భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

आज़ादी का अमृत महोत्सव

Annual Report
2022-23

Inventing and Innovating in Technology for Humanity (IITH)

Contents

> Research is creating new Knowledge - *Neil Armstrong*

Board of Governors

Chairman
Dr B V R Mohan Reddy
Founder Chairman and
Board Member of
Cyient Limited

Member
Shri Rakesh Ranjan, (IAS)
Additional Secretary (TE),
Ministry of Education,
Government of India

Ex-Officio Member
Prof B S Murty
Director
IIT Hyderabad

Member
Smt V Karuna, (IAS)
Secretary to Government, Higher
Education, Government of Telangana
State

Member
Prof Vinod Krishan
Senior Professor & Dean
Indian Institute of Astrophysics

Member, Senate Nominee
Prof Saptarshi Majumdar
Professor
Department of Chemical Eng
IIT Hyderabad

Member
Dr Prema Ramachandran
Director
Nutrition Foundation of India

Member, Senate Nominee
Prof Shiv Govind Singh
Professor
Department of Electrical Eng
IIT Hyderabad

Member
Prof M Lakshmi Kantam
Professor
Institute of Chemical Technology
Mumbai

Secretary
Commodore Manohar Nambiar (Retd)
Registrar
IIT Hyderabad

Our Deans

Prof Saptarshi Majumdar
Dean (Academic)

Prof Tarun Kanti Panda
Dean (International Relations)

Prof Ranjith Ramadurai
Dean (Administration)

Prof K V L Subramaniam
Dean (Planning)

Dr Mudrika Khandelwal
Dean (Alumni & Corporate Relations)

Prof Chandrashekhar Sharma
Dean (Sponsored Research & Consultancy)

Prof Kanchana V
Dean (Faculty)

Prof Venkatasubbaiah K
Dean (Students)

Phanindra KBVN
Associate Dean (Planning)

Our Distinguished Professors

Dr Bayya Yegnanarayana
Professor, IIIT Hyderabad,
Microsoft Chair, & INSA Senior
Scientist

Prof Chennupati Jagadish
Head of Semiconductor
Optoelectronics & Nanotechnology
group, Australian National
University

Dr Rao Surampalli
President and CEO of Global
Institute for Energy, Environment
& Sustainability, Lenexa, Kansas

Prof Christopher C Berndt
Professor, Dept of Mechanical Eng &
Product Design Eng, Swinburne
University of Technology

Prof Jun Murai
Professor & Dean of Graduate
School of Media and Governance
Keio University, Japan

Dr Saraswat V K
Member - NITI Ayog

Prof J N Reddy
Professor, Mechanical Engineering
Texas A&M University

Prof Nobuhiro Tsuji
Graduate School of Engineering
Kyoto University

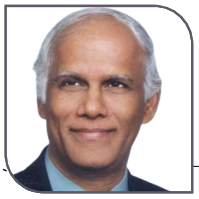
Prof Seeram Ramakrishna
Mechanical Engineering, National
University of Singapore

Dr Pulickel M Ajayan
Benjamin M & Mary Greenwood
Anderson Professor of Eng
Rice University, USA

Dr Paresh Kumar Narayan
Professor,
Monash Business School
Monash University, Australia

Dr Vidyasagar M
SERB - National Science Chair,
India

Prof Rohini M Godbole
Professor
IISc Bangalore



Prof Rao R Tummala
Distinguished & an Endowed Chair
Professor, Georgia Institute of
Technology, Atlanta, Ga, USA

Prof Vijay P Singh
Regents Professor
Texas A&M University, USA

Director's Message

Dear Friends,

As we submit the Annual Report for 2022-23, it is with immense pleasure that I take this opportunity to reflect upon the extraordinary achievements and progress witnessed at the Indian Institute of Technology Hyderabad (IITH) over the past year. The dedication of our remarkable faculty, excellent staff and brilliant students has been a driving force behind our success, and I extend my heartfelt gratitude to each member for their unwavering commitment and hard work.

IITH's Attainments:
In our fifteenth year, known as the Crystal year, IITH has achieved significant milestones. Retaining our overall NIRF Ranking at 14 and securing the 14th Rank in Research in the country is a testament to our consistent excellence. Maintaining our status within the Top 10 ranks of NIRF among technical institutes for the eighth consecutive year, with a current Rank of 8, reinforces our position as the premier second-generation IIT. Notably, our remarkable position of 3rd Rank in the NIRF Innovation Rankings and the considerable progress in the QS-2023 subject rankings in Physics and Astronomy showcase our commitment to academic excellence. IITH has earned four ISO certifications, including ISO 9001:2015 for Providing Educational Services, ISO 14001:2015 for Greenery and Environmental Promotional Activities, ISO 50001:2018 for Energy Saving Practices, and ISO 27001:2013 for Data Security Services. Additionally, we received ISO 22000:2018 certification for Food Safety Management Systems in the IITH Mess. This recognition underscores our commitment to quality across various facets of our institution. The placement scenario at IITH remains robust, with over 500 placement offers from 140+ companies during Phase 1 of campus placements this season.

Academics @IITH:
IITH is committed to pushing the boundaries of education and providing freedom and flexibility to students. Our diverse range of academic initiatives empowers learners to explore new frontiers, engage in cutting-edge research, and embrace interdisciplinary approaches. Collaborations with esteemed institutions have resulted in the introduction of programs such as MTech in Medical Device Innovation, MTech in Ophthalmic Engineering, and an MSc Program in Medical Physics. To contribute to the Indian Semiconductor Mission, IITH has launched a unique BTech program in IC Design and Technology and MTech programs in Systems Packaging, Semiconducting Materials and Devices and Quantum & and Solid State Devices. These additions complement our existing MTech programs in areas like E-Waste management, Integrated Sensor systems, EV Technology, Microelectronics and VLSI, creating a strong ecosystem in the field of Semiconductors. Various initiatives, including a Dual Degree program for BTech students, an MTech in Techno-Entrepreneurship, and a Certificate Course on Deeptech Entrepreneurship, emphasize our commitment to fostering an entrepreneurial ecosystem.

Research, Innovations & Entrepreneurship @IITH:
Our robust framework for research and innovation has led to significant accomplishments. The research base at IITH boasts 9200+ research publications, 1,35,000+ citations, and approximately Rs 900 Crore of sanctioned research funding. Notably, our researchers have taken an early lead in 6G research and have developed affordable Ultra-High Performance Fiber Reinforced Concrete (UHPFRC) for infrastructural applications. IITH's participation in IInvenTiv, a mega R&D Fair, showcased six industry-ready technologies, while collaborations with organizations like SMC Japan, MSIL, and others are paving the way for India-specific innovations in V2X communications. Our 5G Tech: NB-IoT System-on-Chip (SoC) is a unique innovation in the field. The entrepreneurial ecosystem at IITH has supported 130+ startups, creating 1000+ jobs and generating revenue exceeding Rs 1200 Crore. Notably, the Acclimatization Boot Camp (ABC) for Defense Startups, launched by Hon'ble Defense Minister Shri Rajnath Singh, underscores our commitment to supporting innovative ventures.

Collaborations & Relations Building:
IITH's collaborative partnerships with industry and institutions have strengthened, resulting in impactful interdisciplinary research projects. Agreements with CSIR NEIST Assam, Commissionerate of Collegiate Education, Govt of Telangana, Kathmandu University, Nepal, CMOS - College of Medical Sciences, Nepal, IIIT Hyderabad, and others reflect our commitment to collaborative growth. MoUs with DRDO, Suzuki Motor Corporation, TCS, Hexagon, NCAM, Auckland University of Technology, Greenko, NHAI, and Beyond Next Ventures India Pvt Ltd (BNVI) further highlight our dedication to fostering innovation through collaboration. The adoption of five villages in our vicinity, with faculty, staff, and students providing voluntary support, exemplifies our commitment to community engagement.

Awards & Recognitions:
The recognition of 17 faculty and 1 PhD scholar from IITH among the Top 2% of Scientists by Stanford University is a testament to our faculty's excellence. Numerous awards and fellowships received by our faculty and researchers, including the INSA Young Scientist Award and "THE Award for International Collaboration of the Year 2022," underscore our commitment to academic and research excellence. Our students, too, have showcased outstanding performances at various forums, receiving accolades such as the Stephen Mitchell Award, winning hackathons, and earning recognition on international platforms.

Alumni:
IITH alumni continue to excel across various domains, making a remarkable impact on the academic realm. Many alumni have assumed faculty positions at prestigious institutes, including IITs, IIMs, and NITs, demonstrating the quality of education and training at IITH. The first batch of graduates from IITH celebrated a decennial year in 2022. Their batch started the legacy of contributing to a common cause for the development of their Alma mater. This class of 2012 has created a lawn tennis court on campus.

Campus Infrastructure:
With cutting-edge facilities, modern classrooms, well-equipped laboratories, and collaborative spaces, IITH offers a vibrant ecosystem fostering creativity and intellectual exploration. Our recent additions, including the DST-IITH, Integrated Clean Energy Material Platform (ICMAP) for Bioenergy and Hydrogen, 5G Testbed, and a demonstration-purpose Scanning Electron Microscope, reflect our commitment to providing state-of-the-art infrastructure.

The establishment of the Raindrop Research Facility (RRF), the Advanced Darksky Observatory, and collaborations with Malla Reddy Narayana Hospitals (MRNH), ICICI Bank Limited, and others further enhance our research and development capabilities.
Special moments include the laying of the Foundation Stone for BVR Mohan Reddy School of Innovation & Entrepreneurship, the inauguration of the TiHAN Testbed for Autonomous Navigation, and the inauguration of the Chemistry Department Building.
The completion of our Sports & Cultural Complex SNCC, with state-of-the-art facilities, promises to be a central hub for holistic development at IITH, fostering talent, community, and the overall spirit of our institution.

Cheerful Moments @IITH:
From celebrating our 14th Foundation Day with Mr Senapathy “Kris” Gopalakrishnan as the Chief Guest to hosting events like the research excellence awards ceremony, "JAPAN DAY" job fair, MILAN 2022 Championship, Elan & ηVision-2023, E-Summit 2K22, and the Milan Championship, IITH has been vibrant with energy and excitement.

Conclusion:
As we look ahead, optimism and enthusiasm fill our hearts. Our commitment to excellence, innovation, and societal impact remains unwavering. In the coming year, we will continue to embrace change, seize opportunities, and pioneer new frontiers in education, research, and community engagement.

I invite you to explore the detailed insights provided in the following pages of our Annual Report. It is a testimony to the collective efforts of our dedicated team, and I encourage you to share in our pride.

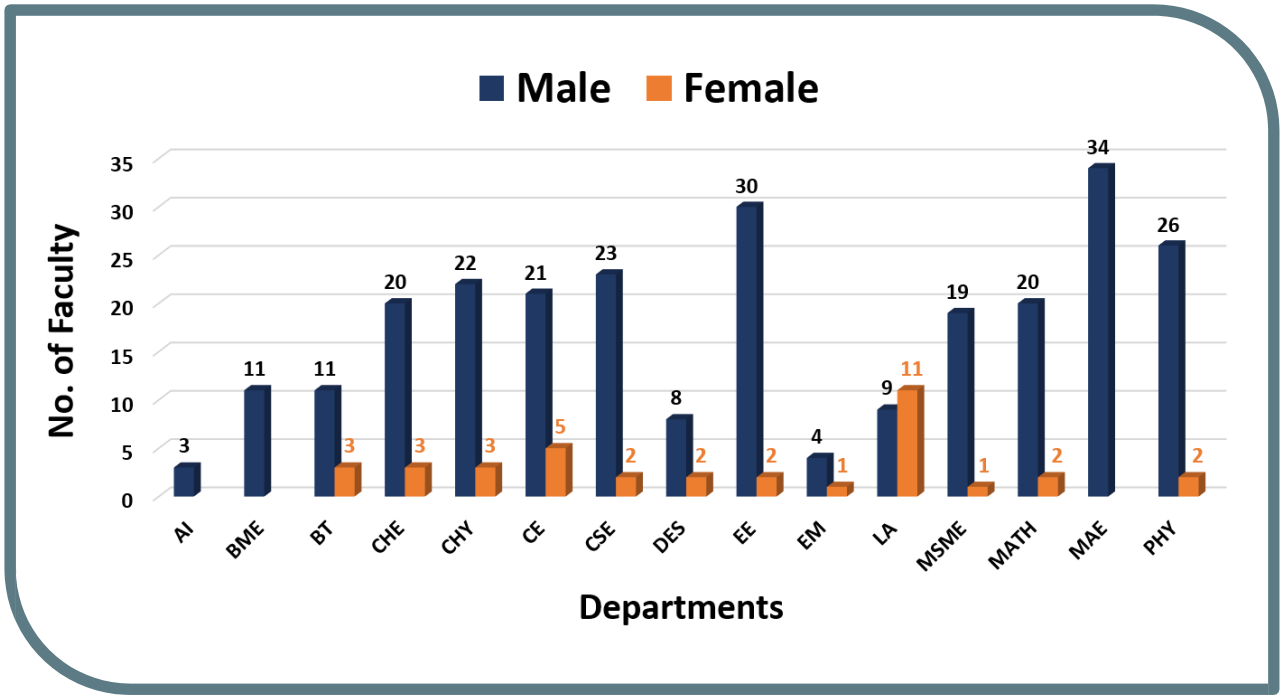
Thank you for your continued support as we strive for excellence and make a positive difference in the world.

