his research by using conjugates of calixarenes and carbohydrates. Besides this, his group is also involved in several additional activities connected directly with proteins, enzymes and nucleic acids. These include, disease diagnosis and therapy via the use of glycoconjugates, lectins.
and glycosidases (i.e., glycobiology); cytotoxicity of cancer cells (chemical nucleases); metallation of proteins resulting in bionano materials; molecular dynamics simulations. All this would eventually influence the disease diagnosis, therapy and device making via the bio-compatible materials thus generated.

Prof. Rao had executed several sponsored research projects and evaluated a large number of proposals submitted to various funding agencies in India and a few in abroad. Besides publishing his work in internationally reputed journals from ACS, RSC, Wiley and Elsevier, he has been involved in reviewing a large number of manuscripts submitted to these journals. He has been granted 4 US patents and has filed one dozen Indian patents. His publications received impressive citations. His research group was among the 28 Indian Scientist’s listed under “Highlighting Authors of high-quality research in ACS journals, 2012”. He mentored several doctoral and master’s students for the completion of their theses and the group alumni were well placed in academia and industry.

Not only has Prof. Rao been actively involved with research but he has also served as a selection committee member for faculty and scientists and as a committee member for DST for subject expert. Prof. Rao is a recipient of CRSI Bronze Medal in 2004. He is a Fellow of National Academy of Sciences India and a fellow of Indian Academy of Sciences. He had been on the Editorial of boards of Indian Journal of Chemistry (Section A) and Journal of Chemical Sciences.
prof. v. ramgopal rao
department of electrical engineering
academic background
b.tech., kakatiya university, 1986
m.tech., iit bombay, 1991
dr.-ingenieur, universitaet der bundeswehr munchen, germany, 1997
post-doctoral fellow, university of california, usa, 1998

research interests
micro/nano-fabrication
nano-electro-mechanical sensor systems
nano-scale devices

about prof. rao
prof. rao is a p. k. kelkar chair professor in the department of electrical engineering and the chief investigator for the centre of excellence in nanoelectronics project at iit bombay. he has over 350 publications to his credit, in the area of electron devices & nanoelectronics in refereed international journals and conference proceedings and is an inventor on 30 patents (including 13 issued us patents) and patent applications, with many of his patents licensed to industries for commercialization. he is also a co-founder of the company nanosniff technologies pvt. ltd. at iit bombay which is developing products in the area of nanotechnology.

the primary research focus of prof. rao’s group has been the deep understanding of the impact of materials and processes on nanoscale devices, and utilization of this understanding in the engineering of semiconductor devices and systems to significantly improve their performance. his work has provided clear insights into device-circuit
interactions involving lateral asymmetric channel devices and FinFETs, which contributed to the power reduction in integrated circuits used in mobile phones. His group’s research on drain-extended MOS (DeMOS) has enabled integration of high voltage and high frequency applications in standard CMOS. The multi-disciplinary research activities he has initiated at IIT Bombay in the area of Nano-Electro-Mechanical-Sensor systems have enabled development of low-cost sensor systems for healthcare and security applications in the country.

Prof. Rao’s work has been recognized with many awards and honors in the country and abroad. He is a proud recipient of the Shanti Swarup Bhatnagar Prize in Engineering Sciences in 2005 and the Infosys Prize in 2013. Dr. Rao has also received the Swarnajayanti Fellowship award from the Department of Science & Technology; IBM Faculty award; Best Research award from the Intel Asia Academic Forum; Techno-Mentor award from the Indian Semiconductor Association; DAE-SRC Outstanding Research Investigator award; NASI-Reliance Platinum Jubilee award; and the H.H. Mathur Excellence in Research Award from IIT Bombay.
Prof. B. Ravi is an Institute Chair Professor of Mechanical Engineering at IIT Bombay. He joined the Institute in 1992, after completing his Masters and PhD from the Indian Institute of Science, Bangalore. He held short visiting appointments in USA at West Virginia (1996) and Purdue University (2006).

Prof. Ravi works in two areas: metal casting and medical devices, and heads the twin labs E-Foundry and OrthoCAD with several mega R&D projects. He guided 12 PhD & 70 Masters students, published 230 technical papers & three books, gave over 300 invited talks in India and overseas, provided consultancy to dozens of manufacturing companies and conducted 55 training courses benefitting over 2000 engineers and teachers.

