Dear Friends,

Greetings from IIT Bombay!

Hope you are healthy and safe.

Another month has passed with the situation in the country showing no signs of turning around yet. Mumbai city seems to have steadied out in terms of the daily rate of addition of fresh cases over the past month, however, in areas surrounding the city and contiguous with it, the number of cases is increasing alarmingly. The campus has seen a few more cases with the total number of cases from the campus now standing at 13. We have opened up to PDFs and project staff coming from outside the campus, with some restrictions, and have allowed the functioning of offices with pared-down staff numbers and policies of rotation.

We are working on a dashboard for the COVID-19 webpage which will be continuously updated with details of cases recovered, still active, etc. We hope to have this up on the webpage soon. In addition to this, the student task force has picked up an initiative named 'Campus online', aimed at digitizing and bringing online several of our processes currently requiring physical forms and registers. Prof. Sudarshan is the Convener of the committee driving the initiative, and the committee has, in addition to the student members, a representation from ASC in order to ensure good coordination.

I am delighted to announce that Prof. Pratim Biswas, a distinguished alumnus of IITB and a world leader in aerosol research, has been selected as the next Dean of Engineering at the University of Miami. Prof. Milind Atrey has been selected as the President of Indian Cryogenics Council, the apex council for the same, for 3 years. Furthermore, Karmvir Singh Phogat who completed his Ph.D. in Systems and Controls Engineering in 2018 has received the best Automatica Paper Prize for the years 2018-2020. Automatica, a premier journal in the field of Automatic Control, had selected just 3 papers for the award.

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News from IIT Bombay

Innovation, Development & Entrepreneurship with Alumni Support (IDEAS)

With a vision of providing accelerated, hands-on learning to aspiring entrepreneurs among students and empower faster headway toward venture fabrication, The Alumni batch of 1990 started a legacy project named as IDEAS. The program is superintended by Desai Sethi School of Entrepreneurship (DSSE) in which students partake in IDEAS gain experiential cognizance slants of startup creation and business lifecycles. They are guided in things such as ideation, teamwork, market research, product development, business model, project management, and interaction with professionals.

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Faculty Research at IIT Bombay

Geology - Understanding the Evolution and Formation of Planet Earth

Prof. Kanchan Pande is a renowned geologist and Professor in the Department of Earth Sciences of IIT Bombay. He has received numerous accolades in his career, the most recent being the Prof. S.C. Bhattacharya award for Excellence in Pure Sciences, bestowed by the Institute. Prof. Pande has had a brilliant, satisfying, and exciting journey as a researcher and professor. His journey over the years is a living proof of the fact that knowledge and education, when taken up purely out of curiosity, leads to radical discoveries. This interview will take us through his journey over the years.

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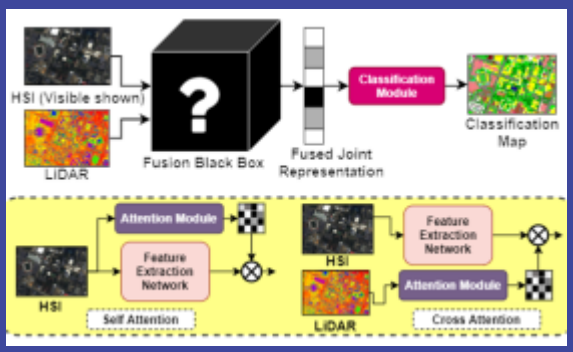
Student Research activities at IIT Bombay



Computer Vision, AI for Social Good, Remote Sensing

Name: Satyam Mohla | **Guide**: Prof. Subhasis Chaudhuri, Prof. Biplab Banerjee | **Department**: Electrical Engineering (Dual Degree)

Today, with recent advances in sensing, multimodal data is becoming easily available for various applications, especially in remote sensing (RS), where many data types like multispectral (MSI), hyperspectral (HSI), LiDAR etc. are available. Effective fusion of these multi source datasets is becoming important, for these multi-modality features have been shown to generate highly accurate land-cover maps.