Best Regards,
Prof B S Murty

Faculty Statistics

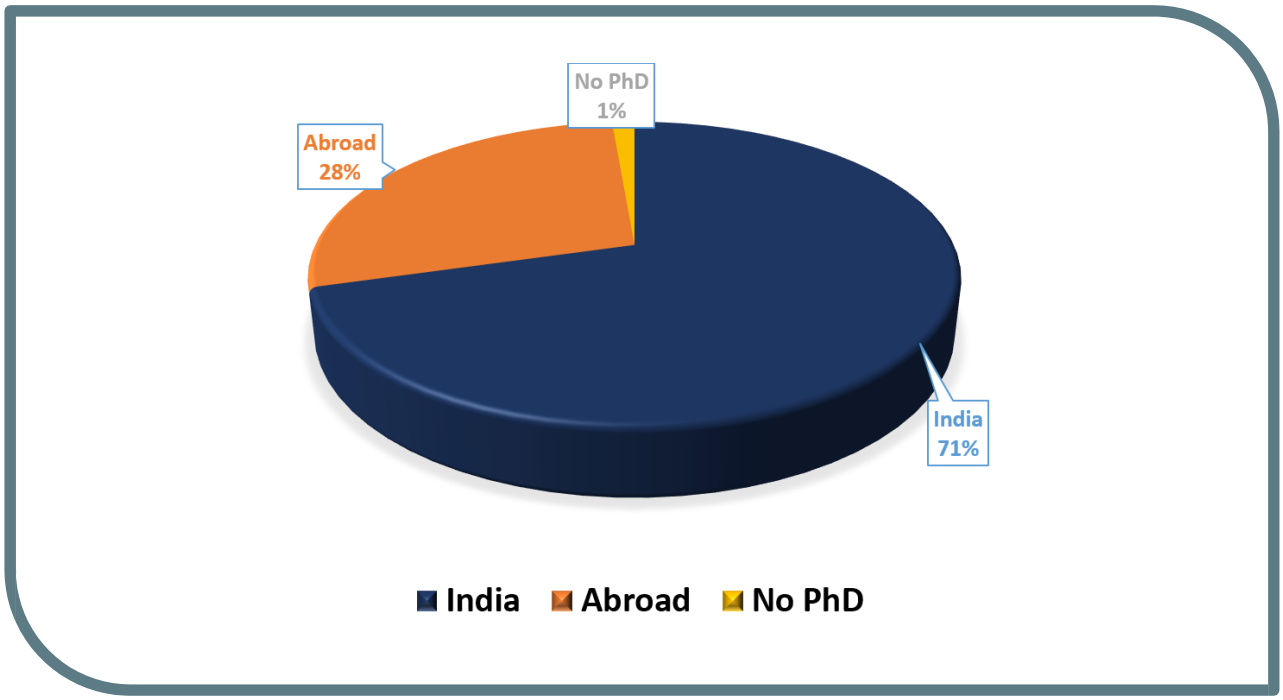
Department-wise

As on 31 March 2023, IITH is having 299 faculty members on-roll. ~14% of the total faculty are women.



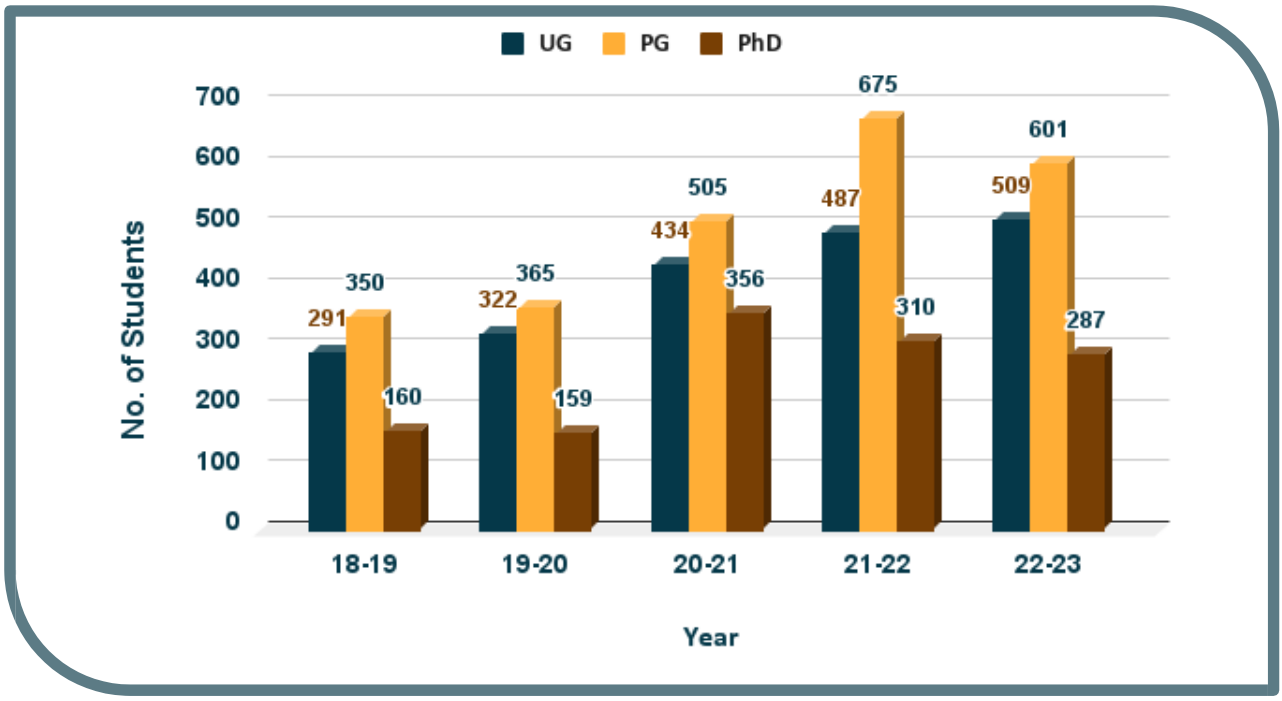
Place of PhD

Place of PhD denotes the geographical location (India/ Abroad) of the Institute from where the concerned faculty has obtained PhD.

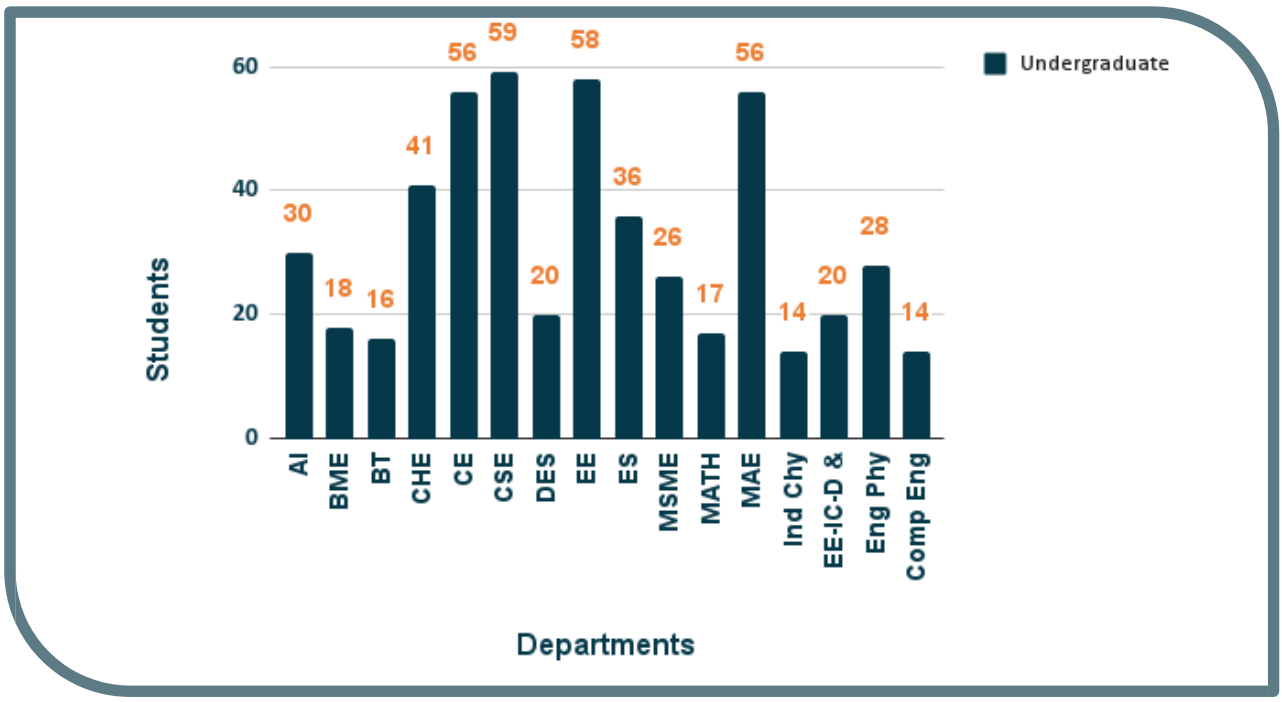


Student Statistics

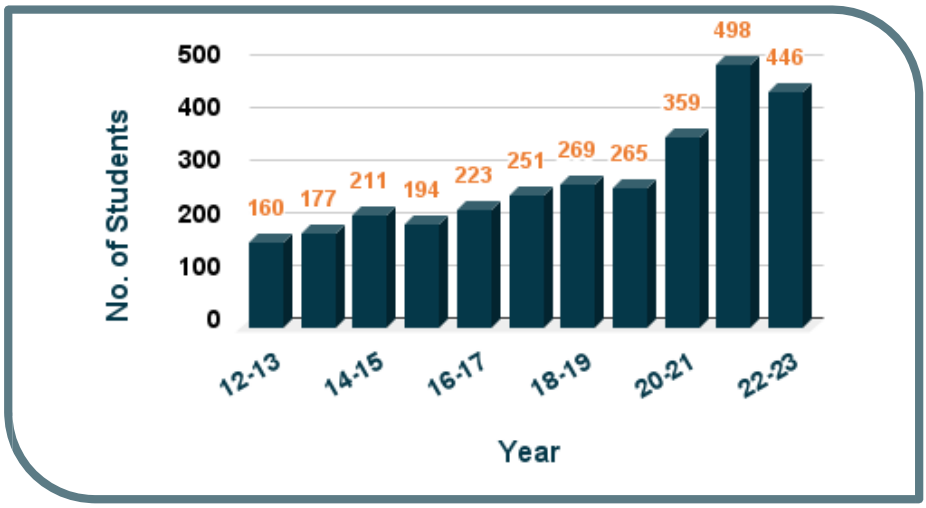
While maintaining the dynamic students among UG, PG and PhD, IITH has seen an increase of 22 seats in UG programs for the AY 2022-2023.



The summary of annual intake for various courses

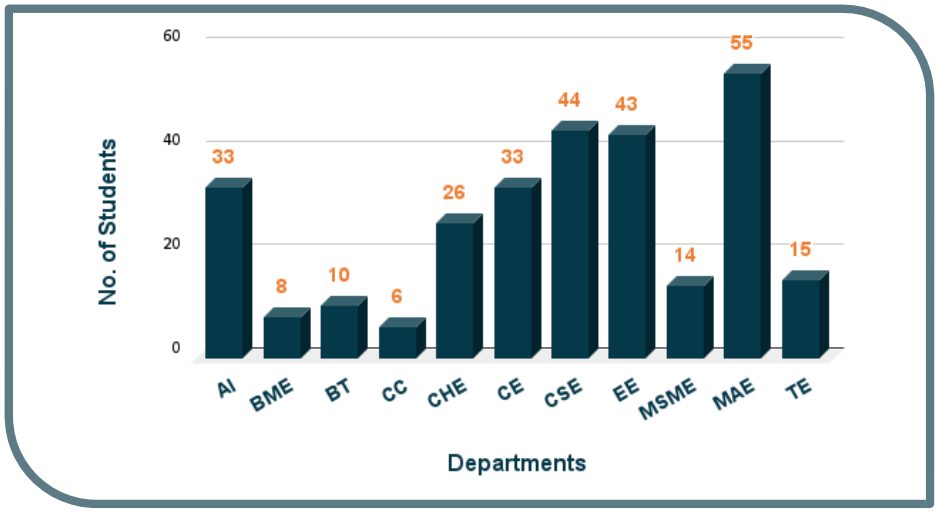


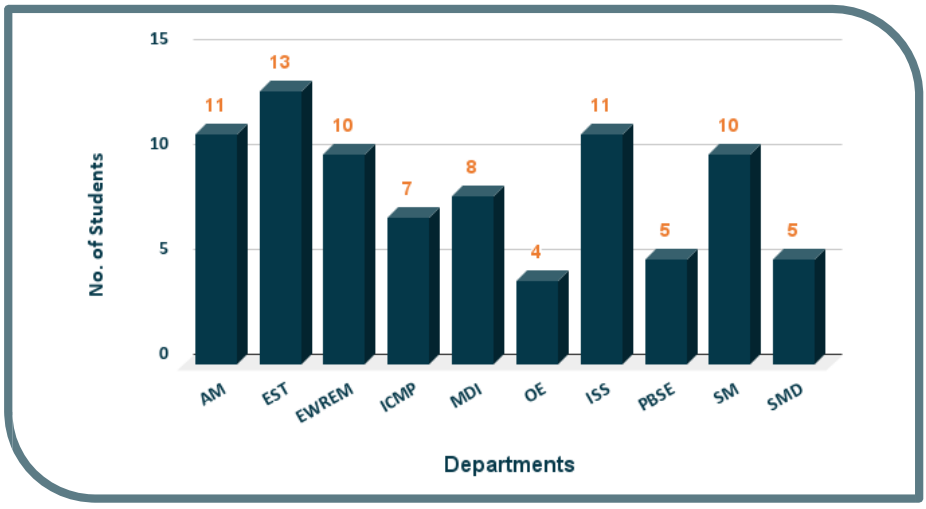
Department-wise Distribution of Undergraduate Students (BTech+BDes) for 2022-2023