Prof. Ravi has successfully demonstrated multi-institutional collaborative translational R&D work. His co-developed AutoCAST (for casting design, with 3D Foundry Tech, Mumbai), FLOW+ (for casting simulation, with CSIR-NI-IIST, Trivandrum), and CollabDDS (for tele-radiology, with
AIIMS, NIC, and CSIR-CSIO). The Cloud-based E-Foundry has clocked over 60,000 visitors worldwide. Hardware products include innovative experimental setups for metal casting, as well as medical devices like orthopedic implants, diagnostic devices, and surgical instruments, leading to 15 patents filed in India.

Prof. Ravi’s work has been recognized by several awards: Best PhD Thesis in 1992 from IISc Bangalore; WTI Foundation Award in 2003 for draft manufacturing policy, given by former Prime Minister Shri Vajpayee; IIT Alumni Innovations 2011 Award for AutoCAST; DST-Lockheed Martin India Innovation Award 2012 for E-Foundry, and Patwardhan Best Technology Development Award in 2012 for knee mega-prosthesis. CNBC TED MED India featured his work in April 2013. He represented India three times at World Foundry Congresses, in Germany (1989), USA (1996) and Spain (2014). The Royal Academy of Engineering invited him twice to manufacturing policy meetings in London (2014 and 2015).

At the national level, Prof. Ravi serves as the Vice President, Governing Council of CMTI, Bangalore; and member of several committees including: Program Advisory Committee, DST (Ministry of Science & Technology); Expert Committee on Orthopedic Devices, Bureau of Indian Standards; Undergraduate Engineering Board, AICTE; Scientific Advisory Committee, Walawalkar Hospital, Dervan; and academic boards of several institutes. He is a Fellow of the Institution of Engineers, associate editor of Indian Foundry Journal as well as Sadhana, and review board member of many international journals.

Prof. Ravi is committed to indigenous product innovation, and empowering teachers in other colleges to enhance the interest and employability of their students in the manufacturing sector.
Prof. G.G. Ray
INDUSTRIAL DESIGN CENTRE

ACADEMIC BACKGROUND
B.Sc., Physiology (Hons), University of Calcutta, 1971
M.Sc., University of Calcutta, 1974
Ph.D., University of Calcutta, 1980

RESEARCH INTERESTS
Manual Material Handling
Agricultural ergonomics and tool design
Sustainable and affordable ergonomic design intervention
Ergonomics for the geriatrics population
Design for special people

ABOUT PROF. RAY
Prof. Ray joined IIT Bombay in December 1979 with responsibility of developing first Ergo-Design laboratory in India. He has worked mostly in the areas of design ergonomics with special reference to manual material handling and developing accepted load for the women using head mode of load carrying. He has also carried out extensive ergo-design works in the area of agricultural tools design, developed several products for people with cerebral palsy, and for those who are visually challenged. He has moreover, conceptualized several products for the Indian geriatric population. Prof. Ray is currently engaged in developing appropriate design solutions for the workers in traditional brick kiln industry and creating mobile phone/e-Note book based educational application for the migrating workers and children of India.
He has received the prestigious “Prof. J.N. Maitra” Memorial Gold Medal in the Indian Science Congress, from the Physiological Society of India and received three best paper awards in the international ergonomics conferences. He was also appointed as short-term faculty at the Tufts University, USA and has also been a Visiting Professor at the University of Lulea, Sweden. He is also the Honorary President of the Indian Society of Ergonomics, Chairman of Bureau of Indian Standards (BIS), Member of the Board of Governors, Indian Institute of Packaging and was an Ex-advisor to Godrej & Boyce furniture division. He has also been associated with various consultancy projects with leading firms of the country, contributing his technical expertise to improve product design and ergonomics.

Prof. Ray has published more than 35 papers in journals and presented papers in more than 120 conferences. He has six design registrations on developing LPG gas stoves for visually challenged, has published one book on “Ergonomics Guideline for designing home interior for the elderly” and edited two books in the area of Ergonomics.
Prof. Samajdar is an Institute Chair Professor from the Department of Metallurgical Engineering and Materials Science in IIT Bombay. Prior to joining IIT Bombay in 1998 he worked in different industries. His research on crystallographic texture is centered around the ‘National Facility of Texture & Microtexture’. He is working extensively on Thermo-Mechanical processing and Microstructural Engineering with a broad spectrum of sponsoring agencies ranging from atomic energy to defense, and a range of national and multinational industries are supporting his research work.