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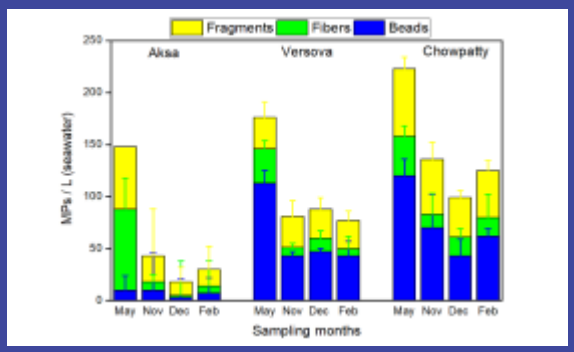

Microplastics in the marine and freshwater ecosystems

Name: Sayan Dutta | **Guide**: Prof. Amritanshu Shriwastav | **Department**: Environmental Science & Engineering (M.Tech.)

Microplastics can be defined as synthetic plastic particles with a typical size range from 1 µm to 5 mm. This is the first study of its kind which aimed at determining the abundance, morphological & spatio-temporal variation of microplastics in the water column of selected marine & freshwater ecosystems of Mumbai & to present a comparison of the two ecosystems based on microplastic contamination level.

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Bio-energy

Name: Priyabrata Pradhan | **Guide**: Prof. Amit Arora & Prof. Sanjay Mahajani | **Department**: Centre for Technology Alternatives for Rural Areas (Ph.D.)

The recent outbreak of COVID-19 has certainly impacted the global goal of clean energy for all. Bioenergy can play a lead role in this scenario due to its wider availability & broad range of applicability. Despite significant advancement in this domain, not much attention has been paid to a holistic system analysis for development of an adaptive & sustainable bioenergy system. In this work we propose a conceptual framework for a sustainable bioenergy system in Indian context.

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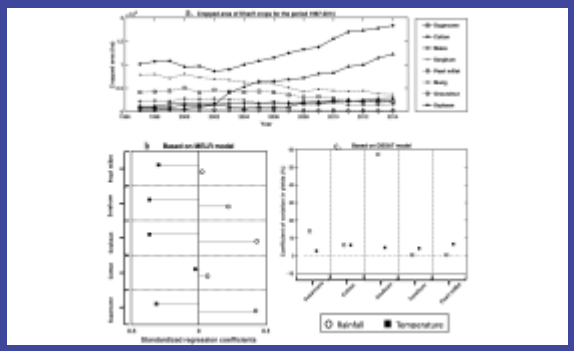

Rainfall deficits and cropping choice drive crop loss in Marathwada, India

Name: Mariam Zachariah | **Guide**: Prof. Arpita Mondal | **Department**: Civil Engineering (Ph.D.)

Understanding the role of climate variability in driving crop loss is an important research area, particularly for the agrarian economy of India. Among other social, economic and political factors, crop loss also contributes to ensuing crises such as bankruptcy, famine and suicides.

To this end, we quantified the effects of growing season rainfall and temperature on selected crops grown in Marathwada, in the state of Maharashtra.

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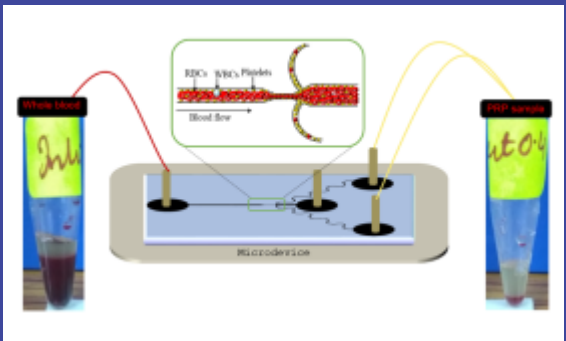

A Microdevice for Platelet Rich Plasma Separation from Blood

Name: Vijai Laxmi | **Guide**: Prof. Amit Agrawal & Prof. Suhas S Joshi | **Department**: Mechanical Engineering (Ph.D.)

The aim of our work is to develop a microdevice for platelet - rich plasma (PRP) separation. Platelets are subcellular fragments of size 2-3 μm in diameter in the shape of discs originated from the megakaryocytes. The developed microdevice is a passive device as opposed to the active devices. It does not need a sheath flow thereby reducing the number of accessories required for its operation. It employs relatively large dimensions so that it is easy to fabricate. The microdevice yields a high amount of platelet enrichment (beyond the requirement of 3-8 times with respect to the physiological level) & exhibits a clog-free operation, making it a reliable device in practical setting.