Yearly Intake of all MTech Students

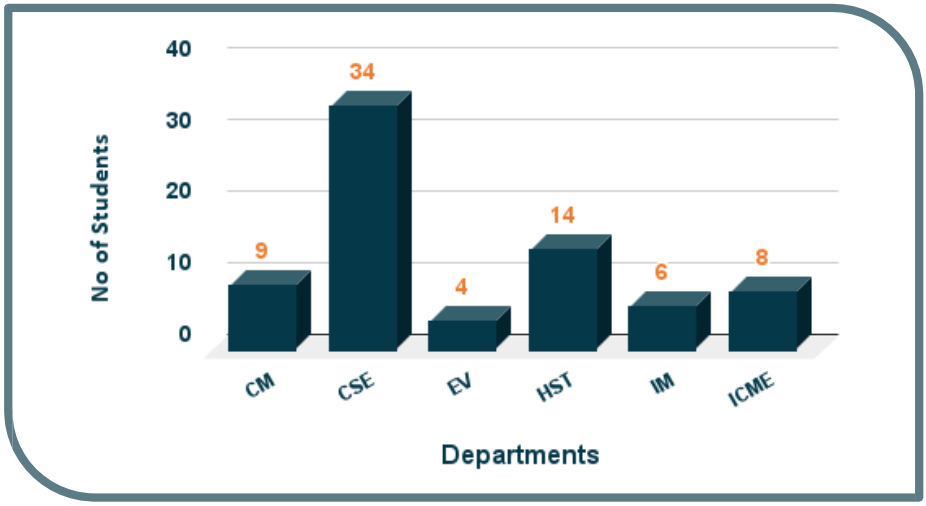
Department-wise Distribution of MTech Students for 2022-2023

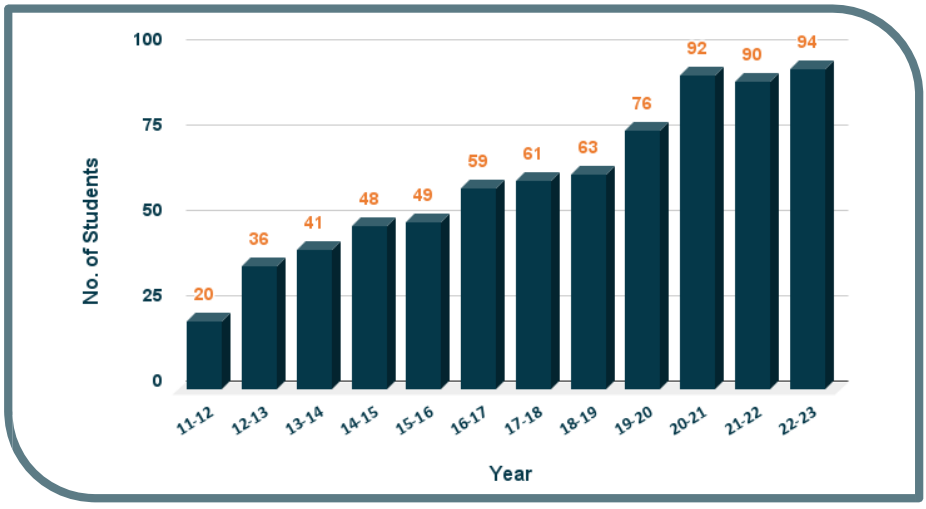




Department-wise Distribution of MTech (Interdisciplinary) Students for 2022-23

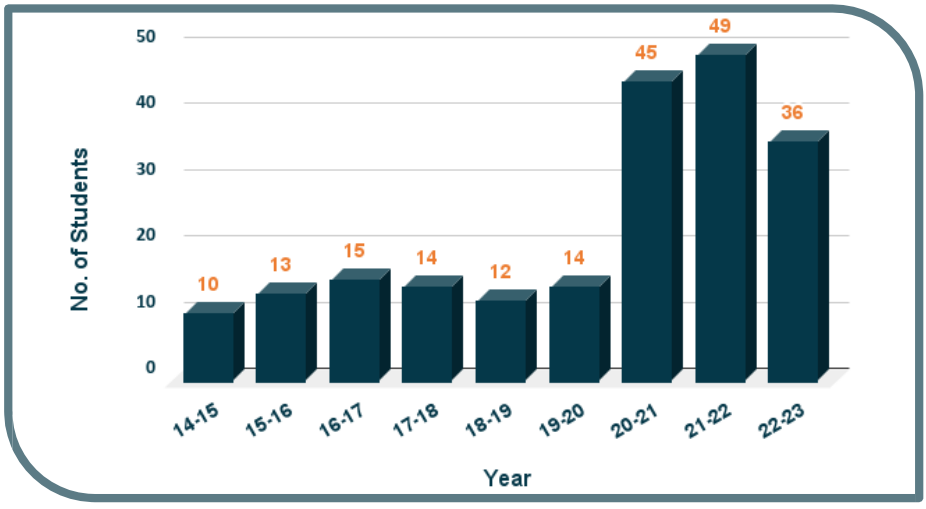
Department-wise Distribution of MTech (Online) Students for 2021-22



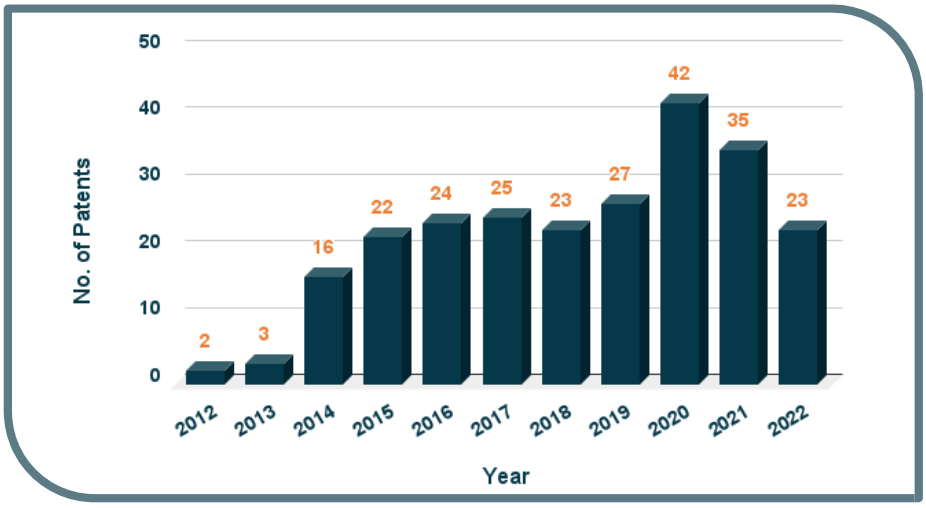


Yearly Intake of MSc Students

Yearly Intake of MDes Students

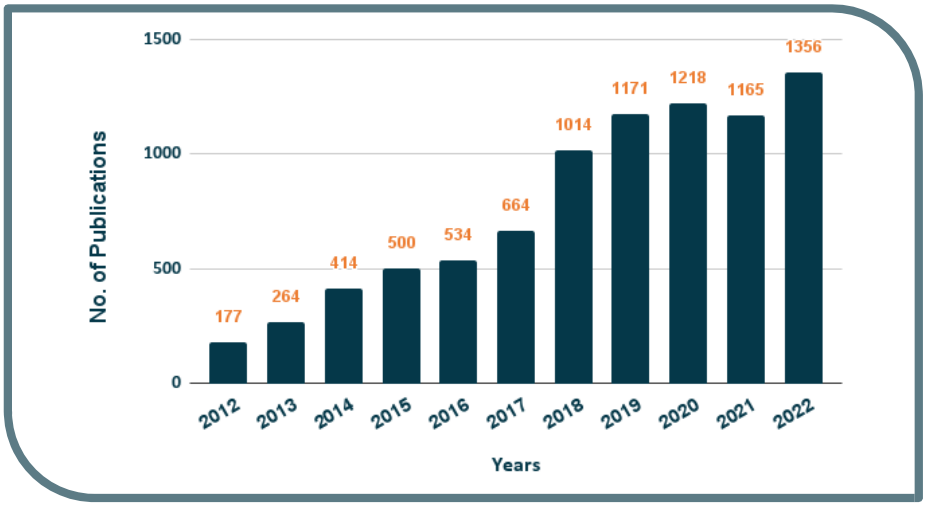


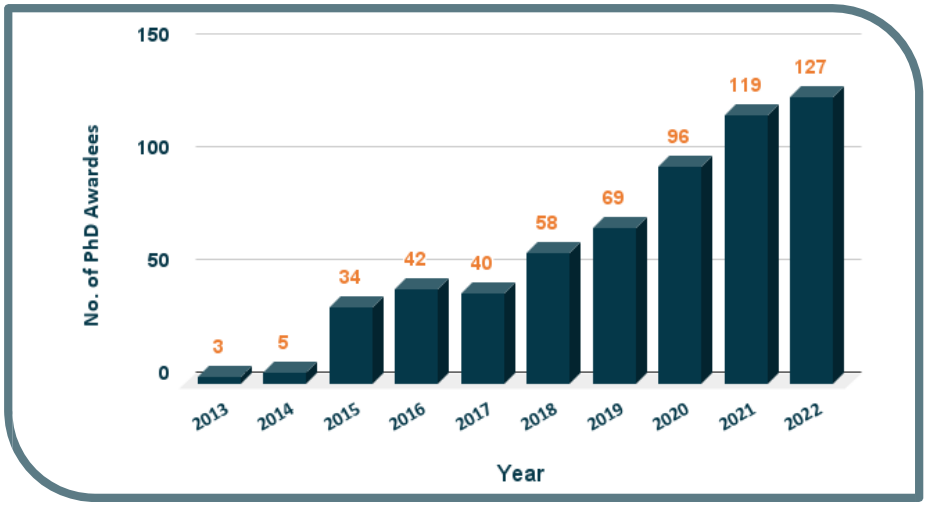
Patents, Publications & PhD



Year-wise Distribution of Patents filed

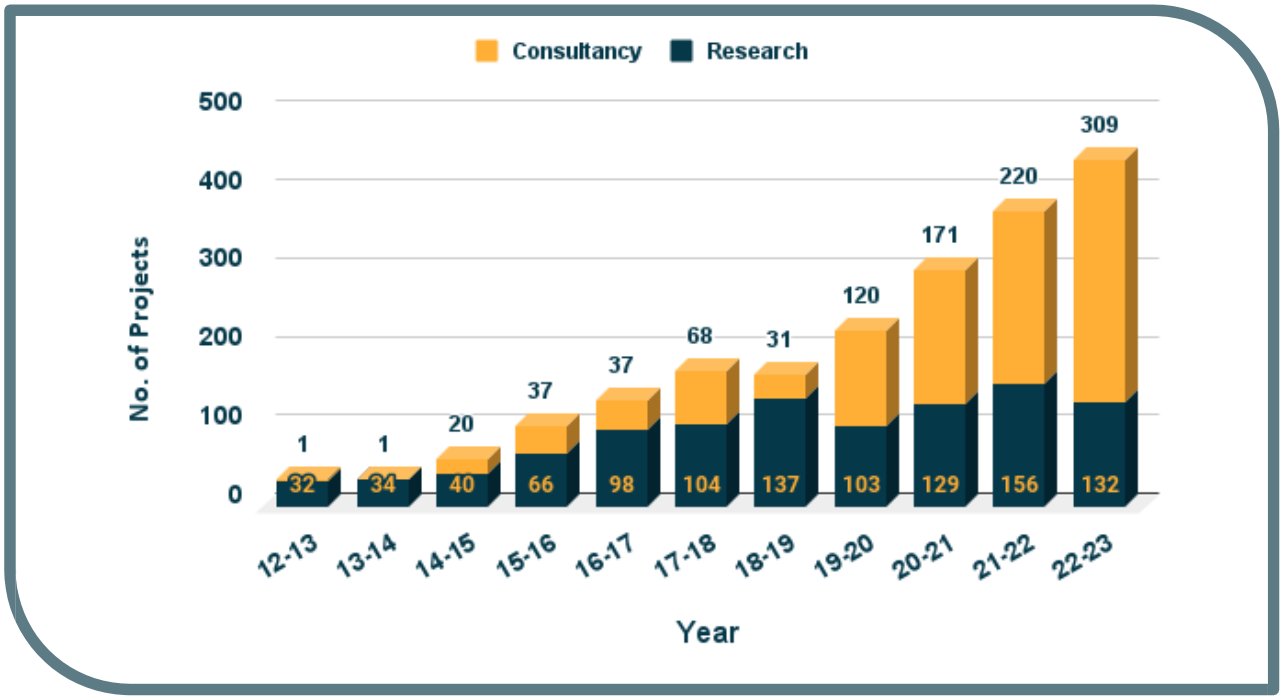
Year-wise Distribution of Publications



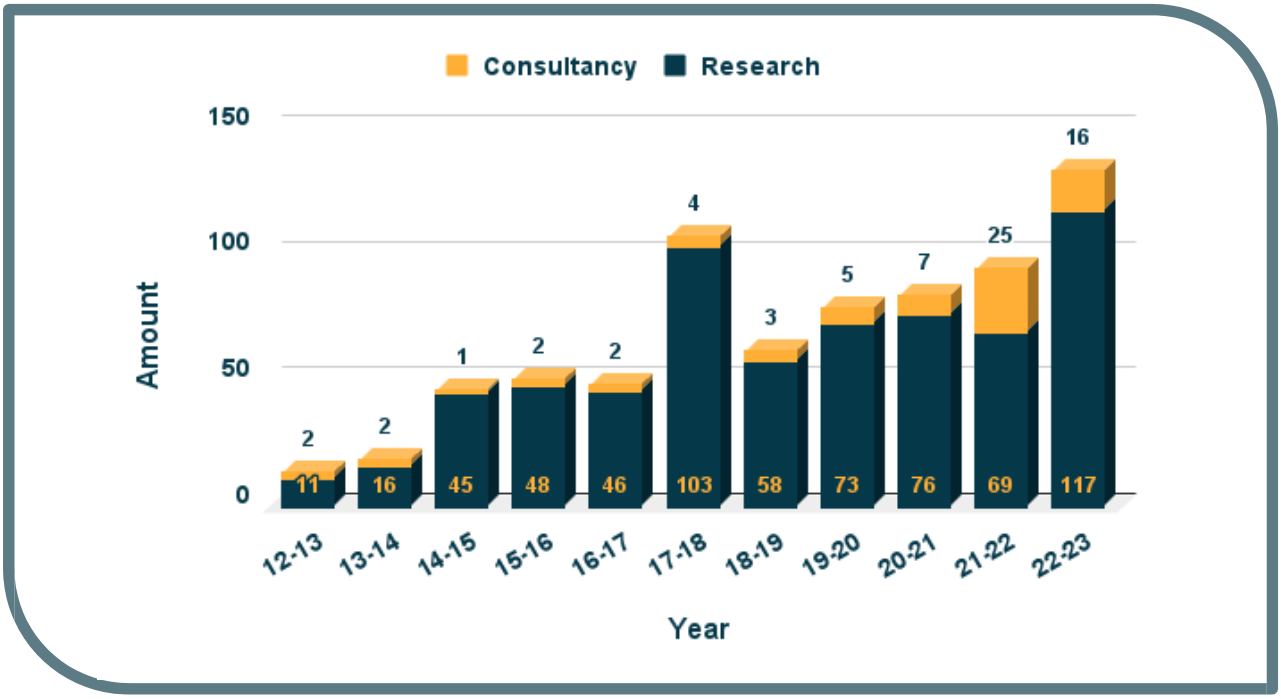


Year-wise Distribution of PhD Awarded

Research & Development



Year-wise distribution of No. of Projects



Year-wise distribution of Project Funds (Value in Cr {INR})

Placement & Internship

Webpage: https://ocs.iith.ac.in/

Placements

Job Offers

Placement Drive 2023 at IIT Hyderabad, which began on December 1, 2022, was conducted in hybrid mode. In 2023, there was a significant increase in International offers when compared to the previous years. Despite the recession, several core industries proactively participated and recruited a good number of students. Placements for this year highlight positive trends both in terms of the diversity of recruiters as well as the quality of profiles offered.