Prof. Samajdar has been an Indian Representative for ICOTOM. He has also been associated with different national and international academic institutes and industrial R&D. He has co-authored a book - ‘Thermo-Mechanical Processing of Metallic Materials’. This is a text book for graduate students and practicing engineers which has now become a standard textbook for graduate students in sever-
al institutes in India and abroad.

He has published 140 Paper in different International Journals and has been a recipient of Fellow of INAE and EMSI, and Humbolt Fellowship (Germany).
Prof. Pratul Kumar Saraswati  
DEPARTMENT OF EARTH SCIENCES

ACADEMIC BACKGROUND
B.Sc., Banaras Hindu University, 1976  
M.Sc., Banaras Hindu University, 1978  
Ph.D., IIT Bombay, 1983

RESEARCH INTERESTS
Cenozoic micropaleontology and biostratigraphy
Understanding the response of symbiont-bearing foraminifera to paleoenvironment & paleoclimate
Developing geochemical proxies for the paleobiology of foraminifera

ABOUT PROF. SARASWATI
Prof. Saraswati started his career with ONGC. He was involved in biostratigraphy, paleoenvironmental interpretation and subsurface correlation of the exploratory wells in Saurashtra offshore and Bengal Basins. He joined IIT Bombay in 1988 and since then he has carried out several projects with oil industry, the major ones include Coastal environments of Gulf of Cambay, Carbonates of Kutch and Biostratigraphy of Myanmar offshore. Presently, he is working on biostratigraphy and sequence stratigraphy of Kutch and Cambay basins.

His area of research is Cenozoic micropaleontology. He has focused principally on symbiont-bearing benthic foraminifera, the major producers of carbonate in shallow seas in deep time. His research is on application of these foraminifera in biogeochronology, paleoclimate and paleoenvironmental reconstruction. With his students and co-re-
searchers, he has provided updated stratigraphy of the Eocene successions of Kutch and Cambay that are widely used as timeframe for various geological interpretations. His current interest is to develop geochemical proxies for the paleobiology of the fossil and extinct foraminifera. He has studied several species from Pacific and Indian Oceans for their stable isotopes and trace elements to decipher the signatures of life history in their shells.

He was a member of the Peer Review Group of the DGH, Ministry of Petroleum, Advisory Committee of the Western Offshore Basins, ONGC, Research Advisory Committee of Wadia Institute of Himalayan Geology and National Committee of IUGS. Presently, he is on the Board of Governors of Rajiv Gandhi Institute of Petroleum Technology, RAC of Agharkar Research Institute and PAC of the SERB-Earth Sciences (DST). He has authored 60 papers in refereed journals and chapters in books and presented 30 papers in conferences. He is on the Editorial Boards of Journal of Petroleum Geology (Wiley-Blackwell), Energy Exploration and Exploitation (Multi Science), Journal of Geological Society of India and Journal of Palaeontological Society of India.

He is a recipient of the STA Fellow at Akajima Marine Science Laboratory, Japan and JSPS Fellow, Shimane University, Japan.
About Prof. Sethi

Prof. Sethi has contributed immensely through his research activities. He has researched in the development of gas clean-up systems for small scale biomass gasifiers for rural electrification, and also in the development of air pollution source profiles for India. He is the recipient of Outstanding Engineer of the Year Award by ONGC, Excellence in Teaching Award by IIT Bombay and winner of the prestigious Vasvik Award 2014.