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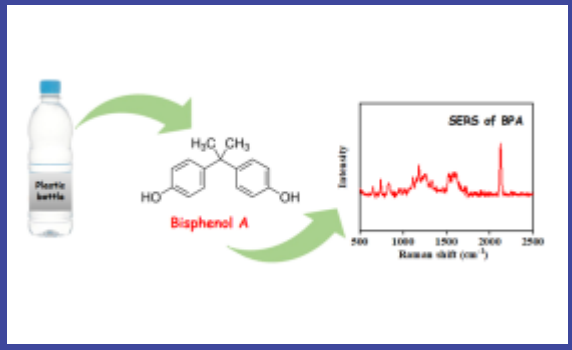

Detection of emerging contaminants in bottled water

Name: Sudeshna Mondal | **Guide**: Prof. Chandramouli Subramaniam | **Department**: Chemistry (Ph.D.)

Plastics have turned out to be one of the most useful inventions of the last century. However, chemicals such as Bisphenol A (BPA) - a commonly used additive during production of PET (polyethylene terephthalate) based plastic bottles causes reproductive defects in children, infertility & breast cancer in humans, when exposed above the threshold limit of 0.6 ppm according to European Union Migration limit.

Our study attempted to understand the thermal stability of PET that is commonly used for storage & handling of water and food products. This assumes greater significance in the Indian context when ambient temperature reach 45^{O}C in summer.

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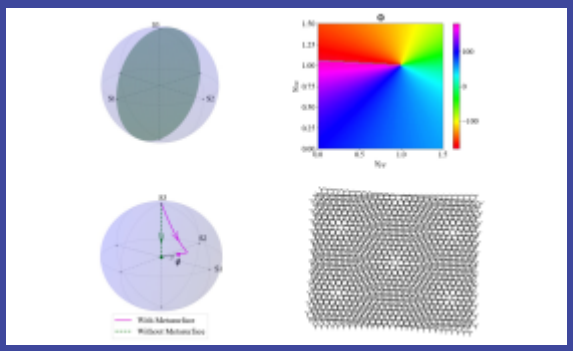

Valleytronics in Atomically Thin Semiconductors

Name: Mandar Sohoni | **Guide**: Prof. Anshuman Kumar | **Department**: Physics (B.Tech, DD)

In recent years, valleytronics – the technology to manipulate the electronic valley degree of freedom' in two dimensional gapped Dirac systems, which possess pairs of degenerate band extrema or valleys, has received enormous attention for quantum information processing applications. In contrast to conventional information storage techniques that utilize charges or spins, gapped Dirac systems offer valleys in their electronic band structures as quantum information storage bits, i.e., qubits. In hexagonal two-dimensional materials, these two disparate valleys occur at high symmetry points in the band structure.

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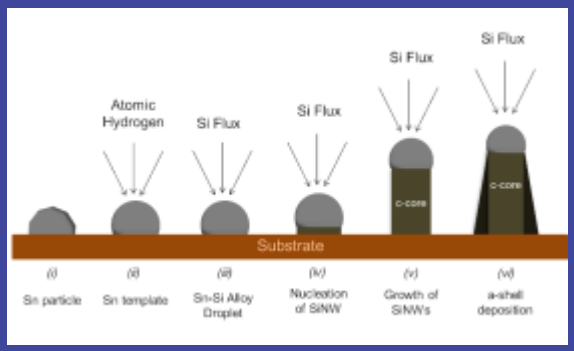

Silicon nanowires for electrochemical energy storage and thermoelectric power generation

Name: Rashmi Tripathi | **Guide**: Prof. R. O. Dusane | **Department**: MEMS (Ph.D.)

Silicon Nanowires (SiNWs) are being considered for various applications like efficient electrodes for batteries and supercapacitors. Silicon is the most sought-after material for battery anode due to its highest reported theoretical capacity of ~4200 mAh/g, which is ten times higher than that of currently used graphite anode in commercial batteries. The alloying reaction of Li with Si during the charge cycle delivers a high capacity, but with a huge structural change of Si. Nanostructuring of Si minimizes the stress developed in the anode during the charge-discharge cycle, giving longer life to the battery.

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Upcoming Events

Institute E-Valedictory function

Institute E-Valedictory Function for the graduating batch (Class of 2020) is being organised on July 18, 2020 @ 7.00 PM

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