Key Highlights for the year 2022-2023

- Number of Companies Registered: **335**
- Total number of students: **845**
- Number of Students Registered for Placement: **762**
- Total offers Issued: **629**
- Number of Companies hired: **176**
- Highest Package: **₹ 63.78 Lakhs**
- Average Package: **₹ 20.07 Lakhs**
- Number of International offers: **55**

Top Paying Recruiters:

Higher Education

A good number of students from UG and PG opted for higher education in India and abroad. Mentioned below are the few universities opted by the students for higher education:

- California Institute of Technology
- Carnegie Mellon University
- Columbia University
- Georgetown University
- Georgia Institute of Technology
- Harvard Business School
- New York University
- University of Southern California
- Purdue University
- University of Illinois
- University of Pennsylvania
- University of Texas
- Karlsruhe Institute of Technology
- University of Minnesota Twin Cities
- University of Munster
- ISI
- IISc Bangalore
- IIT Delhi
- IIT Madras
- IIM Ahmedabad
- IIT Bombay

Internships

IIT Hyderabad is continuously working towards industry engagement. Semester-long Internships for BTech & BDes, Interdisciplinary MTech, Industry lectures, industry defined MTech projects are some of the key initiatives taken in this direction in recent years. IITH witnessed a significant increase in the number of National and International internship offers for the AY 2022-23. A total of 255 offers were received from 83 companies, out of which 08 are international from 05 Japanese Companies. The participating companies are from diversified sectors such as IT, Financial Services, E-Commerce, Manufacturing, Consulting, Construction, Healthcare Services, Auto Retail, R&D, etc.

Highlights for the year 2022-23:

- Number of companies registered: **194**
- Companies hired: **83**
- Total Internship Offers: **255**
- Summer Internship offers: **180**
- Semester-long Internship offers: **72**
- Highest monthly stipend: **₹ 2 Lakhs**
- Average monthly stipend: **₹ 70,700/-**
- Internship offers of 2020-21 converted to PPOs: **104**

Top Hirers for the year 2022-23:

Incubation Centres

CfHE - Centre for Healthcare Entrepreneurship

Webpage: https://cfhe.iith.ac.in/

CfHE is a Section 8 company established at IIT Hyderabad with Section 12 A, 80G and CSR Registrations. CfHE is also a recognised Technology Business Incubator (TBI) approved by DST and a BIONEST through BIRAC, DBT, Government of India. CfHE strives to bring affordable solutions that meet the healthcare needs of the country. CfHE achieves this through incubating companies engaged in innovative medical devices, medical services and other healthcare needs. These companies are incubated after a world-class one-year healthcare entrepreneurship education program, in which fellows undergo a structured bio-design thinking process, identify unmet clinical needs through clinical immersion at leading hospital partners in Hyderabad, innovate solutions and prototype them along with strong mentoring in setting up business, as well as regulatory practices.

The grand pitch of the 2021 batch:
The "Grand Pitch" for the Foundation for Center for Healthcare Entrepreneurship's sixth batch of fellows was conducted on November 5, 2022.

1. M/s Avinya Neuro Tech Pvt Ltd, founded by Mr Aniket Kumar & Ms Sai Soumya, is A smart wearable device to tackle Non-Convulsive Status Epilepticus condition in critical patients
2.M/s Kausthubha Med tech Pvt Ltd, founded by Dr Gurushankar, Smart Wearable Pregnancy Monitoring Device
3.M/s Vi hab Solutions Pvt Ltd, founded by Mr Arif Ali, is a Device for in-bed passive mobilization of bedridden patients
4. M/s Healthora Innovations Pvt Ltd, founded by Ms. Shalini Balgude, Device an Assistive mobility and rehabilitation device for pediatric patients with Cerebral Palsy

Medtech Symposium:
The third edition of the Med Tech Symposium was hosted on 11th & and 12th March 2023 @ CfHE, IIT Hyderabad. Sessions are Govt Bodies, Regulatory Policies and funding Channels, Funding Perspectives: Public and Private Partners, Medtech Industry Industrial Collaboration with Early Startups, Incubation EcoSystem, Stakeholder Perspectives in Fellowship Program and Medical Device Innovation, Challenges and opportunities Startup Journey, Importance of Business model & Understanding the Market, Importance of Regulatory part, Funding.

Medtech

Achievements:
1. M/s Heamac Health Pvt Ltd is Honored to present ITS innovation IIT 2022, and our Hon'ble Prime Minister, Shri Narendra Modi, appreciates the All IITs R & D Fair, where 75 promising innovations were demonstrated by the 23 IITs.
2. M/s Heamac Healthcare Pvt Ltd has been chosen as the winner of the Finale. HEAMAC will now represent TiE Hyderabad at the TiE_University Global Competition in the months of May and June in Silicon Valley.
3. M/sJivika Healthcare Pvt Ltd received the NATHEALTH Healthcare CSR Award at the NATHEALTH Annual Summit 2023.

Product Deployment
Deployment of 3 IoT-enabled ICU ventilators in district hospital @Vizianagaram, A CSR initiative in partnership with Indian Oil Corporation Limited and Center for Healthcare Entrepreneurship, IIT Hyderabad.

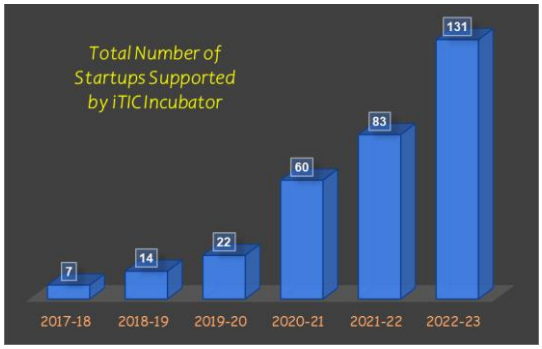
i-TIC - Technology Incubation Centre

Webpage: https://itic.iith.ac.in/

If iTIC can be seen as a startup incubator in the making, the year 2022-23 can be said to be its scaleup stage. The previous years have put the foundations in terms of structured programs, qualified and energetic teams, prototyping and other working facilities, and a policy framework. This year iTIC is able to extend this expertise to more and more entrepreneurs and startups. The following is a brief summary of the activities of iTIC this year.

Incubation:

The number of startups supported by iTIC has touched 130 this year. The histogram indicated this growth across the years. In this context, it is worth mentioning that this is accomplished by keeping a fair balance on hardware and software domains; 30% of these startups are hardware driven, while another 30% are software rooted and approx. 40% a hybrid mix of both.



Program	Status		As on 31st March, 2023
Pre-Incubation	Ongoing	13	
	Graduated	31	
Incubatio	Ongoing	17	
	Graduated	15	
Advanced Incubation	Ongoing	01	
	Graduated	00	
Acceleratio	Ongoing	00	
	Graduated	32	
iDEX	Ongoing	24	
	Graduated	00	

NICE (with NMDC), TiHAN-iTIC (with TiHAN), NIDHI Prayas (of DST), Tide 2.0 (of Meity), and iDEX (with MoD) remain the prominent schemes for pre-incubation and incubation support. The table below indicates the stage-wise distribution of the startups supported by iTIC.

We have also expanded our footprint by conducting a significant number of focused workshops and events for a wider set of audience, the following being a few of them.

Skill Development Activities

- **Fabrication Factory Series:** To impart basic prototyping skills for founders and aspiring entrepreneurs, FFS was a 3-week long program conducted in June 2022.
- **TiHAN Innovation Accelerator:** Designed for researchers, academicians, and aspiring entrepreneurs, the program aims to enable them to convert their research into commercially viable products. It was conducted in May 2022.
- **Ottonomo'22 Challenge:** A grand challenge with TiHAN to source solutions to industry problems. The challenge ran from Feb – June 2022.
- **Deep Engagement Program:** iTIC in collaboration with SINE IIT Bombay under MeitY Startup Hub, organized Deep Engagement Program on March 15, 2023, that brought together 20 incubator representatives for a day-long event focused on establishing and sustaining successful incubator programs.
- **Mentor/Expert sessions:** A total of 35+ expert mentor sessions were arranged this year for startups. Few mentorship sessions were on a one-to-one basis whereas others were group mentoring.

Showcase and Exhibitions

- **Innovation Day at IIT Hyderabad 2023:** The Innovation Day event, held on January 7th, 2023, provided a unique opportunity for innovators to showcase their work and be recognized for their ideas and innovations.
- **Nidhi Prayas Cohort 1 Demo Day:** On August 17, 2022, iTIC organized Nidhi Prayas Cohort 1 Demo Day where the graduating startups showcased their prototypes in an open house format to the IITH fraternity.
- **DefExpo 2022:** The largest defence exhibition was held from Oct 18-22, 2022 at Gandhinagar Gujarat. The event saw the participation of 5 defense applications startups from iTIC.
- **E-Motor Show 2023:** The E-Motorshow 2023 was held at the HITEX Exhibition Centre in Hyderabad from February 8-10, 2023. This three-day event brought together startups, investors, designers, and entrepreneurs from various domains to showcase the latest developments in the electric vehicle (EV) industry. A total of 4 startups from the EV ecosystem participated in the exhibit.
- **Aero India 2023:** The Aero India Expo 2023 was held from February 13-17, 2023 at the Air Force Station, Yelahanka, Bengaluru. The event was a platform for innovators, startups, MSMEs, and conglomerates from the defense and aerospace industry to come together and showcase innovations. 6 startups from iTIC demonstrated their products.

Other Relevant Events:

Inauguration of TIP building: On July 2, 2022, the TIP building was inaugurated by the Hon'ble Minister of Education, Shri. Dharmendra Pradhan. The event included an exhibition and interaction of startups from the IITH ecosystem.

Semicon Roadshows: The Semicon Roadshow series is an initiative to sensitize engineering students and faculties towards opportunities in the electronics and semiconductor industry in India. A total of 6 roadshows were conducted pan India with the participation of 1000_+ students and 80+ faculties.

Entrepreneur meet-ups: iTIC regularly organizes informal Entrepreneurs' meetings where founders from iTIC-associated startups network, share their learnings, make new connections, and have some fun. This year iTIC organized two such meetings on Apr 22 and Jan 23.

iTIC Foundation Day celebrations: The annual celebration took place at the TIP Building lawns on Oct 31, 2022, providing a platform for our startup founders, board members, and mentors to come together and network.

India Tech Startups Landscape Report 2022 - The Indian Tech Startup Landscape Report, created by Nasscom Zinnov, offers an in-depth analysis of the Indian Tech Startup Ecosystem, covering emerging trends and challenges. A debriefing session was hosted on March 23, 2023

Summary:

These activities and events have helped project iTIC as a mentor incubator in the ecosystem with an intent and capability to share and support these learnings with others and also lead programs involving multiple incubators. We hope that the coming years will see iTIC playing a crucial role in enhancing the innovation ecosystem and culture. Seeking the support and participation of all in that journey.

