DEPARTMENT OF BIOSCIENCES AND BIOENGINERING

List of Research Topics for Spring Semester 2021-2022

Sr. No.	Name of Guide/ Co-guide	Title/s of research project	Special academic prerequisites
BT			
BT-1	Shamik Sen	MMP9/CD44 crosstalk in cancer invasion	None
BT-2	Shamik Sen	MMP mediated differentiation of mesenchymal stem cells (MSCs) in cancer & their roles in cancer metastasis	None
BT-3	Anirban Banerjee	Exploring co-ordinated activity of autophagy and ubiquitin-proteasomal system for elimination of intracellular bacteria	None
BT-4	Anirban Banerjee	Exploiting ubiquitin-proteasomal system for vaccine development against bacterial infections	None
BT-5	S.K. Ghosh	Title of the project: Understanding regulation of nuclear size and faithful chromosome segregation at a molecular level	None
BT-6	S.K. Ghosh	Studying mechanism of cellular stability of extrachromosomal element in budding yeast	None
BT-7	Debjani Paul Co-guides: Kiran Kondabagil and Kantimay Das Gupta (Physics)	Development of a Peptide Nucleic Acid (PNA) based two-colour absorption platform for pathogen detection	M. Sc. in any biosciences discipline (e.g. biochemistry, molecular biology, microbiology, etc.) background
BT-8	P.S. Phale	Unraveling the mechanism involved in the preferential utilization of aromatic compounds over glucose by *Pseudomonas* sp. CSV86.	None
BT-9	Rajesh Patkar	Understanding Molecular Pathobiology of Inter-species Interactions during Candidiasis	**PS Category** MSc in Microbiology or any relevant area Hands-on research experience in molecular biology and fungal pathobiology.
BT-10	Swati Patankar	Trafficking to the apicoplast in *Toxoplasma gondii*	None
BT-11	Swati Patankar	Regulation of translation in *Toxoplasma gondii* leading to differentiation into bradyzoites	None

BT-12	Sandip Kaledhonkar	Development of Time-resolved cryo-EM and its application for biomolecular reaction	Experience in computer programming, robotics is preferred but not required, Physics, mathematics at bachelor level
BT-13	Sreelaja Nair	Understanding The Barriers To Cardiac Regeneration In Humans Using Zebrafish As A Model System	None
BT-14	Sreelaja Nair	Building theoretical models to understand emergence of three-dimensional shape and structure of embryos and organs during embryonic development.	None
BT-15	Ambarish Kunwar Co-guide: Kiran Kondabagil	Biophysical and Computational Study of Translocation by Molecular Motors	Student with Physics/Engineering Physics/Electrical/Electronics and instrumentation background preferred with strong interest in experiment and computation
BT-16	Samir Maji	Liquid-liquid phase separation of alpha-synuclein: Implication in Parkinson's disease	Fellowship category (FA)
BT-17	Samir Maji	Amyloid based hydrogel for Drug delivery and nanotechnological application	Fellowship category (FA)
BT-18	Samir Maji	Prion-like infectious property of p53 tumor suppressor in cancer pathogenesis	Fellowship category (FA)
BT-19	Samir Maji	Functional amyloid by protein hormones in secretory granules biogenesis	Fellowship category (FA)
BT-20	P.V. Balaji	Functional annotation of glycosyl hydrolases (computational project)	Computer programming
BT-21	Ranjith Padinhateeri	Physics of chromatin organization in a cell nucleus	Students with M Sc Physics/Mathematics or B Tech/BE in core engineering subjects like Computer Science, Electrical Engg, Mechanical, Aero etc. Students should be willing to do computational study.
BT-22	Ranjith Padinhateeri	Role of phase separation in self-organization of a cell	Students with M Sc Physics/Mathematics or B Tech/BE in core engineering subjects like Computer Science, Electrical Engg, Mechanical, Aero etc. Students should be willing to do computational study.

BT-23	Prakriti Tayalia	An immune-competent 3D model as a platform to study skin tissue related disorders	None
BT-24	Prakriti Tayalia	3D scaffolds as *in vitro* platforms for personalized drug screening and cancer immunotherapy	None
BME			
BME-1	Debjani Paul	Development of a robust droplet microfluidic system for physical markers of antimicrobial resistance	B. Tech/M. Tech. (Chemical Engineering or Mechanical Engineering or Engineering Physics or Biomedical Engineering or Electrical/Electronic Engineering or Instrumentation Engineering) or M. Sc. (Physics or Biophysics).
BME-2	Hari Varma	Laser speckle based invivo imaging : small animal and human studies	Students with B.Tech/M.Tech in EE, ECE, Instrumentation, photonics and Biomedical Engineering, MSc physics or photonics.
BME-3	Ambarish Kunwar	Computational study of interactions potential anti-cancer drugs and microtubule-associated proteins with microtubule	Student with Physics/Engineering Physics/Electrical/Electronics and instrumentation background preferred with strong interest in experiment and computation

Prof. Rohit Srivastava
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