TAP topics

Name of Faculty	Project code	Area	Title of PhD topic	Nature of the project
Sayantan Dutta	SyD-TAP	Biophysics/Soft Matter	Computational Model of self-assembly and dynamics of biomaterials	Theoretical / Computational / Modelling
Guruswamy Kumaraswamy	GK-TAP	Microplastics	Molecular Mechanisms of Micro-Nanoplastic Formation	Experimental
Ateeque Malani	AtM-TAP	Decarbonization, gas adsorption, storage	Decarbonization using Red-Mud Soil : Combined Modelling and Experimental Study (Co-guide, Prof. D N Singh from Civil Dept)	Both: Theoretical (Computational or Modelling) + Experimental
Sonali Das	SD-TAP	Catalysis & Reaction Engineering	Catalyst and process development for low-temperature onboard NH3 decomposition coupled with NH3-H2 engines	Both: Theoretical (Computational or Modelling) + Experimental
Jyoti Seth	JS-TAP		Microstructure and Rheology of Particle Networks at Fluid-Fluid Interfaces	Both: Theoretical (Computational or Modelling) + Experimental
Ganesh Viswanathan	GAV-TAP	Cancer systems biology	Modeling TNFα mediated Cell death in chemoresistant Acute Myeloid Leukemia	Both: Theoretical (Computational or Modelling) + Experimental
Mani Bhushan, Sujit Jogwar	MB-TAP	Process Systems Engineering	Foundational Model to Aide Process Design Activity	Theoretical / Computational / Modelling
Ratul Dasgupta	RD-TAP1	Fluid Mechanics	Direct Numerical Simulation of Turbulent Flows of Charged Suspensions	Theoretical / Computational / Modelling
Ratul Dasgupta	RD-TAP2	Fluid Mechanics	Fluid dynamics of droplet coalescence in clouds	Both: Theoretical (Computational or Modelling) + Experimental

Name of Faculty	Project code	Area	Title of PhD topic	Nature of the project
Sayantan Dutta	SyD-TA or SyD-FA	Soft Matter, Biophysics	Computational Model of self-assembly and dynamics of biomaterials	Theoretical / Computational / Modelling
Sudarshan Vijay	SV-TA or SV-FA	Machine learning	Accelerating materials discovery using noise-tolerant optimisation methods for quantum chemistry	Theoretical / Computational / Modelling
Nagappan Ramaswamy	NR-TA or NR-FA	Batteries	Energy Storage in Redox Flow Batteries	Experimental
Nagappan Ramaswamy	NR-TA or NR-FA	Electrochemical energy conversion and storage	Water Electrolyzers for Hydrogen Production	Experimental
Ateeque Malani	AtM-TA or AtM-FA	Energy, Simulations	Simulation Study of Enhanced Oil Recovery	Theoretical / Computational / Modelling
Ateeque Malani	AtM-TA or AtM-FA	Climate Change, Simulations	Modelling of early stages of cloud formation	Theoretical / Computational / Modelling
Ateeque Malani	AtM-TA or AtM-FA	Gas Storage, Energy, Simulations	Design of Porous Materials for Gas Storage and Separation	Theoretical / Computational / Modelling
Ateeque Malani	AtM-TA or AtM-FA	Energy, Simulations, Materials	Design and Analysis of Clay-swelling Inhibitors	Theoretical / Computational / Modelling
Sonali Das	SD-TA or SD-FA	Catalysis & Reaction Engineering	Catalyst and reactor development for sustainable light-assisted CO2 Utilization	Experimental
Sonali Das	SD-TA or SD-FA	Catalysis & Reaction Engineering	Catalyst and process development for Plasma-catalytic conversion of Methane to C2 hydrocarbons.	Both: Theoretical (Computational or Modelling) + Experimental
Sonali Das	SD-TA or SD-FA	Catalysis & Reaction Engineering	Catalyst and Reactor development for Hydrogen production from Methane Pyrolysis	Experimental
Swati Bhattacharya	SwB-TA or SwB-FA	Molecular Simulations	Using computer simulations to understand how diabetes develops and develop new therapeutics	Theoretical / Computational / Modelling
Swati Bhattacharya	SwB-TA or SwB-FA	Computational biophysics	Computational study of Cancer Related Intrinsically Disordered Proteins: Insights for Understanding Disease Mechanisms and Guiding Therapeutic Discovery	Theoretical / Computational / Modelling
Bharatkumar Suthar	BKS-TA or BKS-FA	Batteries	Development and Electrochemical Modeling of Low-Temperature Optimized Sodium-Ion Batteries	Both: Theoretical (Computational or Modelling) + Experimental