TiHAN

DST NM-ICPS Technology Innovation Hub on Autonomous Navigation

Webpage:**https://tihan.iith.ac.in/**

Major Activites at TiHAN during FY 2022-23

Testbed on Autonomous Navigations (Aerial/Terrestrial) at TiHAN, IIT Hyderabad:

Dr Jitendra Singh, the Minister of State for Science and Technology & Earth Sciences, inaugurated India's first Testbed for Autonomous Navigation at IIT Hyderabad on 4th July 2022. During the inauguration, he emphasized that the TiHAN Autonomous Navigation Testbed (Aerial & Terrestrial) will be the hub for cutting-edge solutions in safe, sustainable, and smart mobility. Singh stated, "This pioneering facility will spearhead the development of futuristic technology for autonomous vehicles, enabling precise testing of advanced navigation technologies, facilitating rapid technology advancement and global market expansion". The significant features of Testbed are 5G enabled, Edge Cloud, Drone Hanger Facility, Command Control Station, Weather Monitoring Station, Rainfall Simulator, Vehicle to Infrastructure (V2I) communications, Drone Landing Area, Pedestrian crossing, Smart poles, Roadside unit (RSU), Multilane Highway, T-Intersection, Signalized and Unsignalized Intersection, S-curve, Rigid Road, Dual Lane Road, open test area, etc. TiHAN Testbed has become the Platform for collaborative research on Next Gen Mobility for national and international levels of Academia, Industry, and R&D Labs. Various services for Autonomous Navigation-related Research and Development are Homologation, SoP, regulatory framework, etc., are provided using the Testbed's pricing model. https://tihan.iith.ac.in/tihan-iith-testbed/

TiHAN R&D Activities:

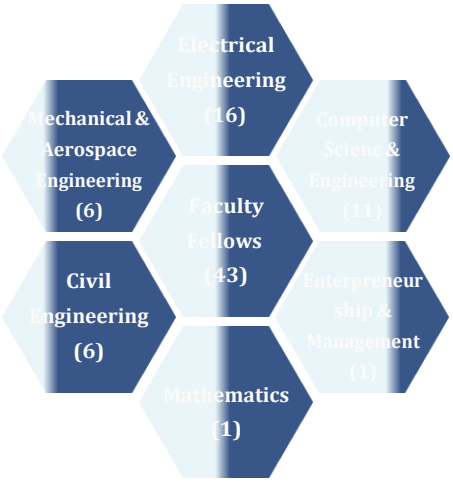
- **Autonomous Ground Vehicles(AGVs):** Data Collection for Autonomous Vehicles (AVs), Advanced Driver Assistance Systems (ADAS) Safety Standards, Development of multisensory fusion-based perception sensing system in progress, AEB and FCW Evaluation at TiHAN Testbed, Autonomous e-bike navigation Autonomous Navigation Humanoid, Map-based navigation of Autonomous Ground Vehicles (AGVs), Radar-based SLAM for autonomous vehicles, Oil and Gas Pipeline Inspections using UAVs and UGVs, Off-Road Autonomous Vehicles, Mining Applications, etc.
- **Connected Autonomous Vehicles(CAVs):** V2X Communications for Autonomous Vehicles, Development of Pedestrian Detection System in VehicleInfrastructure (V2I) Communications, Emergency VehicleWarning System for Vehicle (V2V)Communications, Implementation of ForwardCollision Warning (FCW) System using V2X Technology for Autonomous Vehicles(AVs).

- **Autonomous Unmanned AerialVehicles (UAVs):** Bioinspired Micro UAVs for Surveillance, Nano (UAVs) for Energy Harvesting Applications, Command Control Station (CCS), State Estimation and path planning of Autonomous Vehicles (AVs), Geofencing of Unmanned Aerial Vehicles, Marker Based Landing (MBL), Urban Air Mobility – Heavy payload drones, UAVs in GPS Denied Conditions, UAV Based Smart Agriculture, Anti-drone Detection and Neutralization, Swarm of UAVs etc.
- Autonomous Surface Vehicles (ASVs) and Underwater Navigation.

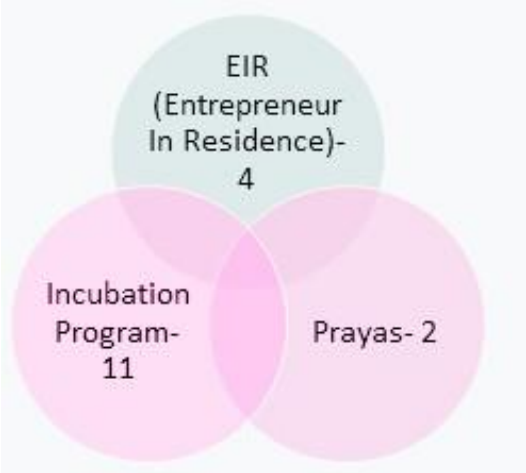
TiHAN Technology Products:
TiHAN focuses on the technologies related to Autonomous Navigation, mainly UAV and UGV. To date, TiHAN has developed 35 technology products, including UAV with high-end sensors- Lidar/HSI, Driving Under Influence Simulator, Inhouse developed UGV and UAV kits, Development of Lane Departure Warning System (LDWS) for SAE Level 3 Vehicles, Autonomous/Remote Operated Surfboard, etc.

Research and Development, Human Resource & Skill Development:
R&D Collaborators: TiHAN has extensive research collaborations with diverse national and international industries, including SMC Japan, ARAI, TTL, LTTS, ICAT, NATRAX, Reliance Industries, etc. By fostering a robust R&D portfolio within the hub and promoting commercially viable translational research, TiHAN and its partner institutes aim to strengthen consultations and discussions to explore lucrative business prospects in the field of Autonomous Navigation. There are Joint R&D initiatives on a cost-sharing basis, Consultancy projects with both Govt. and Private entities. Also identified Areas of Collaboration with various Industries (some NDA signed, Project Agreement going on) – Suzuki Motor Corporation sent vehicles from Japan for R&D on ADAS for the Indian scenario and testing in the TIHAN testbed.

There are 43 Faculty from different Departments of IITH, other Faculty from R&d Collaborators, and 10 Faculty Fellowships.



Startups: TiHAN is funding 17 startups under different schemes such as EiR, Prayas, and Incubation Programs.



TiHAN Achievements:

- **G20 Host Institute – TiHAN Autonomous Navigation Technology Demonstration:** Representatives from the G20 Second Meeting of the Digital Economy Working Group Visited IIT, Hyderabad. India's remarkable advancements in 5G, IoT, 6G System Prototypes, and Autonomous Navigation (TiHAN-IIT Hyderabad).
- **SIRO Recognition by the Department of Scientific and Industrial Research (DSIR) from April 2023 to March 2026.**
- **Autonomous Navigating Humanoid with Spoken Hindi Application.**
- **TiHAN Foundation at IIT Hyderabad has launched a Data collection vehicle for autonomous Driving on Indian roads.**
- **Regulatory Framework and Safety Performance Testing of Autonomous Vehicles in Defined Operational Environments.**

TRP - Technology Research Park

Webpage: https://trp.iith.ac.in/

"IITH Technology Research Park" is an independent Section 8 Company founded, promoted, and hosted by IIT Hyderabad, governed by a Board of distinguished academicians, faculty of IIT Hyderabad, and industry professionals to inculcate the idea of innovative entrepreneurship in synergy with research and development.

During the Financial Year 2022 – 23, IITH Technology Research Park has provided space to 6 different entities ranging from private companies to Indian Defence Forces & Research Organizations.

Out of these 6, 4 were private companies who have established their R&D labs in the TRP building, and amongst them, one (1), namely, CBAI Pvt Limited, had graduated from i-TIC Foundation IIT Hyderabad, the Technology Business Incubator at IIT Hyderabad.

The rest of the companies are working in various sectors ranging from Software, drone technology, biomed / biotech, and pharmaceutical-related research activities.

Other than these, we are proud to host the Indian Navy's R&D arm (WESEE) in the TRP building, which is collaborating with the IITH fraternity towards the development of products that are working towards "Make in India" & and "Atmanirbhar Bharat" goals of the Government of India.

We are also proud to host DRDO's DIA CoE at IITH in the TRP building, which has begun interactions with various departments and faculties to develop niche technologies and products that would be beneficial in achieving the goals set by the Government of India to make and promote indigenous products and technology.

Team IITH with Team WESEE Indian Navy

Centre of Excellence

CCE - Center for Continued Education

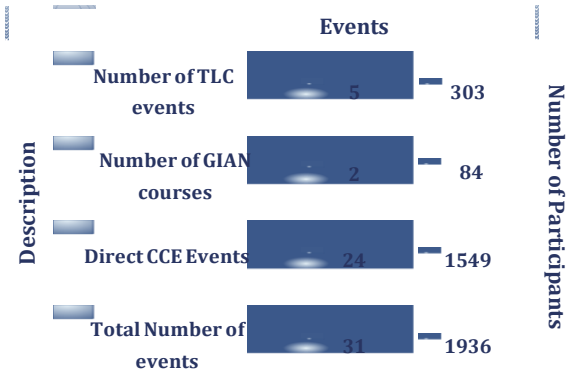
Webpage: https://cce.iith.ac.in/

Overview: The Centre for Continuing Education (CCE) aims to conduct training programs for students, academicians, and working professionals across the country. The young and energetic faculty of IIT Hyderabad are dedicated towards providing learning opportunities for the professional growth of interested participants. With a rapid rise in E-learning programs, CCE @ IIT Hyderabad is keeping abreast with the online programs that can facilitate the learning of working professionals by meeting their work schedules.

Scope and functions:

- To conduct all academic outreach activities like Conferences, Workshops, Certificate Courses, Symposia, Short-term courses, Training programs, and other similar activities of the Institute under the umbrella of the CCE.
- To organize teacher training programs for faculty of engineering colleges.
- To provide necessary logistics and administrative support to run such programs.
- To evolve a mechanism for self-sustainability in the future.

CCE ACTIVITIES - April 2022-March 2023 (Including TLC, GIAN activities):



DST MANAK

Talk on The Science & Art of Technical Paper Writing

CIP - Centre for Interdisciplinary Program

Webpage: https://cip.iith.ac.in/

The Centre for Interdisciplinary Program (CIP) was created with a vision of fostering interdisciplinary studies across various disciplines at IIT Hyderabad. CIP @ IITH is envisioned to create new paradigms in education, integrating techniques, tools and science from multi and cross-disciplinary expertise on the IITH campus.

The CIP would be a cradle for 'SEEDING' new interdisciplinary Programs bringing together experts with common interests from various branches to address the ever-evolving needs of Science, Industry and humanity, thus shaping up new courses and unique Programs that never existed before and training human resources for tomorrow. These teams of interdisciplinary nature would act as epicentres for brainstorming and writing new grants that would emerge into new Centres of Excellence of National Importance. IITH has formalized 09 interdisciplinary (ID) regular MTech and 02 online MTech programs, 01 BTech program in Computational Engineering, 01 MSc Program in Medical Physics and ID and joint PhD programs.

Admissions:
The admission details for the Academic year 2022-23 are as follows: 25 students joined for the 4-year BTech (Computational Engineering), 73 Students for the 2-year MTech, 3 Students for the 3-Year MTech, 2 students for 2-year MSc program, 15 students for ID PhD Program and 10 students for Joint Doctoral Program (JDP).

Postgraduate Courses in Interdisciplinary Program:
The programs under CIP have launched a variety of new elective courses. Furthermore, starting with the academic year 2022–2023, all ID MTech programs have undergone full revision and implementation.

Details of ID MTech programs started in the Academic Year 2022-2023:

Ophthalmic Engineering

1. Prepare professionals with a solid base in engineering and clinical exposure focussed on ophthalmology.
2. Provide professionals for technology organizations working in ophthalmology and related fields.
3. Inspire cross-functional (engineering and ophthalmology) teams to advance technology-related research in ophthalmology.
4. Enable engineers and clinicians to get deeply involved in designing better technology products/services
5. Create professionals who can take up technology challenges in ophthalmology as a startup

Integrated Circuits and Microsystem Packaging

1. The Integrated Circuits and Microsystems Packaging (ICMP) MTech program at IIT Hyderabad is a first-of-its-kind multi-departmental program that focuses on the design, fabrication, and characterization of electronic packages and microsystems.
2. The curriculum is designed to provide training in theoretical foundations and practical aspects by various departments, including Electrical Engineering, Mechanical and Aerospace Engineering, and Materials Science and Metallurgical Engineering.
3. The program will provide students with hands-on training in state-of-the-art design tools and equipment.

Details of ID MSc Program:

Medical Physics

IIT Hyderabad, in partnership with Basavatarakam Indo-American Cancer Hospital And Research Institute, launched an MSc in Medical Physics with approval from AERB. This is quite a unique program among all IITs where the students work closely with a cancer hospital in acquiring experience and knowledge on Radiation therapy, dosimetry, radiation safety and regulations in clinical practice. Medical Physics is a branch of Applied Physics that uses physics principles, methods and techniques in practice and research for the prevention, diagnosis and treatment of human diseases with a specific goal of improving human health and well-being.

Interdisciplinary and Joint PhD Program:

The Centre offers a unique interdisciplinary doctoral program where each enrolled student will be guided by two faculties from different disciplines in a project that needs multidisciplinary expertise. The CIP also hosts an interdisciplinary joint doctoral program with Deakin University, Australia, where the doctoral student receives a joint degree with IITH and Deakin University and will be guided by one supervisor from each Institute.

DIA-CoE

The journey of DRDO collaboration with IITH started in 2020 with a DRDO Research cell which has been transformed into a Centre of Excellence as DIA CoE. IIT Hyderabad will take up futuristic projects towards Long-term Directed Research needed for DRDO. There are 13 Projects undertaken by IITH for DRDO. Eight Projects are for Advanced Material & processing, three Projects for Sensors, seven for "Electronics, Micro Electronics &amp, and 2 for Computational Systems." The Progress of these Projects is reviewed periodically by the TEC (Tech Evaluation), RAB (Research Advisory Board), and GC (Governing Council) of DFTM. Primary outcome is the Realization of Large size Additive Manufacturing machines and all the other Projects.