He has published more than 25 Journal Papers and more than 50 Conference papers. He has been associated with the National Environmental Engineering Research Institute (NEERI), Maharashtra Pollution Control Board (MPCB) and Central Pollution Control Board (CPCB) and has been engaged with a wide range of research on environmental topics like air and water pollution. In association with IIT Delhi, IIT Kanpur and IIT Madras he has been collaborating towards a national effort to improve air quality. He has been participating in a wide range of topics such as

Academic Background

B.Tech., IIT Bombay, 1983
MS., University of Cincinnati, 1990
Ph.D., University of Cincinnati, 1996

Research Interests

Aerosols and air quality
Hot gas clean-up (thermal gasification of biomass)
Satellite remote sensing for air quality management
Satellite remote sensing in association with Washington University in St. Louis, USA; transport and air pollution with Newcastle University, UK; health and exposure with University of Minnesota; and ecology and sustainability with the Columbia University, USA.
Prof. Vishnu Dutt Sharma
DEPARTMENT OF MATHEMATICS

ACADEMIC BACKGROUND
B.Sc., University of Allahabad, 1966
M.Sc., University of Allahabad, 1968
Ph.D., Banaras Hindu University, 1972

RESEARCH INTERESTS
Quasilinear hyperbolic systems of Partial Differential Equations.
Nonlinear waves (Compressive and expansive Shocks) in magnetogasdynamics and shallow water

ABOUT PROF. SHARMA
Prof. Sharma is a Professor in the Department of Mathematics at IIT Bombay. He has served as the Head of the Department of Mathematics at the Institute from 1996 to 2000 and from 2003 to 2006. His research interests lie mainly in the area of hyperbolic systems of quasilinear partial differential equations and the associated nonlinear wave phenomena. He has contributed in the area of nonlinear gas-dynamic waves governed by quasi-linear systems of PDEs and specifically in the development of theory and its applications to several physical situations. His unifying treatment of wave propagation, providing a complete characterization of weak waves modifying and generalizing several known results in the literature, constitutes a major scientific contribution that has impacted many subsequent works in this area. In the area of two-phase flows, he has proposed a first fully nonlinear treatment of wave propagation including shocks. The evolutionary behavior of shock waves of arbitrary strength, which is another longstanding
problem in the literature, has been analyzed by him and his students; this together with his recent work on resonantly interacting waves and Lie group invariance to investigate the class of solutions to nonlinear PDEs involving shocks has shown a significant impact in the academic research community. His research Monograph “Quasilinear hyperbolic systems, compressible flows, and waves” (Chapman & Hall/CRC Press, 2010) is an outcome of his major contributions to this area. Currently he is working on two-dimensional unsteady flow problems involving dissipative and dispersive systems with classical and non-classical shocks about which not much is known.

Prof. Sharma has held visiting positions at the University of Maryland, Mathematics Research Center of the University of Wisconsin, University of Delaware, the University of Stanford and the Courant Institute of Mathematical Sciences. Prior to his joining IITB in 1988, he was on the Faculty of Banaras Hindu University. He has been associated with UGC and CSIR as member of various committees. During his active research career, spanning about 45 years, he has contributed more than 95 research papers, most of which have been published in respected scientific journals. He is a Fellow of INSA and NASI, and is currently a member of the editorial board of the Indian Journal of Pure and Applied Mathematics.

He is a recipient of IITB’s Award for Excellence in Teaching, and Professor S.C. Bhattacharya Research Excellence Award in Basic Sciences. He was awarded C.L. Chandna Mathematics Award by the Canadian World Education Foundation, Canada, for distinguished and outstanding contributions to Mathematics, Research and Teaching, the M.N. Saha Award for Research in Theoretical Sciences from the University Grants Commission, Govt. of India, and the Distinguished Services Award from the Vijnana Parishad of India and the Indian Society of Information Theory and Applications for outstanding contributions to Promote Applications of Mathematics in India.
Prof. Bhanu Pratap Singh

DEPARTMENT OF PHYSICS

ACADEMIC BACKGROUND
B. Sc. (Hons.), Kurukshetra University, 1973
M. Sc., University of Roorkee, 1975
Ph.D., IIT Kanpur, 1984

RESEARCH INTERESTS
Nonlinear Optics, Spectroscopy and lasers
Quantum confined low-dimensional systems - Conjugated polymers, quantum wells, wires dots and few atomic/molecular layer semiconductors etc.
Nanophotonics

ABOUT PROF. SINGH

Prof. Singh is an Institute Chair Professor from the Department of Physics in IIT Bombay. He has contributed to science education and research in various capacities both at institutional and national levels. He has guided/co-guided several Ph.D./M. Tech dissertations and served as thesis examiner as well as reviewer for journals. He has been instrumental in introducing several new courses to bridge the frontiers of optical sciences in undergraduate physics program. For wider outreach, he has developed NPTEL course on nonlinear optics with Prof. K. C. Rustagi. He has served planning committees of several DST SERC schools in optical sciences apart from being the faculty member and an organizing director of one such on “nao-optics”. In addition, he has served DST committees for “optical computing” and “national program on laser materials”

