

DEPARTMENT OF BIOSCIENCES AND BIOENGINEERING

List of Research Topics for Autumn Semester 2019-2020

Sr. No.	Name of Guide/ Co-guide	Title/s of research project	Special academic prerequisites
BT			
BT-1	Ashutosh Kumar	Structural insight into specialized Nucleosome formation	Should have Physics and Mathematics at B. Sc. level.
BT-2	Ashutosh Kumar	Deciphering the molecular and pathological basis of aggregation of hIAPP for rational drug design against Type 2 Diabetes mellitus (T2DM)	Should have Physics and Mathematics at B. Sc. level.
BT-3	Ashutosh Kumar	Probing structure and recognition dynamics of proteins from SCF complex ubiquitin ligase	Should have Physics and Mathematics at B. Sc. level.
BT-4	P.V. Balaji	Functional annotation of glycosyl hydrolases (computational project)	Computer programming
BT-5	Dulal Panda	Role of plus tips regulating microtubule dynamics in neuron: Implication in neurodegeneration and diseases	FA Category
BT-6	Dulal Panda	FtsZ as anti-tuberculosis drug target:	None
BT-7	S.K. Ghosh	Studying epigenetic determinant and parasexual cycle in human fungal pathogen, <i>Candida albicans</i>	None
BT-8	Rahul Purwar	A quantitative analysis of immune-metabolism of human skin keratinocytes during inflammation using system biology approach. (Funding agency: DST)	M.Sc. (Biotechnology/ Biochemistry/ Life Sciences) PS category
BT-9	P.S. Phale	<i>Pseudomonas putida</i> CSV86: studies on carbon catabolite repression leading to preferential utilization of aromatics over glucose	None
BT-10	P.S. Phale	Comparative genomics and assembly of catabolic pathway in <i>Pseudomonas</i> spp. responsible for Carbaryl degradation	None
BT-11	Kiran Kondabagil Co-guide: Mandar Inamdar	Quantifying Protein Configurations and Deformations	Biotechnology/Chemical Engineering/Mechanical Engineering background preferred
BT-12	Anirban Banerjee	Role of host ubiquitination in clearance of <i>Streptococcus pneumonia</i>	None

BT-13	Anirban Banerjee	Extent of damage in the pathogen containing vacuole and cellular response.	None
BT-14	Shamik Sen	Computational modeling of tumor heterogeneity & cancer invasion	Student with strong computational background interested in computational biology
BT-15	Ambarish Kunwar	Computational study of isotype specific interaction of motor proteins with microtubules	Prior knowledge of computer programming
BT-16	Ambarish Kunwar	Computational study of interaction of tau with microtubules	Prior knowledge of computer programming
BT-17	Sanjeeva Srivastava Dr. Sudhir Nair, Professor and Surgeon, Head and Neck Surgery, Tata Memorial Centre, Mumbai	A proteogenomic characterization of oral cancer in Indian population	General biology background OK.
BT-18	Sanjeeva Srivastava Dr. Aliasgar V Moiyadi, Professor and Chief of Neurosurgery, Tata Memorial Centre, Mumbai Co-guide: Dr. Neelam Shirast, ACTREC, Tata Memorial Centre, Mumbai	A proteogenomic characterization of medulloblastoma in Indian population	General biology background OK.
BT-19	Sanjeeva Srivastava, Co-guide: Dr. Swati Patankar	Investigating the role of differentially regulated proteins in different complication of severe falciparum malaria using proteomics	General biology background OK
BT-20	Ranjith P	Physics of chromatin organization in a cell nucleus	Students with M Sc Physics/Mathematics or B Tech/BE in engineering subjects like Computer Science, Electrical Engg, Mechanical, Aeroetc. Students should be willing to do computational study.
BT-21	Debjani Paul	Enrichment of rare cells in a microfluidic device	None

BT-22	Debjani Paul Co-guide: Mithun Mitra (Physics) and Amitabha Nandi (Physics)	Locomotion of bacteria in crowded environments	Physics background preferred, but it is not a hard criteria for cut-off.
BT-23	Samir Maji	Amyloid based hydrogel for L-dopa delivery in Parkinson's disease	Any back ground.
BT-24	Samir Maji	Studying liquid-liquid phase separation of alpha-synuclein in Parkinson's disease	Any back ground.
BT-25	Prakriti Tayalia	Material based immunotherapy for autoimmune diseases	None
BT-26	Prakriti Tayalia	Role of exosomes in infiltration of T cells in solid tumor	None
BME-1	Rohit Srivastava	0D and 2D materials for biomedical applications	MSc Chemistry with 2 years relevant research experience under SF category
BME-2	Hari Varma	Development of optical imaging system for invivo imaging of tissue	M-Tech and B-tech degree in Electronics, Electrical, Mechanical, Biomedical and Instrumentation engineering. MSc in Physics, Photonics/optics, Applied physics and Instrumentation.
BME -3	Ambarish Kunwar	Computational study of interactions of various potential anti-cancer drugs with cancer drug-resistant tubulin istopyes	Prior knowledge of computer programming
BME-4	Ambarish Kunwar	Computational study of cargo transport by a team of molecular motor proteins	Prior knowledge of computer programming
BME -5	Debjani Paul	Development of a centrifugal microfluidic platform for particle separation	None
BME -6	Debjani Paul	Development of a microfluidic sample preparation module for DNA analysis from complex clinical samples	None
BME-7	S. Mukherji	Nanostructure decorated optical sensors.	CT category with BME / EE / ECE background (one)
BME-8	S. Mukherji	Nanostructures of various metals, composites and polymers donate unique properties to waveguides for enhancing their sensing properties in the presence of a suitable receptor.	TA category with BME / BT / EE / ECE or equivalent background

BME-9	Neeta Kanekar	Design and development of insole-based balance and gait monitoring system	Electronics/ECE/Instrumentation /BME (B.Tech/M.Tech) backgrounds preferred.
BME-10	Ashutosh Kumar (BSBE) Co-guide: Dr. Anurag Lila (KEM Hospital, Mumbai)	Targeting metabolic reprogramming linked with protein misfolding and aggregation in Type 2 Diabetes Mellitus (T2DM).	M Tech, B Tech, M.Sc. with Physical chemistry/Physics will be preferred.
BME-11	Rinti Banerjee	Smart biomaterials and nanoparticles for trigger responsive drug delivery	Background: Any
BME-12	Prakriti Tayalia	3D fabricated structures to study T cell expansion	None
BME-13	Sanjeeva Srivastava Dr. Sudeep Gupta, Professor and Director ACTREC, Tata Memorial Centre, Mumbai	A proteogenomic characterization of breast cancer in Indian population	General biology background OK. Background - MBBS, MDS, MPTH, MVSC preferred
BME-14	Sanjeeva Srivastava Dr. Sudeep Gupta, Professor and Director ACTREC, Tata Memorial Centre, Mumbai	A proteogenomic characterization of cervical cancer in Indian population	General biology background OK. Background – MBBS, MDS, MPTH, MVSC preferred
BME-15	Debjani Paul	Using machine learning-based image processing techniques for disease diagnosis	Masters' degree in BME Foreign student category

Prof. Rinti Banerjee
Head