List of Equipment Sponsored by DIA-CoE, IITH

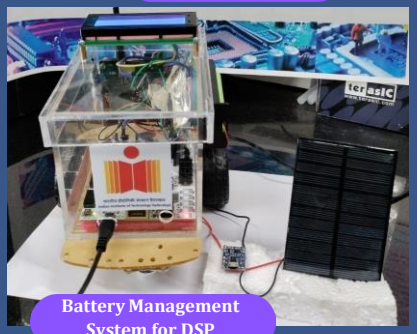
High-

Stability

Viscomete

High temperature carbonization furnace

LAAM Machine



Battery Management System for DSP

List of On-going projects under IITH

Project Titles	Name of the PI	PDC	Lab
Design of a cost-effective, real time and accurate Battery Management System (BMS) Controller unit for Battery Energy Storage System	Prof Amit Acharyya	22-06-2024	DSP
Development of Digital Scene Matching Area Correlation Algorithms & Prototype System	Prof Sumohana S Channappayya	12-07-2023	DRDL
Laser cladding of functional graded ceramic coatings for high temperature and wear applications: Assessment of mechanical properties and their correlation with molten pool history and its improvement through laser shock peening	Dr Muvvala	21-06-2024	DRDL
Direct Metal Laser Sintering of C 103 Refractory Alloys	Dr Viswanath Chinthapenta	22-06-2023	DRDL
Development of Fibers Reinforced Alumina & Zirconia matrix Composites for high temperature applications	Prof Bharat B	08-07-2024	ASL
Study of storage ageing conditions (i.e. Shelf-life and Out-life) on physical, thermal and mechanical properties of Epoxy based prepregsystems (i.e. Tow & fabric Prepreg)	Prof Ch Subramanyam	22-06-2023	ASL
Thermo structural analysis for predicting damage in functionally graded plates using a peridynamic approach.	Dr Amirtham	22-06-2024	ASL
Investigating the evolution of heterogeneous microstructure in metallic alloys by Thermomechanical processing using correlative FIB SEM and in situ TEM techniques.	Dr Sai Rama Krishna Malladi	14-12-2024	DMRL
Large Area Additive Manufacturing (LAAM): Design and Development of Powder based Directed Energy Deposition System for Direct Fabrication of Rocket Components	Prof S Surya Kumar	29-03-2023	DRDL
Design and analysis of high accuracy MEMS accelerometer and gyroscope for inertial navigation	Prof Ashok Kumar Pandey	22-06-2024	RCI
Development of processes for SOI wafer dissolution and glass wafer through holes towards the realization of MEMS Inertial sensors	Prof Prem	08-07-2024	RCI
Design, analysis, verification and performance evaluation of Analog to Digital interface single-channel ASIC for high-performance closed-loop capacitive gyroscope for inertial navigation applications	Prof Abhishek Kumar	22-06-2025	RCI
Pressure less fabrication of carbon foam using bituminous coal for ablative applications	Dr Atul Suresh Deshpande	22-06-2024	ASL

ICMR-DHR-CoE

Webpage: https://rdc.iith.ac.in./

Indian Institutes of Technology, Hyderabad has been incorporated with the ICMR-DHR Centre of Excellence (CoE) for inculcating MedTech innovations. The CoE is a joint venture of the Indian Council of Medical Research (ICMR) and the Department of Health Research (DHR), as its name already suggests. The purpose of these centres is to develop products and technologies in conjunction with the requirements of the National Health Mission, Ayushman Bharat and Public Health Programmes of the government for their potential deployment, as reported by IANS.

Ongoing Projects:

1. Cervical cancer and cervico-vaginal infection screening kit
2. Tissue mimetic hydrogel-based therapy for corneal scarring
3. Tool for real-time sensor tracking over multiple trials
4. Rapid EEG gelling system
5. Compact and portable low-cost microscope for digital Cytology applications
6. Smart wearable patch for detecting nicotine in sweat samples
7. Image-guided Boiling Histotripsy Device for Treating Neuroblastoma
8. Customized 3D-printed PCL-silk scaffolds for implants

Companies Supported:

1 .M/s Heamac Health Pvt Ltd -nLite360 Intelligent Phototherapy device that provides customized treatment to Dynamic Jaundice conditions

2. M/s Beable Health Pvt Ltd-Game based Upper Limb Rehabilitation Device for Neuroplasticity

3. M/s Kvayat Medical Pvt Ltd-DiaPatch with ActiFlush Technology: The world's first smart flushable Diaper

4. M/s Nemocare Pvt Ltd-Nemocare Raksha: A diagnostic and Monitoring tool for neonates

All have been selected by ICMR for HTA (Health Technology Assessment)

RDC - Rural Development Centre

Webpage: https://rdc.iith.ac.in./

Online teaching for rural village students:

Our honourable director has initiated online teaching for the government schools around IIT Hyderabad. The main motto of this programme is to enhance the learning skills of school kids with the help of IITH faculty, students and staff. This program is conducted from September 1, 2022, to November 31st, 2022, for the government schools in ZPHS Kandi, ZPHS Mamidipally, ZPHS Rudraram, ZPHS Cheriyal and ZPHS Mailaram. In this programme a total of 154 volunteers taught Mathematics, Physics, Biology and Chemistry subjects. IITH has spent approximately 4.6 lakhs to set up the computer desktops, LCD projectors, etc, for this purpose. Dr Debraj got CSR funding by HEFA of 54.835 Lakhs INR for Rural Development.

Paper publications from Dr Shiva Ji lab from research on rural areas of India:

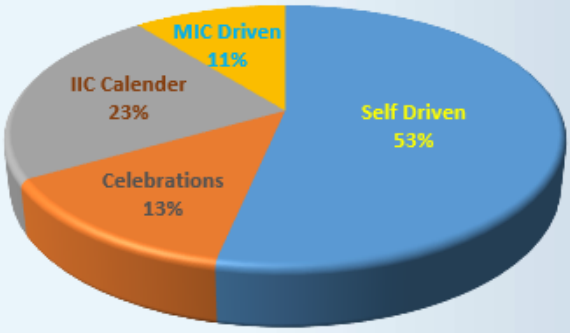
- Pawar, T., Sharma, A., Ji, Shiva. (2022). Heritage Representation of Kashi Vishweshwar Temple at Kalabgoor, Telangana with Augmented Reality Application Using Photogrammetry. In: Mudenagudi, U., Nigam, A., Sarvadevabhatla, R.K., Choudhary, A. (eds) Proceedings of the Satellite Workshops of ICVGIP 2021. Lecture Notes in Electrical Engineering, vol 924. Springer, Singapore. https://doi.org/10.1007/978-981-19-4136-8_3
- Sharma A., Ji, Shiva., Varma, A. (2022). Enhancing Water Resilience by Rejuvenation of Traditional Water Management Systems Through Community Participation: A Case of Water Systems of Govardhan, Mathura, India. International Conference on Climate and Weather-related Extremes by IIT Roorkee 19-20 Sept 2022.

Innovation Cells

IIC - Institution's Innovation Council

Webpage: https://innovationcouncil.iith.ac.in/

The Institute Innovation Council (IIC) at IIT Hyderabad was initially established in February 2018 with Innovation, IPR, and Entrepreneurship as its 3 pillars. Later in February 2021, the council was reconstituted, as per the IIC norms, with an appropriate framework designed for its Objectives, Functions, Roles, and Responsibilities. Since then, all the innovation and entrepreneurship-related activities of IIC have been strictly implemented by the Council. The IIC meetings were conducted timely with all the representatives of the Council. IIC, IIT Hyderabad has 32 active members to inculcate the culture of Innovation and Entrepreneurship on campus. In FY 2022-2023, IIC at IITH has undertaken 75 activities under various categories, as summarized below.



IIC Activity Statistics at IITH for FY 2022-2023

Highlights:

Innovation Day Exhibition

Innovation and Entrepreneurship Outreach Program in School

Future Inventors Fair

LEAD Pitch by IITHAA

National Pollution Control Day and Energy Conservation Day, 2022

Hindi Cell

In pursuance of the Official Language Policy of the Government of India, the Hindi Cell of the Indian Institute of Technology Hyderabad is promoting the progressive use of Hindi in the Institute. Every possible effort is made by the Hindi cell to follow the rules and regulations related to the official language Hindi in the institute. The Quarterly Progress Report and Annual Evaluation Report related to the progress of the Official Language, Hindi, in our Institute, is sent by the Hindi Cell to the Department of Official Language, Government of India. The highlights of Hindi Cell's official language activities are as follows.

Ongoing Activities of the Cell:

Hindi Cell translates the Institute's Annual Report, Annual Audit Report, and various other documents like Office Orders, Office Memoranda, General Orders, Circulars, etc., which are covered under Section 3(3) of the Official Languages Act, 1963. In addition, various other letters and correspondence, RTI replies, etc., are either translated or prepared in Hindi. The Hindi Cell also tries to ensure the effective implementation of the "Official Language" policy of the Government of India in the Institute. Hindi Cell ensures the use of bilingual display boards and various name boards, notice boards, rubber stamps, letterheads, and bilingual file covers and also helps in compliance thereof. It also ensures bilingual preparation of degree certificates, PhD subject titles etc., to be awarded by the Institute during the convocation.

Hindi Language Training:

Hindi Cell emphasizes the need to impart Hindi training to all those employees of the Institute who do not have working knowledge of Hindi. The Hindi Cell nominates all such employees and gets them trained by getting them admitted in training programs like Prabodh, Praveen, and Pragya through the Hindi Teaching Scheme under the Central Hindi Training Institute. About 43 officers and employees were nominated in the said three training programs in the language training session of January 2023. For the first time in the history of our institute, the employees were nominated and trained for language training.

Hindi Workshops:

In order to solve the difficulties and problems faced by the employees in the use of official language in their day-to-day official work, the Hindi cell organizes Hindi workshops for the employees of the Institute in every quarter, and eminent official language scholars are invited to it. The details of the Hindi workshops organized are as follows:

Date	Invited Guest Faculty	Topics of the workshop
23-06-2022	Dr Ravi Chandra Rao, Asst. Director, HTS, Secunderabad	Rajbhasha Skills
07-12-2022	Dr Atmaram, Asst. Professor, Hindi Dept, UoH	Official Language Implementation & Our Duties
18-01-2023	Smt Mitalee Agrawal, PRO, Typing IIT Hyderabad.	Computer Hindi Skills
01-03-2023	Shri Kamaluddin, Asst. Director, HTS, Secunderabad	Official Language Implementation & Noting and Drafting

Hindi Week Celebrations:

On the occasion of Hindi Diwas on 14 September 2022, Hindi Cell organized “Hindi Week Celebrations” from 14 to 20th September 2022 in the Institute. In the inaugural ceremony of this program, Prof Gajendra Kumar Pathak, HOD, Department of Hindi, University of Hyderabad, was invited as the chief guest. During this Hindi week celebrations, the Hindi cell organized many competitions for the faculty, staff, and students, like essay writing, Dumb charades, official terminology competition, and Extempore speech competition. Prof B S Murty, Director, IIT Hyderabad, was the chief guest on the occasion of the closing ceremony of Hindi week celebrations on 20-09-2021. Certificates and mementos were given to all the winners of the competitions organized during the Hindi week celebrations. In the end, the vote of thanks was given by Dr Anupam Gupta, Faculty In-charge, Hindi Cell & Member Secretary, OLIC, and after the national anthem, the Hindi Week celebrations were successfully concluded.

Bilingual Website:

According to the official language policy of the Government of India, the website of the Institute was made bilingual by the Hindi cell, and the annual report and annual audit reports, office orders, etc. of the Institute are also being uploaded on it.

Unicode:

Hindi Cell has put a detailed description on the intranet, “How to Install Unicode Fonts,” with the help of the Computer Center to enable Unicode in computers of all departments of the Institute. The staff is being trained to work in Hindi.

Committees:

Official Language Implementation Committee

According to the guidelines of the Department of Official Language and on the recommendations of the Hindi Cell, the Official Language Implementation Committee(OLIC) was constituted on 06-09-2021. The Director of the institute is the Chairman of this committee, and the Registrar is the Vice-Chairman. All section heads are members of the committee. The faculty in charge of the Hindi cell is the member secretary of the committee. The purpose of this committee is to promote the implementation of the official language policies of the government and to review the progressive use of Hindi in the institute. In the financial year 2022-23, under the chairmanship of the Director of the Institute, meetings of the Official Language Implementation Committee were organized on 27 April 2022, 5 September 2022, 18 November 2022, and 13 February 2023. In all these meetings, discussions were held on taking all possible steps and taking necessary action to accelerate the progress of official language implementation in the institute.

Publications

To promote the activities of Hindi in the Institute, the publication of "Pravaat," a Hindi quarterly e-magazine, was started by the Hindi cell. Which was unveiled on September 14, 2022, by the chief guest Prof Gajendra Kumar Pathak, Head of Department, Department of Hindi, Central University of Hyderabad. during the inaugural ceremony of the Hindi week, in the presence of the Registrar, IITH Shri Commodore Manohar Nambiar, Faculty in charge of the Hindi Cell, Dr Anupam Gupta, and Hindi translator Shri Naveen Srivastava and other dignitaries. The first issue of the Pravaat Hindi quarterly e-magazine was published in October 2022, and the second issue in January 2023. The publication of Pravaat Patrika is going on continuously every quarter. In this magazine, faculty members, students, and employees of the institute send their research works, articles, poems, etc., for publication.

Inspection Program of Parliamentary Committee on Official Language

On November 11, 2022, the first sub-committee of the Parliamentary Committee on Official Language conducted the inspection program of our institute, in which the Director of the institute, Prof B S Murthy, Registrar, Commodore Manohar Nambiar, Faculty in-Charge of Hindi Cell Dr Anupam Gupta and Hindi Translator Naveen Srivastava were present. The Parliamentary Committee on Official Language made some recommendations regarding the progress in the implementation of the official language in the Institute, which is being ensured compulsorily in the Institute.

Inspection

Parliamentary

Celebrations

IITH on the International Yoga Day adored its importance by taking part in a life-filled yoga session led by Honorable Prime Minister Shri Narendra Modi.

Video Abstract: *https://youtu.be/EPs1003f88o*

76th Independence Day has been celebrated with flag hoisting by esteemed Director, IITH, Prof B S Murty. Followed by recognition of Armed Forces of IITH (Staff & Students).

Video Abstract: https://www.youtube.com/watch?v=zoia0YXxlV_o

IITH community took the integrity pledge to mark of the Vigilance Awareness Week - 2022.

In an enthusiastic spirit IITH has celebrated the ConstitutionDay/ SamvidhanDivas to commemorate the adoption of the Constitution of India, with a session of Preamble Reading by IITH fraternity and a talk on the theme "Responsibility of Citizens" by Shri M Ramana Kumar, Superintendent of Police, Sangareddy, Telangana.

From the vibrance of the tricolor to the vivid color of celebrations of being Republic IITH. Acting Director, Prof KVLS, Dept of Civil Engg, charged the spirit of patriotism with an encouraging & energizing address to the gathering.

IITH concluded Rashtriya Ekta Divas 2022
with Week-long Celebration with Unity Run, Pledge & an Exhibition on the life of the
Iron Man of India Shri Sardar Vallabh Bhai Patel.

Hindi Cell, IITH commemorated the occasion of the Closing Ceremony of Hindi Week celebrations.

