Dear Friends,

Greetings from IIT Bombay!

Hope you are healthy and safe.

Hoping to soon escape from this fearsome situation presented in front of us, we plan to welcome August with the same enthusiasm as the city welcomes the monsoon rain. Although the times are tough, there is a glimmer of hope in the darkness that things will bounce back to a brighter future in the forthcoming days. Hence without any further ado, we will be starting the Autumn Semester 2020-2021 in online mode from August 10, so that our (current/on-roll) students don't suffer any academic loss due to the crisis.

Corontine, a homegrown app, has been created by Prof. Ganesh Ramakrishnan and Prof. Manjesh Hanawal to solve contact tracing without privacy issues for the campus residents. Also, to accumulate data on what restrictions should be imposed on the campus residents and off-campus workers, a contact tracing team has been constituted by Prof. Pradeep from Aerospace Department, Prof. Debjani Paul from Bioscience and Bioengineering and Mr.Sajith, Institute Safety Officer as the core members. Moreover, telemedicine services are being provided for not so urgent health issues.

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News from IIT Bombay

Recent Faculty Honours

IITB is well-known to stand apart not only because of its students but also its professors who leave no stone unturned to make us proud again and again. I am delighted to announce the achievements of our highly accomplished professors.

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Rural Immersion Program for the Students of Science and Engineering (RISE)

As Mahatma Gandhi rightly said, "The soul of India lies in its villages". Taking inspiration from the same, The Class of 1992, as a part of their Legacy Project, started a unique two-week immersive cultural experience of life in rural India in May 2019, for the students of IIT Bombay. This program is called RISE - The Rural Immersion program for students of Science and Engineering.

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Faculty Research at IIT Bombay

Fluid Mechanics is Non-intuitive. Small changes can give significant solutions

We had the amazing opportunity of interviewing Shanti Swarup Bhatnagar Award winner Prof. Amit Agrawal, Institute chair professor at Department of Mechanical Engineering, IIT Bombay. He leads a group of scientists who are involved in the development of next-generation diagnostic microdevices. So far, his research work has translated into more than 150 articles published in peer-reviewed international journals and about a dozen patents.

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Student Research activities at IIT Bombay

The representation of climate change in novels and their film adaptations

Name: Nandita Mahajan | **Guide**: Prof. Suddhaseel Sen | **Department**: Humanities and Social Sciences (PhD)

This essay theorizes the manifestation of the theme of climate change in the reception of novels and their film adaptations. To this end, I draw from and adapt Amitav Ghosh's conception of textual hybridity: asserting that the era of climate change perhaps requires a movement beyond language to the image, which he believes is better capable of representing physical form, Ghosh prophesies that literature will evolve to incorporate hybrid forms that entwine text and image, such as the graphic novel.

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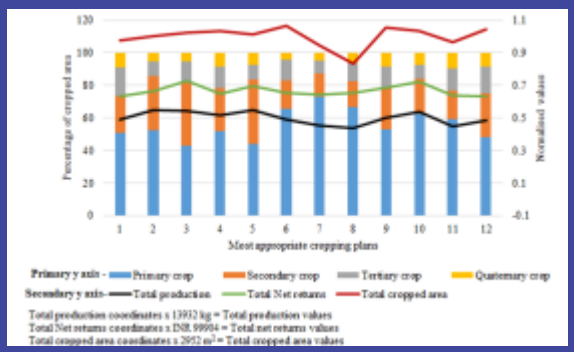

Micro-planning of agricultural resources at farm level

Name: Aniket Deo | **Guide**: Prof. Amit Arora and Prof. Shubankar Karmakar | **Department**: CTARA (PhD)

Indian agriculture has an unfortunate history of farmers suicides, indebtedness & heavy migration of agricultural manpower into other sectors. The reason is justified by successive crop failures, increasing inputs costs, market rate uncertainties & vicious climate change. On the contrary to the declining workforce in agriculture, the demand for food in India is constantly rising. Our work focusses on designing appropriate production plans for optimal resource management such that maximum gains are generated from the available resources.