His research activities in broad areas of nonlinear optics
and laser spectroscopy have been mainly focused on the third order nonlinear optical processes in conjugated polymers, porphyrins, dye doped glasses and semiconductor nanoparticles, nanopillars, nonlinear optical waveguides, logic and bi-stable devices, and spectroscopy of rare earths. His work on organic polymers has thrown light on the origin of the nonlinearity in terms of their electronic and chemical structures, its correlation with their characteristic photo induced elementary excitations and applications in nonlinear optical devices. His work in these areas has been widely cited.

He has published nearly 65 papers in peer reviewed journals and have presented 50 papers in national and international conferences. He was awarded the Research Foundation Fellowship for postdoctoral research at State University of New York, Buffalo (USA) during 1986-1988.
Prof. D.N. Singh

DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC BACKGROUND

B. Tech., IIT Kanpur, 1986
M.Tech., IIT Kanpur, 1989
Ph.D., IIT Kanpur, 1993

RESEARCH INTERESTS

Environmental Geotechnology
Instrumentation
Societal Issues and Entrepreneurship

ABOUT PROF. SINGH

Prof. Singh has successfully innovated, developed and publicized Environmental Geotechnology, in the realm of Geotechnical Engineering education and practice. His research is quite basic, interdisciplinary, focused on addressing challenges being faced by the society and deals with a novel concept: Porous Media Characterization Using Energy Fields and capturing various mechanisms, in a nondestructive and noninvasive way. Some fundamental contributions by Prof. Singh are: Development of methodologies for determining chemical, thermal and electrical properties of geomaterials, and characterization of unsaturated soils. He is now trying to address issues related to bio-geo interface and sustainable development.

Prof. Singh has been associated with TATA Power, Reliance Industries Ltd., Indian Petrochemicals Ltd., MAERSK, JNPT, CIDCO, SERB & DST New Delhi, TIFAC-Mission-REACH, BMC/MCGM and BTRA. He has taken up sponsored projects from IEOT-ONGC, BCCI, MCGM, BARC, CSIR, MHRD,
ICAR, AICTE, AERB, GRASIM Industries, BHP-Billiton Australia and Marie Curie International Research Staff Exchange Scheme. He has published 240 technical articles of which 160 are in the refereed journals and 80 are in conferences and has been an Editor-in-Chief for Environmental Geotechnics. He has been an Editorial Board Member of nine International Journals and Guest Editor for 11 international Journal volumes.

In his career, Prof. Singh has won many awards and honors. He is a recipient of SP Research Award by SP Foundation, Rolla, MO, USA, Richard Feynman Prize 2014 for best paper by ICE, UK, John R. Booker Excellence Award, and the IAC-MAG Excellent Contributions Award 2008, to name a few.

He is a fellow of the Indian National Academy of Engineering, New Delhi and the American Society of Civil Engineers (ASCE).
Prof. Singh is currently a professor of Chemistry and Biswas-Palepu Distinguished Chair Professor in IIT Bombay. He has made significant contributions in the area of Organochalcogen (Se, Te) Chemistry. In particular, his strategy of using intramolecular coordination for isolating several novel and interesting organochalcogen species has been highly successful. These species include triselenides, selenenyl iodides, selenenyl esters, ebselen derivatives, chalcogen-containing macrocycles, stable monomeric precursors for MOCVD of II-IV semiconductors and Te-O bonded clusters. His work on selenoenzyme glutathione peroxidase mimetics has been very well recognized and is being cited almost in all important publications in the area. In this work, he has convincingly shown that dichalcogenides having a weakly interacting donor group (O or N) in the close proximity of selenium/tellurium exhibit excellent GPx-like activity. The intramolecular coordination approach has also resulted in the development of a facile route for the synthesis and isolation of novel Se-O/
Se-N heterocycles. His recent work on preorganized metallophilic mercuraazamacrocycles, which readily trap $\text{d}^{10}$ ions such as $\text{Cu}^+$ and $\text{Ag}^+$ is novel and is attracting current interest.