Program Broadcast:
https://youtu.be/eNZKJ96Op5g

On the enlivening occasion of International Womens Day, Student Gymkhana, IITH made an attempt to Know & learn from the Women of IITH "Their journey & Achievements in various roles & positions & their inspirational stories".

Featuring:
Dr Shuhita Bhattacharjee - LA,
Dr Jayshree Patnaik - EM, Dr Shruti Upadhyaya - CE and Ms Mitalee Agrawa – PRO

Hockey Club, IITH organized a Hockey Exhibition Match on National Sports Day to commemorate the birth anniversary of Hockey legend, Major Dhyan Chand.

Dept of Sports, IITH celebrated the 75th year of Independence Aazadi ka Amrit Mahotsav with "FIT RUN COMPETITION HARGHARTIRANGA ABHIYAN".

Video Abstract: *https://www.youtube.com/watch?v=NN3-j5si7tM*

Department of Mathematics, IIT Hyderabad has decorously celebrated National Mathematics Day.

IIT Hyderabad has organized a Clean Campus drive on the occasion of Gandhi Jayanti.

Inventing & Innovating in Technology for Humanity

DEPARTMENTS

Department of Artificial Intelligence

The Department of AI, which came into existence in 2019, is making consistent progress in its pursuit of excellence in Academics and Research. The department graduated the country's first batch of AI BTech students in 2023.

The department added two new faculty members, Dr Konda Reddy Mopuri and Dr Ayon Borthakur, to its list of direct faculty members. Dr Konda Reddy works in the area of Computer Vision, whereas Dr Ayon Borthakur works in the area of Neuromorphic Computing. The department saw many activities aimed at bringing the student and faculty communities together. Faculty members gave invited lectures and inputs for policy-making through various events. Dr Vineeth presented at high-profile events such as Microsoft Research Workshop, Purdue University Seminar Series, Carnegie Mellon University CLeaR Seminar, etc. Dr Maunendra presented delivered invited lectures in the IEEE Seminar series, Symposium on Artificial Intelligence and Law (SAIL), Ed-Conclave: IIT Bombay's Annual Science and Technology festival. Dr. Konda Reddy presented in a capacity-building program at Asia@Connect. Dr Ganesh was involved in the design of standards for fairness assessment and ratings of AI systems. Dr Vineeth Balasubramanian and Dr. Srijith P K were instrumental in bringing the 14th edition of the Asian Conference on Machine Learning (ACML) to India. Dr Vineeth and Dr Srijith were two of the main organizers of ACML 2022, which saw large participation from national and international attendees at the event. They also organized OAMLS: Online Asian Machine Learning School to help prepare the next generation of machine learning researchers and practitioners by providing them with knowledge of machine learning, covering fundamentals as well as state-of-the-art advancements in the field.

The department faculty members continued to publish their research outputs at well-reputed venues such as AAAI, ICASSP, AAMAS, WACV, ACL, IEEE Transactions on Computational Social Systems, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Artificial Intelligence, IEEE Journal on Selected Topics in Signal Processing, IEEE Access, etc. The department also strengthened its connection with the industry through seminars, sponsored and consultancy projects, invited talks, etc. With the field of AI, as well as the work being done in the department in these areas, gaining more prominence and visibility, the department aims to scale greater heights in the years to come.

For more information, please visit: https://ai.iith.ac.in/

Faculty

Head of the Department

Maunendra Sankar Desarkar
PhD: IIT Kharagpur
(Associate Professor-*Computer Science & Engineering)*
Profile page:
https://iith.ac.in/cse/vineethnb/

Assistant Professor

Ayon Borthakur
PhD - Cornell University, USA
Profile page:

https://iith.ac.in/mae/rpkumar/

Ganesh Ghalme
PhD: IISc Bangalore
Profile page:
https://iith.ac.in/ai/ganeshghalme/

Konda Reddy Mopuri
PhD: IISc Bangalore
Profile page:
https://iith.ac.in/ai/ganeshghalme/

Internal Adjunct Professor

Abhinav Kumar
PhD - IIT Delhi
Profile page:
https://iith.ac.in/ee/abhinavkumar/

Aditya T Siripuram
PhD - Stanford University
Profile page:
https://iith.ac.in/ee/staditya/

Amit Acharyya
PhD - University of Southampton, UK
Profile page:
https://iith.ac.in/ee/amit_acharyya/

Balasubramaniam Jayaram
PhD - Sri Satyasai Institute of Higher Learning
Profile page:
https://iith.ac.in/math/jbala/

C Krishna Mohan
PhD - IIT Madras
Profile page:
https://iith.ac.in/cse/ckm/

Ketan P Detroja
PhD - IIT Bombay
Profile page:
https://www.iith.ac.in/~ketan/index.html

Kishalay Mitra
PhD - IIT Bombay
Profile page:
https://sites.google.com/view/kishalaymitra/home

Lakshmi Prasad Natarajan
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/lakshminatarajan/

M V Panduranga Rao
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/cse/mvp/

Manish Singh
PhD - University of Michigan, Ann Arbor
Profile page:
http://www.iith.ac.in/~msingh/

Mohan Raghavan
PhD: IISc Bangalore
Profile page:

https://www.iith.ac.in/~mohanr/

Prasanth Kumar R
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/mae/rpkumar/

Rajalakshmi P
PhD - IIT Madras
Profile page:
https://iith.ac.in/ee/raji/

Sathya Peri
PhD - University of Texas at Dallas
Profile page:
https://iith.ac.in/cse/sathya_p/

Shantanu Desai
PhD - Boston University, USA
Profile page:
https://iith.ac.in/phy/shantanud/

Soumya Jana
PhD - UIUC, USA
Profile page:
https://iith.ac.in/ee/jana/

Sri Rama Murty Kodukula
PhD - IIT Madras
Profile page:
https://iith.ac.in/ee/ksrm/

Srijith P K
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/cse/srijith/

Subrahmanya Sastry Challa
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/math/csastry/

Sumohana S Channappayya
PhD - The University of Texas at Austin, USA
Profile page:
https://iith.ac.in/ee/sumohana/

Surya kumar S
PhD - IIT Bombay
Profile page:
https://iith.ac.in/mae/ssurya/

Vineeth N Balasubramanian
PhD - Arizona State University, USA
Profile page:
https://www.iith.ac.in/~vineethnb/research.html

Publications:

1. Mopuri K R, Bilen H, Tsuchihashi N, Wada R, Inoue T, Kusanagi K, Nishiyama T, & Tamamura H. (2022). Early sign detection for the stuck pipe scenarios using unsupervised deep learning. Journal of Petroleum Science and Engineering. https://doi.org/10.1016/j.petrol.2021.109489.
2. Nayak G K, Mopuri K R, Jain S, & Chakraborty A. (2022). Mining Data Impressions from Deep Models as a Substitute for the Unavailable Training Data. IEEE Transactions on Pattern Analysis and Machine Intelligence, 44(11). https://doi.org/10.1109/TPAMI.2021.3112816.

Funded Research Projects:

1. Ganesh Sambhaji Ghalme; Learning in the Presence of Strategic Agents; 55.4 L. [SERB-CRG/AI/F293/2022-23/G532].
2. Mopuri Konda Reddy; Deep Learning for Long-Tailed Computer Vision Tasks; 18.06 L. [G558].

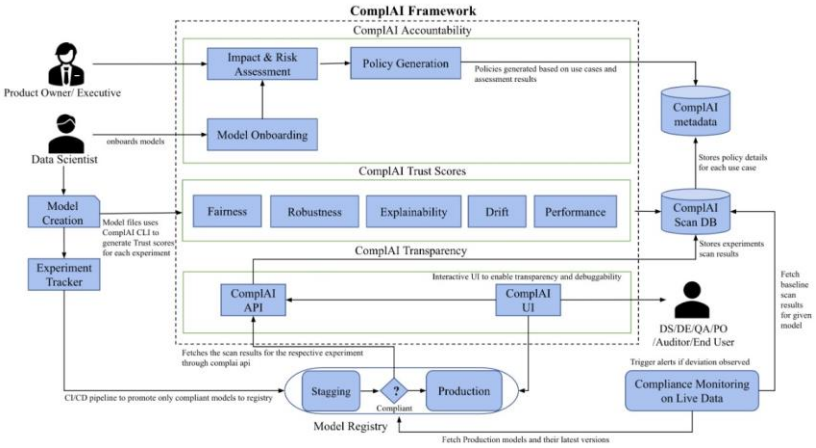
Awards & Recognitions:

1. Ganesh Sambhaji Ghalme received the Best Paper Award for the Paper titled "Efficient Algorithms for Fair Clustering with a New Fairness Notion" presented at the RBCDSAI FCAI Conference on Deployable AI (DAI) 2022.

Research Highlights:

1. A framework for multifactor assessment of supervised ML - Dr Maunendra Sankar Desarkar

A framework for multifactor assessment of supervised ML methods is proposed in this work. The framework works based on the concept of counterfactuals. The framework generates synthetic counterfactuals, which come in handy, especially for small datasets, as the real counterfactuals in such cases can actually be far from the query data points. ComplAI produces multiple quantitative assessment scores for performance, robustness, drift, etc., and also a single Trust factor score that can be used to compare multiple models for the same task.

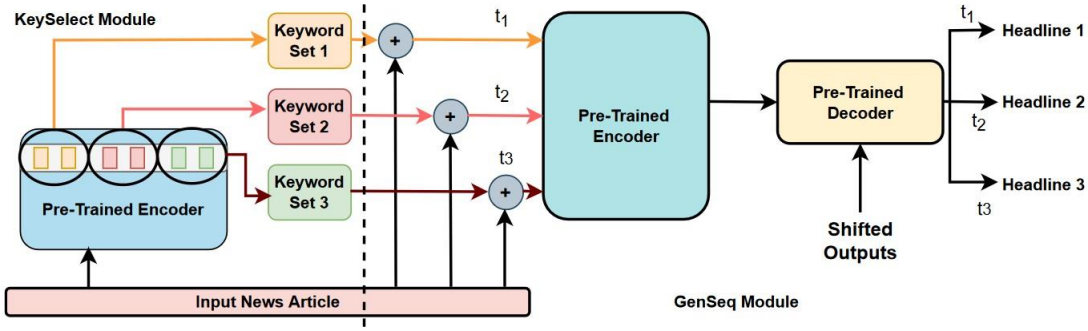


A framework for multifactor assessment of supervised ML

Publication: De A, Gudipudi S S, Panchanan S, and Desarkar M S. (2023). ComplAI: Framework for Multi-factor Assessment of Black-Box Supervised Machine Learning Models. In Proceedings of the ACM Symposium on Applied Computing (pp. 1096–1099). Association for Computing Machinery.

2. A framework for generating multiple parallel headlines for input articles - Dr Maunendra Sankar Desarkar

A framework for generating multiple parallel headlines for input articles is proposed. The work first identifies theme keywords and general keywords from the input. Then, it uses these keywords to generate headlines that are grounded on the theme but different from each other in lexical and/or semantic terms – and are representative of the input article.



A framework for generating multiple parallel headlines for input articles

Publication: Venkatesh E, Kaushal Maurya, Deepak Kumar, and Maunendra Sankar Desarkar. 2023. DivHSK: Diverse Headline Generation using Self-Attention based Keyword Selection. In Findings of the Association for Computational Linguistics: ACL 2023, pages 1879–1891, Toronto, Canada. Association for Computational Linguistics.

Department of Biomedical Engineering

While we celebrate the running of 15 glorious years of IIT Hyderabad, the Department of Biomedical Engineering (BME) has completed 11 years of its splendid journey. After moving to our own department building in 2021, we established 11 research labs and two teaching labs in the last year. The department has achieved a marvelous feat in academic programs and research activities. Currently, the department has 11 full-time faculty, four adjunct faculty, and one visiting faculty. Last year, Prof Mohanan from Sree Chitra Thirunal Institute of Medical Sciences joined us as an adjunct faculty. He is well known for the Toxicity/biocompatibility studies of materials and medical devices, and this has also reinforced our efforts for toxicological testing of biomaterials and medical device research. The department has eight staff members (2 TS, 3 JT, 1 Technical Officer, 1 Veterinary Officer, Executive Administrative Assistant, and Junior Administrative assistant). Three new staff joined us in the year 2022-23.

Apart from that, the department currently has 113 registered PhD students (i.e., ~10 PhD students/faculty – a remarkable number indeed), with many students supported by sponsored research grants. In 2022-23, 6 students completed their PhD program. The department also has 56 BTech and 28 MTech students. This is the third year of our BTech program, and we have been receiving accolades for running a unique BTech program in Biomedical Engineering. Our BTech curriculum has also been replicated at different Institutes and Universities. Also, our MTech program now has two streams of specialization, namely, MEDSAS (Medical Sensing, Analytics, and Software) and NBM (Nanomedicine Biomaterials). The department also participated in starting a new MTech course in Ophthalmic Engineering along with several other departments within the Institute and in collaboration with LV Prasad Eye Hospital. We have also increased the courses having lab component to 50% of total courses. Several BME courses represent the latest and advanced research of high relevance for today. All the students who completed their MTech degree in 2022 got placements; typically, 50% of students opted for industry jobs, and the remaining 50% pursued higher studies. In 2022-23, 25 PhD students joined the PhD program; amongst them, six students were selected for the prestigious PMRF fellowships.

In terms of research activities, the Department has done an excellent job in the year 2022-23 by securing eight extramural research grants from various funding agencies worth ~ 9 Cr, with a couple of high-value research grants like Indo-Italy Networks of Excellence in Computational Neuroscience and Sree Ramakrishna Paramhanmsa Research Grant in Biomedical Sciences (SreePVF). The faculty from BME published ~ 86 research articles in 2021-22; among them,> 20 research articles were published in Q1 journals. The faculty from BME delivered more than 40 seminars/talks at several international and national conferences/symposia. Several students received the best presentation/poster award in different conferences/symposia.