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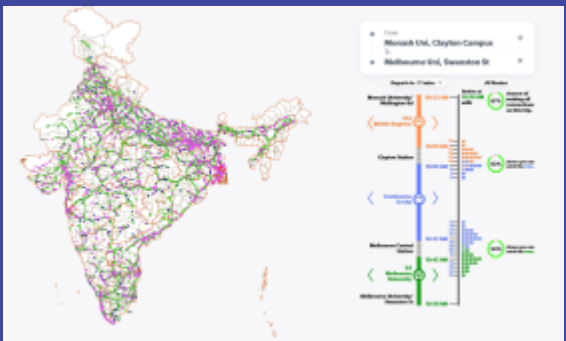

User Models for Visual Analytics

Name: Amit Jena | **Guide**: Prof. Venkatesh Rajamanickam | **Department**: IDC (Ph.D.)

We are increasingly exposed to sensing and prediction in our daily lives. Uncertainty is both inherent to these systems and usually poorly communicated. With an aim to understand how to communicate the uncertainty to non-experts who have no technical background and also at the same time maintaining the relevance of the project for domain experts we built our first study around the public transport in Melbourne, Australia. Through this project, we are trying to understand the Perception of Visual Uncertainty Representation by Non-Experts.

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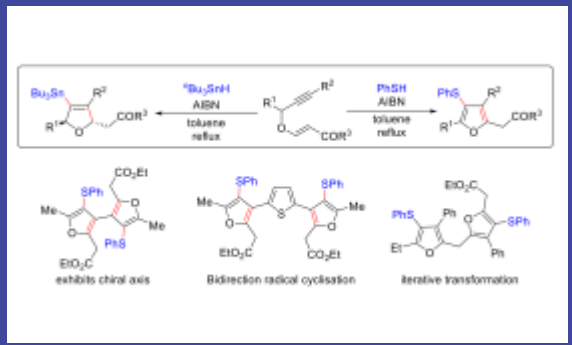

Organic Synthesis Methodology

Name: Padmaja | **Guide**: Prof. Santosh J. Gharpure | **Department**: Chemistry (Ph.D.)

Organic synthesis has emerged as an important area of research in recent times of a pandemic stricken world. It enables us to develop efficient strategies for the synthesis of molecules that already have a biological significance or could have the potential in future. Creativity in methodology development has led to the synthesis of those molecules which have had a significant effect in not just pharma but also in agrochemicals, biomolecular chemistry & energetic materials. One such heterocycle, furan is present in furanoflavanoids, furanocoumarins & furanolactones.

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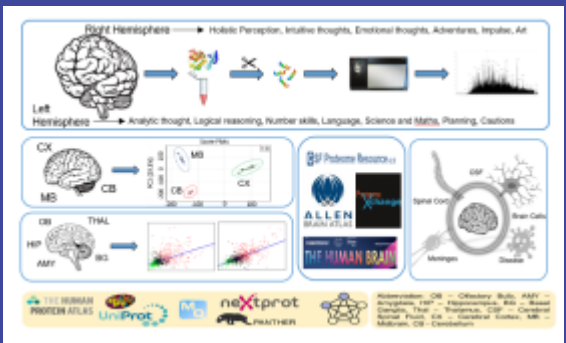

Human Brain Proteome Map

Name: Athithyan Paramasivan and Sanjyot Shenoy | **Guide**: Prof. Sanjeeva Srivastava | **Department**: Chemistry (B.S.)

The human brain is an organ of deep interest and intrigue. Due to its principal role in cognition and thinking, it has been a subject of intrigue throughout history. The brain is divided into two hemispheres, each with different composition and hence different functionalities, but due to the difficulty in obtaining reliable samples, very less is known about the inter-hemispheric relationship and biological implications. Brain Lateralization is an important field of neuroscience research. How the left and right hemispheres differ from each other in their structure and function is one of the important questions in which the current neuroscience research is focused on.