Prof. Singh has published 150 papers and is a Fellow of the Indian National Science Academy (INSA), the National Academy of Sciences, Allahabad, Indian Academy of Sciences and the Royal Society of Chemistry. He has also received the CRSI silver medal in recognition of his outstanding contributions to research in Chemistry. In 2012, IIT Bombay conferred the Prof. S. C Bhattacharya Award of Excellence for Research in Pure Sciences, on Prof. Singh for his outstanding contributions in field of “Organochalcogen Chemistry”. Prof. Singh is a member of the Advisory Editorial Board of Japanese Chemical Society Journal ‘CHEM. LETT’.

Prof. Singh has more than 20 years of teaching experience in the area of rock engineering, underground excavation technology and slope stability. He has so far published more than 300 research papers in different national and international journals and conferences of repute. He has successfully completed more than a dozen Science & Technology and consultancy projects in the area of slope stability, blasting and geo-technical engineering.

Prof. Singh has been one of the fore-runners in India to study petro-physical properties of Indian rocks and their relation to carbon dioxide storage. He has correlated the genesis, porosity, permeability, depth and environmental stress to obtain the quantity and conditions required to optimize high yield, as well as keeping a high extent of liquefied carbon dioxide in the bed rocks. His ground breaking work has led to a directional shift in the government policies which are now focusing on the storage capacities of the igneous and metamorphic rocks. Techniques like Artificial...
Neural Networks, Adaptive Neuro-Fuzzy Inference System and Generalized Regression Neural Networks have been extensively used by him for more than a decade, for effective prediction of the more important and difficult to find parameters. He has also been involved in studies on drilling and blasting, mine planning and design for optimum utilization of minerals for several decades now. The work done on the stability of optimum exploitation of mine fuels has also found appreciation globally. Other than this, he has been actively involved in providing solutions for instability of natural and cut slopes, specifically in hilly regions. He is also one of the pioneers to study the initiation and propagation of rockfall in India, commonly observed along cut slopes.

Prof. Singh has been a Member of the Ministry of Railway to access the present alignment of Railway Tunnel from Katra to Kashmir, and a member of the Technical Advisory Group of NE Railway to access the alignment of Railway Tunnel from Jaliban, Assam to Imphal, Manipur. He has been a Governing Body Member of the National Geotechnical facility, DST, New Delhi, Expert member of the Ministry of Communication and Information Technology, Government of India, to access the development of early warning system for natural disaster.

He is a proud recipient of Professor H.R. Anireddy Memorial Award; Gopal Ranjan Research Award; SGAT Excellence Award for Geo-Engineering Contribution; GSI Sesquicentennial Commemorative Award; First P.N. Bose Mineral Award; Turkish Government Fellowship, through the Ministry of Human Resource and Development, Government of India; and Young Scientist Award from the Indian Science Congress Association of India, besides many other national and international honours.
About Prof. Sohoni

Prof. Sohoni has been with IIT Bombay for past 20 years. He started his career at the Chennai Mathematical Institute in 1993. At IIT Bombay, he has worked on numerous research themes which includes Applied Geometry, Theoretical Computer Science and recently, the Water Sector in development. He has been involved in a long collaboration in the area of Computer Aided Design, where he worked with many entities and companies in the area of feature-based modelling and curve and surface design.

His contribution has been in many areas of theoretical computer science including concurrency theory, computational complexity, and polyhedral theory and optimization. In computational complexity, along with Prof. Ketan Mulmuley (an IITB Alumnus), he is the co-proposer of the Geometric Complexity Theory approach to the P vs
NP problem. He has also contributed in the area of game theory and market equilibria. Prof. Sohoni has worked in many inter-disciplinary areas and with researchers across various departments. In water and development theory, he has developed many case-studies in drinking water and related subjects such as groundwater, modelling and design of water supply schemes.