Bharatkumar Suthar	BKS-TA	Batteries	Smart Diagnostics of Grid-Integrated Battery Systems Using Physics-Based Models and Machine Learning	Theoretical / Computational / Modelling
Bharatkumar Suthar	BKS-TA	Batteries	Zinc-Ion Batteries for Affordable Grid Storage	Both: Theoretical (Computational or Modelling) + Experimental
Sharad Bhartiya	SBh-TA	Control Theory	Behavioral systems theory based MPC	Theoretical / Computational / Modelling
Santosh Noronha	SN-TA or SN-FA	Genetic engineering	Production of chiral pharma intermediates	Experimental
Santosh Noronha	SN-TA or SN-FA	Industrial Biotechnology	Catalytic bioreactors	Experimental
Abhijit Majumder	AbM-TA or AbM-FA	Organ on chip, microfabrication and microfluidics, CFD	Placenta on Chip	Both: Theoretical (Computational or Modelling) + Experimental
Arindam Sarkar	AS-TA or AS-FA	Electrochemistry	High-capacity Prussian blue cathodes for Zn ion battery	Experimental
Arindam Sarkar	AS-TA or AS-FA	Electrochemistry	All-iron redox flow battery	Experimental
Arindam Sarkar	AS-TA or AS-FA	Catalysis	Investigating the Underlying Unity of Chemical and Electrochemical Processes	Experimental
Arindam Sarkar	AS-TA or AS-FA	ECO2RR	Investigations on electrochemical CO2 reduction to formate/other C1/C2 chemicals	Experimental
P Sunthar	PS-TA or PS-FA	Batteries	Optimizing Lithium-Ion Battery Cycles for Maximised Lifetime and Safety	Theoretical / Computational / Modelling
Amol Subhedar	AmS-TA	CFD/lattice Boltzmann	Lattice Boltzmann Modeling of Rarefied Flows in Complex Porous Geometries	Theoretical / Computational / Modelling
Jhumpa Adhikari	JA-TA or JA-FA	Thermodynamics and Molecular Simulations	Phase change materials for carbon capture	Theoretical / Computational / Modelling
Pramod Wangikar	PW-TA or PW-FA	bioinformatics	Computational Analysis of mass spectrometry Data for mRNA Characterization	Theoretical / Computational / Modelling
Pramod Wangikar	PW-TA or PW-FA	bioinformatics	Computational Analysis of MS Data for Synthetic Peptide Characterization	Theoretical / Computational / Modelling
Rochish Madhukar Thaokar	RT-TA or RT-FA	Fluid Mechanics	Development of theoretical tools for droplet and cell electrohydrodynamics	Theoretical / Computational / Modelling
Jyoti Seth	JS-TA or JS-FA	Self-Assembly	Why Do Like-Charged Polymers Stick Together?	Theoretical / Computational / Modelling

Jyoti Seth	JS-TA or JS-FA	Electrorheology	Electrorheology of Networked Suspensions	Both: Theoretical (Computational or Modelling) + Experimental
Jyoti Seth	JS-TA or JS-FA	Suspensions	Simulating the Elasticity of Soft Materials for Biomedical and Environmental Applications	Theoretical / Computational / Modelling
Sujit Jogwar	SSJ-TA	Process Systems Engineering	Sustainable power production through biogas	Theoretical / Computational / Modelling
Sujit Jogwar	SSJ-TA	Process Systems Engineering	Decarbonization through electrification	Theoretical / Computational / Modelling
Sujit Jogwar	SSJ-TA	Process Systems Engineering	Distributed control of interacting systems	Both: Theoretical (Computational or Modelling) + Experimental
Jason R. Picardo	JP-TA	Biofluid mechanics, multiscale modelling, , data-driven methods	Flow and mass transfer in the lungs and gut	Theoretical / Computational / Modelling
Jason R. Picardo	JP-TA	Stochastic dynamical systems, turbulence, pattern formation	Patterns in turbulence: emergence of order amidst chaos	Theoretical / Computational / Modelling
Rajdip Bandyopadhyaya	RB-TA or RB-FA	Water treatment	Chemical sensor device development for detection of water pollutants and technology for their removal	Experimental
Rajdip Bandyopadhyaya	RB-TA or RB-FA	Water treatment	Gravity-driven device for removal of microorganisms, metals and microplastics from water	Both: Theoretical (Computational or Modelling) + Experimental
Rajdip Bandyopadhyaya	RB-TA or RB-FA	Nanoparticles	Engineering nanoparticle size and shape: multiscale modeling, simulation and applications	Both: Theoretical (Computational or Modelling) + Experimental
Mani Bhushan and Ravi Gudi	MB-TA	Process Systems Engineering	Digital twin based decision support system for process design and operations	Theoretical / Computational / Modelling
Partha Sarathi Goswami and Devang Khakhar	PSG-TA or PGS-FA	Fluid Mechanics/Suspensions	Rheology and dynamics of dense, turbulent fluid-solid flows	Both: Theoretical (Computational or Modelling) + Experimental
Partha Sarathi Goswami and Devang Khakhar	PSG-TA or PGS-FA	Fluid Mechanics/Granular flows	Theoretical and experimental studies on segregation behaviour of cohesive and non-cohesive powders under vertical transport	Both: Theoretical (Computational or Modelling) + Experimental

TA or FA topics

Partha Sarathi Goswami	PSG-TA or PGS-FA	Turbulence	Nonisothermal particle laden turbulent flows: direct numerical simulations (DNS) and experiments	Both: Theoretical (Computational or Modelling) + Experimental
Hemant Nanavati	HN-TA or HN-FA	Polymer Chemical Physics	Accurate Molecular Models for Real Polymers	Theoretical / Computational / Modelling
Hemant Nanavati	HN-TA or HN-FA	Biopolymer Physics	Molecular Modeling of Elasticity of Spider Silk and Related Biopolymers	Both: Theoretical (Computational or Modelling) + Experimental
Sameer Jadhav	SRJ-TA or SRJ-FA	Biofluid mechanics	Simulation-Based Characterization of Mass Transport and Reaction Dynamics in Enzymatic Microreactors	Theoretical / Computational / Modelling
Yogendra Shastri	YS-TA or YS-FA	Energy	Sustainable Energy Transition Planning for India - Modeling and Analysis	Theoretical / Computational / Modelling
Yogendra Shastri	YS-TA or YS-FA	Bioenergy	Bienergy system design considering food-energy-water-climate nexus	Theoretical / Computational / Modelling
Yogendra Shastri	YS-TA or YS-FA	Sustainability	Development of an open-source tool for life cycle assessment of transport sector	Theoretical / Computational / Modelling