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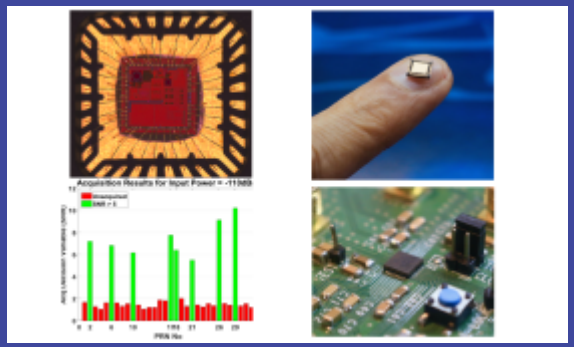

Dhruva: A Universal Navigation Receiver Front-end

Name: Vijay Kanchetla |
Guide: Prof. Rajesh Zele |
Department: Electrical Engineering (Ph.D.)

In the era of smart devices and IoTs, navigation is one of the essential features that we use in various commercial and personal applications. This is the technology that drives your Ola/Uber to the desired destination and facilitates the delivery of food to your home from a restaurant. This technology finds its way in aerial, marine navigation too and it aids nations in surveying their territories, secure their borders, and manage disaster response. We designed "Dhruva," a navigation receiver RF front-end integrated circuit primarily targeted for Standard Positioning Service in civilian applications provided by NAVIC and GPS.

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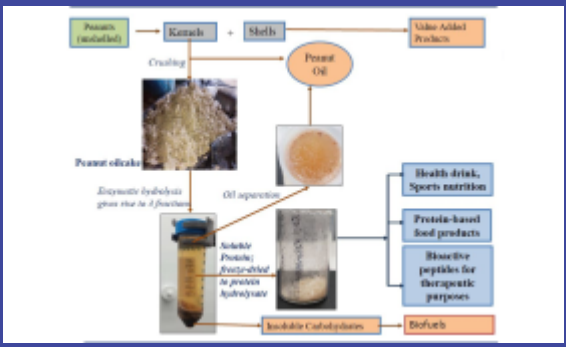

High-quality protein extraction from plant-based sources

Name: Subramoni Hariharan | **Guide**: Prof. Amit Y Arora | **Department**: CTARA (Ph.D.)

With the global population slated to touch 10 billion by 2050, one of the major challenges is ensuring food security concording with nutrient security. Of all the macro-nutrients, protein has garnered a lot of attention over the previous decade, owing to shifts in consumer consumption patterns. The current methods for protein extraction from plants employ harsh chemicals like acids, & alkalis. These affect not only the quality of the protein, but also damage the environment owing to toxic effluents. One of the driving factors of this research was to objectively analyse the possibility of extracting high-quality proteins from under-utilized biomass.

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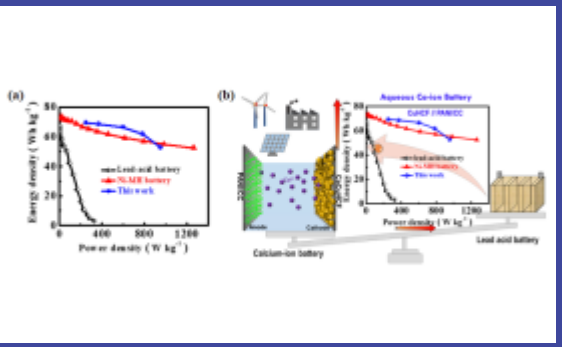

Development of electrode materials for Divalent-ion batteries

Name: MD Adil | **Guide**: Prof. Sagar Mitra | **Department**: Energy Science and Engineering (Ph.D.)

The high-rate cycling capability, volumetric capacity, and environmental benignity at a low-cost define the ingress of the upcoming energy storage devices. The urge of such energy storage devices comes into the picture because today, the state-of-the-art, non-aqueous lithium-ion battery (LIBs) technology is ineffectual to improve its rapid-charging ability beyond a specific limit on a commercial scale. Multivalent-ions can provide more electrons in a single redox reaction under the same conditions giving high specific capacity. Here, we demonstrate the feasibility of a fast, safe, and stable calcium-ion battery system for the first time.

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