He has been an invited speaker in various Universities, including Brown University, Princeton University and Banaras Hindu University. He has been a visiting researcher at Kyoto University, Max Planck Institute and the University of Chicago. Prof. Sohoni has publications in many journals of repute including Journal of Algebra, Contemporary Mathematics series of the AMS, SIAM Journal of Computing etc. In social sciences, he has written in the Economic and Political Weekly and Seminar. He is a regular contributor to Current Science - A Fortnightly Journal of Research.
Prof. S. Sudarshan
DEPARTMENT OF COMPUTER
SCIENCE AND ENGINEERING

ACADEMIC BACKGROUND
B.Tech., IIT Madras, 1987
Ph.D., University of Wisconsin, Madison, US, 1992

RESEARCH INTERESTS
Database systems (query processing and optimization, holistic optimization of database-backed applications, keyword querying on semi-structured data)

ABOUT PROF. SUDARSHAN
Prof. Sudarshan is the Subrao M. Nilekani Chair Professor in the Department of Computer Science and Engineering, IIT Bombay, and is currently Head of the Department. Prior to joining IIT Bombay in 1995 as an Assistant Professor, he worked with AT&T Bell Labs as a Member of Technical Staff, and was a Visiting Researcher at Microsoft Research in 2004-05.

He has done pioneering work on keyword search on semi-structured data including novel ranking and search techniques which have been implemented as part of the BANKS system. His paper on the BANKS system in ICDE 2002 won the Influential Paper Award in ICDE 2012. His work on Holistic Optimization of database applications, has introduced a new approach for optimizing database-backed applications by combining compiler optimization techniques with query optimization techniques and has been implemented as part of the DBridge system. He has made significant contributions to query optimization including techniques for multi-query optimization and parametric...
query optimization which has been implemented as part of the Pyro/PyroJ query optimizer. He has also made contributions to fine grained authorization, including fundamental concepts and algorithms for safe query processing.

He has co-authored the textbook “Database System Concepts” (with A. Silberschatz and H. Korth) which is currently in its 6th edition; this textbook is widely used internationally, and has been translated into six languages. He has published 28 journal papers and presented 68 papers in leading international conferences. He moreover, has over 10,000 citations and H-index of 40 (as per Google Scholar), to his credit. He has been a Fellow of the Association for Computing Machinery (ACM), USA; Indian National Academy of Engineering (INAE); and National Academy of Science, India (NASI).
Prof. Akkihebbal K Suresh
DEPARTMENT OF CHEMICAL ENGINEERING

ACADEMIC BACKGROUND
B.Tech., Mysore University, Surathkal, 1979
M.E., IITSc Bangalore, 1981
Ph.D., Monash University, Melbourne, 1986

RESEARCH INTERESTS
Transport-reaction coupling in heterogeneous systems: Liquid phase oxidations, Interfacial reactions, reactions in particulate media, Process intensification.

Heterogeneous catalysis.

Structure-property-function correlations in polymeric membranes used in separations and controlled release.

Physicochemical and biological basis for the therapeutic action of remedies used in alternative medicinal systems.

ABOUT PROF. SURESH
Prof. A.K. Suresh is an Institute Chair Professor with the Department of Chemical Engineering in IIT Bombay since October 2014. Prior to joining IIT Bombay in 1988 he was working with Hindustan Lever Research Centre in industrial R&D. At IIT Bombay, he started as a Lecturer and went on to become the head of the Department of Chemical Engineering in 2005, after which he took a sabbatical at Washington University in St. Louis. Subsequent to his return, he was appointed as the Dean of Faculty Affairs at the Institute in 2009, a position he held for nearly five years.

His research interests are in the broad area of transport and reaction, with current research being on membrane forming processes, solid state reactions, liquid phase or-
ganic oxidations and some fundamental issues on heterogeneous transport-reaction processes. He has two patents under his name, the first, an enzymatic hydrolysis process for the production of liquefacts (maltodextrins) from tapioca starch and the second, an enzymatic hydrolysis process for the production of glucose syrups from tapioca starch.

Prof. Suresh has made pivotal contribution in the area of reaction engineering, and multiphase and interfacial systems. He has more than 100 publications (in journals and conferences) to his credit some of which have over a 100 citations. He was an elected Fellow of the Indian National Academy of Engineering in 2010 and has been conferred many awards and honours, both at national and international levels.
Before joining IIT Bombay in 1989 as a Lecturer, Prof. Yajnik was a Research Associate at Weinberg Theory Group and a Visiting Fellow at Tata Institute of Fundamental Research. He became a Professor at the Institute in 2001 and has held several administrative positions at the Institute, including Chairman Cultural Affairs 2000-2003 and Dean Student Affairs, from 2011-2015. During 2008-2009 he was on deputation as Dean Academic Programmes and Student Affairs, IIT Gandhinagar.

His research in Grand unification, supersymmetric theories, Cosmology has been of great importance. He has specifically worked on topological solutions in grand unified theories, Matter-anti-matter asymmetry of the Universe, Vacuum structure of spontaneously broken theories, Cosmology of the early Universe, Inflationary cosmology models and possible new gauge forces and particles within the reach of collider experiments. His most recent research focus is on Supersymmetric left-right symmetric model as a low energy theory beyond Standard Model and Vacuum

M.Sc., IIT Bombay, 1980
Ph.D., University of Texas at Austin, 1986

**Academic Background**

**About Prof. Yajnik**

**Research Interests**

Grand unified theories, Supersymmetric unification

General Relativity, semi-classical Gravity, Cosmology
stability in presence of topological defects

He has been a Visiting Professor at McGill University, Universite de Montreal, University of California, Irvine and many more national and international Universities. He has co-edited one conference proceeding, and published two lecture courses. He has 38 papers in archival journals, and has 13 published Conference papers to his credit. He is moreover, a Fellow of Gujarat Science Academy.
Chair Professors 2015 - Department wise

DEPARTMENT OF ELECTRICAL ENGINEERING
Prof. Vivek Shripad Berkmar  INSTITUTE CHAIR  24
Prof. B. G. Fernandes  INSTITUTE CHAIR  40
Prof. Subhasis Chaudhuri  KAMAL NAYAN BAJAJ CHAIR  30
Prof. D. Manjunath  INSTITUTE CHAIR  64
Prof. Shabbir N. Merchant  HAL CHAIR  68
Prof. V Ramgopal Rao  P.K. KELKAR CHAIR  94

DEPARTMENT OF ENERGY SCIENCE & ENGINEERING
Prof. Santanu Bandyopadhyay  INSTITUTE CHAIR  10
Prof. Rangan Banerjee  FORBES MARSHALL CHAIR  12

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCE
Prof. K. Narayan  INSTITUTE CHAIR  72
Prof. D. Parthasarathy  INDIA VALUE FUND CHAIR  78

INDUSTRIAL DESIGN CENTRE
Prof. Ravi Poovaiah  D.L. SHAH CHAIR  82
Prof. G.G. Ray  RAMAKRISHNA BAJAJ CHAIR  98

DEPARTMENT OF MATHEMATICS
Prof. Sudhir Ghorpade  INSTITUTE CHAIR  42
Prof. Amiya K. Pani  INSTITUTE CHAIR  76
Prof. Vishnu Dutt Sharma  INSTITUTE CHAIR  106

DEPARTMENT OF MECHANICAL ENGINEERING
Prof. Suhas S. Joshi  RAHUL BAJAJ CHAIR  46
Prof. Kannan Iyer  PRAJ INDUSTRIES CHAIR  44
Prof. K. P. Karunakaran  INSTITUTE CHAIR  54
Prof. Surjya Kumar Maiti  G.K. DEVARAJULI CHAIR  62
Prof. Milind Vishwanath Rane  INSTITUTE CHAIR  90
Prof. Bhallamudi Ravi  INSTITUTE CHAIR  96

DEPARTMENT OF METALLURGICAL ENGINEERING & MATERIAL SCIENCE
Prof. Ajit Kulkarni  INSTITUTE CHAIR  58
Prof. V. S. Raja  INSTITUTE CHAIR  86
Prof. Indradev Samajdar  INSTITUTE CHAIR  100

DEPARTMENT OF PHYSICS
Prof. Shiv Prasad  INSTITUTE CHAIR  84
Prof. B. P. Singh  INSTITUTE CHAIR  108
Prof. Urjit A. Yajnik  INSTITUTE CHAIR  122

SCHOOL OF MANAGEMENT
Prof. S. Bhargava  INSTITUTE CHAIR  18

SYSTEMS AND CONTROL ENGINEERING
Prof. Bijnan Bandyopadhyay  INSTITUTE CHAIR  8
CHAIR PROFESSORS
AT IIT BOMBAY

The cornerstone of IIT Bombay’s Tryst with Excellence are faculty members with an excellent record of teaching and research who have distinguished themselves in their chosen fields. The most preeminent among them are recognised and aided by the institute by appointing them as Chair Professors.