For more information, please visit: https://bme.iith.ac.in/

Biotechnology and Biomedical Engineering Departments Building

Faculty

Head of the Department

Subha Narayan Rath
PhD - NUS, Singapore
Professor
Profile page:
https://iith.ac.in/bme/subharath/

Professor

Renu John
PhD - IIT Delhi
Profile page:
https://iith.ac.in/bme/renujoh/

Associate Professor

Aravind Kumar Rengan
PhD - IIT Bombay
Profile page:
https://iith.ac.in/bme/aravind/

Falguni Pati
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/bme/falguni/

Harikrishnan Narayanan Unni
PhD - NTU, Singapore
Profile page:
https://iith.ac.in/bme/harikrishnan/

Jyotsnendu Giri
PhD - IIT Bombay
Profile page:
https://iith.ac.in/bme/jgiri/

Mohan Raghavan
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/bme/mohanr/

Assistant Professor

Avinash Eranki
PhD - Utrecht University
Profile page:
https://iith.ac.in/bme/aeranki/

Kousik Sarathy Sridharan
PhD - Aarhus University
Profile page:
https://iith.ac.in/bme/kousiksarathy/

Mohammed Suhail Rizvi
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/bme/suhailr/

Nagarajan Ganapathy
PhD - IIT Madras
Profile page:
https://iith.ac.in/bme/gnagarajan/

Adjunct Faculty

Lt Gen Dr Madhuri Rajeev Kanitkar
Vice-Chancellor of the Maharashtra University of Health Sciences, Nashik
Profile page:
https://en.wikipedia.org/wiki/Madhuri_Kanitkar

Sikandar Shaik
MBBS, DMRD DNB
Consultant PET-CT and Radiology Yashoda Hospitals
Profile page:
https://bme.iith.ac.in/assets/docs/sikandar.pdf

Dr Mohanan P V
Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum
Profile page:
https://www.sctimst.ac.in/People/mohanpv

Prof D Sakthi Kumar
Toyo University, Japan
Profile page:
https://www.drsakthikumar.com/aboutmywork.php#

Patents:

Filed:

1. Aravind Kumar Rengan; A Multimodal Liposomal Composition for Naja Naja Venom Neutralization, and a Method for Producing the Same; 202241024566.

2. Aravind Kumar Rengan; Encapsulated Nano Formulations of Buparvaquone and Methods of Preparation Thereof; 202241062262.

Published:

1. Aravind Kumar Rengan; Modified PEG-400 (mPEG-AA complex) and Uses Thereof; 202141003895.

2. Falguni Pati; Silk Fibroin Microfiber Reinforced Polycaprolactone Composites; 202141055556.

3. Falguni Pati; A Footwear and a Method of Manufacturing Thereof; 202041047879.

4. Subha Narayan Rath; Microfluidic Platform for Three-Dimensional Cell Culture and Multi-Drug Testing and Methods of Fabrication Thereof (Provisional patent); 202141030041.

Granted:

1. Jyotsnendu Giri; Biopolymer-based nanoparticles and a method of preparing the same; 201741027986.

2. Jyotsnendu Giri; A method of producing lipid-based nanocapsules without temperature cycling and the product thereof; 201741012592.

Publications:

1. Shinde V R, Revi N, Murugappan S, Singh S P, & Rengan A K. (2022). Enhanced permeability and retention effect: A key facilitator for solid tumor targeting by nanoparticles. Photodiagnosis and Photodynamic Therapy, 39(undefined). **https://doi.org/10.1016/j.pdpdt.2022.102915**.

2. Alvi S B, Rajalakshmi P S, Jogdand A B, Nazia B, Bantal V, & Rengan A K. (2022). Chitosan IR806 dye-based polyelectrolyte complex nanoparticles with mitoxantrone combination for effective chemo- photothermal therapy of metastatic triple-negative breast cancer. International Journal of Biological Macromolecules, 216(undefined). **https://doi.org/10.1016/j.ijbiomac.2022.07.018**.

3. Yadav D N, Ali M S, Thanekar A M, Pogu S V, & Rengan A K. (2022). Recent Advancements in the Design of Nanodelivery Systems of siRNA for Cancer Therapy. Molecular Pharmaceutics, 19(12). **https://doi.org/10.1021/acs.molpharmaceut.2c00811**.

4. Mudigunda S V, Pemmaraju D B, Paradkar S, Puppala E R, Gawali B, Upadhyayula S M, Vegi Gangamodi N, &

Rengan A K. (2022). Multifunctional Polymeric Nanoparticles for Chemo/Phototheranostics of Retinoblastoma. ACS Biomaterials Science and Engineering, 8(1) https://doi.org/10.1021/acsbiomaterials.1c01234.

5. Adinarayana M, Siddhant K, Vaddamanu M, Sathyanarayana A, Rengan A K, Hisano K, Tsutsumi O, & Prabusankar G. (2022). A simple and efficient approach for the clickability of super-bulky aryl azides. Journal of Heterocyclic Chemistry, 59(6). https://doi.org/10.1002/jhet.4450.

6. Mudigunda S V, Ravichandran G, Appidi T, & Rengan A K. (2022). Ascorbic acid assisted synthesis of fluorescent PEG for bioimaging application. Materials Today: Proceedings, 62(undefined). https://doi.org/10.1016/j.matpr.2022.02.630.

7. Pebam M, Sushma M V, Sankaranarayanan S A, Thanekar A M, Koyande N, & Rengan A K. (2022). Antiviral perspectives of economically important Indian medicinal plants and spices. Proceedings of the Indian National Science Academy, 88(3). https://doi.org/10.1007/s43538-022-00099-w.

8. Gangasani J K, Pemmaraju D B, Murthy U S N, Naidu V G M, & Rengan A K. (2022). Chemistry of herbal biomolecules. Herbal Biomolecules in Healthcare Applications, undefined. https://doi.org/10.1016/B978-0-323-85852-6.00018-4.

9. Dutta N, Pemmaraju D B, Ghosh S, Ali A, Mondal A, Majumder C, Nelson V K, Mandal S C, Misra A K, Rengan A K, Ravichandiran V, Che C T, Gurova K V, Gudkov A V, & Pal M. (2022). Alkaloid-rich fraction of Ervatamia coronaria sensitizes colorectal cancer by modulating AMPK and mTOR signaling pathways—Journal of Ethnopharmacology, 283(undefined) https://doi.org/10.1016/j.jep.2021.114666.

10. Koyande N, Gangopadhyay M, Thatikonda S, & Rengan A K. (2022). The role of gut microbiota in the development of colorectal cancer: a review. International Journal of Colorectal Disease, 37(7). https://doi.org/10.1007/s00384-022-04192-w.

11. Sushma M V, Sabarigresan M, Jogdand A B, Yadav D N, Rengan A K, & Ramadurai R. (2022). Ferroelectric polarization of β-polyvinylidene fluoride as control and mitigator of infectious organisms. Materials Today Communications, 32(undefined). https://doi.org/10.1016/j.mtcomm.2022.104067.

12. Revi N, Sankaranarayanan S A, & Rengan A K. (2022). A study on the role of eugenol encapsulated liposomes in facilitating neuron -microglia mediated wound recovery. Materialia, 23(undefined). https://doi.org/10.1016/j.mtla.2022.101454.

13. Joseph A, Billakanti S, Pandit M A, Khatun S, Rengan A K, & Muralidharan K. (2022). Impact of bandgap tuning on ZnS for degradation of environmental pollutants and disinfection. Environmental Science and Pollution Research, 29(37). https://doi.org/10.1007/s11356-022-19677-y.

14. Sarkar L, Sushma M V, Yalagala B P, Rengan A K, Singh S G, & Vanjari S RK. (2022). ZnO nanoparticles embedded silk fibroin - A piezoelectric composite for nanogenerator applications. Nanotechnology, 33(26). https://doi.org/10.1088/1361-6528/ac5d9f.

15. Sambangi P, Gopalakrishnan S, Pebam M, & Rengan A K. (2022). Nano-biofertilizers on soil health, chemistry, and microbial community: benefits and risks. Proceedings of the Indian National Science Academy, undefined(undefined). https://doi.org/10.1007/s43538-022-00094-1.

16. Thomas A, Sankaranarayanan S A, & Rengan A K. (2022). Modified Polyethylene Glycol Encapsulated Iron Oxide Nanoparticles for Accelerated Wound Healing Application. IEEE Transactions on Nanotechnology, 21(undefined). https://doi.org/10.1109/TNANO.2021.3138260.

17. Ravichandran G, Yadav D N, Murugappan S, Sankaranarayanan S A, Revi N, & Rengan A K. (2022). "Nano effects": a review on nanoparticle-induced multifarious systemic effects on cancer theranostic applications. Materials Advances, 3(22). https://doi.org/10.1039/d2ma00784c.

18. Padmakumar A, Koyande N P, & Rengan A K. (2022). The Role of Hitchhiking in Cancer Therapeutics—A Review. Advanced Therapeutics, 5(9). https://doi.org/10.1002/adtp.202200042.

19. Koyande N P, Srivastava R, Padmakumar A, & Rengan A K. (2022). Advances in Nanotechnology for Cancer Immunoprevention and Immunotherapy: A Review. Vaccines, 10(10). https://doi.org/10.3390/vaccines10101727.

20. Pavithra C L P, Sankaranarayanan S A, Pebam M, Janardhana R K S K, Singh A, Rengan A K, & Dey S R. (2022). Primary attempt towards bioapplicability of one-dimensional high entropy alloys. Materials Letters, 312(undefined). https://doi.org/10.1016/j.matlet.2022.131659.

21. Rudraprasad D, Sushma M V, Rengan A K, Naik M N, & Joseph J. (2022). Characterization and proteome profiling of extracellular vesicles in a murine model of Staphylococcus aureus endophthalmitis. Microbes and Infection, 24(8). https://doi.org/10.1016/j.micinf.2022.105014.

22. Singh A D, Patnam S, Koyyada R, Samal R, Alvi S B,

Satyanaryana G, Andrews R, Panigrahi A K, Rengan A K, Mudigonda S S, Maitra S, & Sasidhar M V. (2022). Identifying stable reference genes in polyethene glycol precipitated urinary extracellular vesicles for RT-qPCR-based gene expression studies in renal graft dysfunction patients. Transplant Immunology, 75(undefined). https://doi.org/10.1016/j.trim.2022.101715.

23. Patra P, Thomas A, & Rengan A K. (2022). Electrically Conductive Polymers and Composites for Biomedical Applications. Conducting Polymers: Chemistries, Properties and Biomedical Applications, undefined(undefined). https://doi.org/10.1201/9781003205418-8.

24. Khatun S, Appidi T, & Rengan A K. (2022). Casein nanoformulations - Potential biomaterials in theranostics. Food Bioscience, 50(undefined). https://doi.org/10.1016/j.fbio.2022.102200.

25. Appidi T, P S R, Chinchulkar S A, Pradhan A, Begum H, Shetty V, Srivastava R, Ganesan P, & Rengan A K. (2022). A plasmon-enhanced fluorescent gold coated novel lipo-polymeric hybrid nanosystem: synthesis, characterization, and application for imaging and photothermal therapy of breast cancer. Nanoscale, 14(25). https://doi.org/10.1039/d2nr01378a.

26. Gangwar R, Rao K T, Khatun S, Rengan A K, Subrahmanyam C, & Krishna Vanjari S R. (2022). Label-free miniaturized electrochemical nanobiosensor triaging platform for swift identification of the bacterial type. Analytica Chimica Acta, 1233(undefined). https://doi.org/10.1016/j.aca.2022.340482.

27. Chinchulkar S A, Patra P, Dehariya D, Yu A, & Rengan A K. (2022). Polydopamine nanocomposites and their biomedical applications: A review. Polymers for Advanced Technologies, 33(12). https://doi.org/10.1002/pat.5863.

28. Patra P, & Rengan A K. (2022). Cancer cell membrane cloaked nanocarriers: A biomimetic approach towards cancer theranostics. Materials Today Communications, 33(undefined). https://doi.org/10.1016/j.mtcomm.2022.104289.

29. Pemmaraju D B, Rengan A K, Ghosh A, Gangasani J K, Murthy U S N, & Naidu V G M. (2022). Herbal biomolecules as nutraceuticals. Herbal Biomolecules in Healthcare Applications, undefined(undefined). https://doi.org/10.1016/B978-0-323-85852-6.00025-1.

30. Gandhi J, Sushma M V, Rengan A K, Naik M N, Mishra D K, Boyinpally S R, & Joseph J. (2022). Proteomic profiling of exosomes in a mouse model of Candida albicans endophthalmitis. Experimental Cell Research, 417(2). https://doi.org/10.1016/j.yexcr.2022.113222.

31. Pebam M, P S R, Gangopadhyay M, Thatikonda S, & Rengan A K. (2022). Terminalia chebula Polyphenol and Near-Infrared Dye-Loaded Poly (lactic acid) Nanoparticles for Imaging and Photothermal Therapy of Cancer Cells. ACS Applied Bio Materials, 5(11). https://doi.org/10.1021/acsabm.2c00724.

32. Gangwar R, Ray D, Rao K T, Khatun S, Subrahmanyam C, Rengan A K, & Vanjari S R K. (2022). Plasma Functionalized Carbon Interfaces for Biosensor Application: Toward the Real-Time Detection of Escherichia coli O157: H7. ACS Omega, 7(24). https://doi.org/10.1021/acsomega.2c01802.

33. Yalagala B P, Sankaranarayanan S A, Rengan A K, & Vanjari S R K. (2022). Biocompatible, Flexible, and High-Performance Nanowelded Silver Nanowires on Silk Fibroin for Transparent Conducting Electrodes toward Biomemristor Application. ACS Sustainable Chemistry and Engineering, 10(14). https://doi.org/10.1021/acssuschemeng.1c08227.

34. Sankaranarayanan S A, Thomas A, Revi N, Ramakrishna B, & Rengan A K. (2022). Iron oxide nanoparticles for theranostic applications - Recent advances. Journal of Drug Delivery Science and Technology, 70(undefined). https://doi.org/10.1016/j.jddst.2022.103196.

35. G V, Hasan Q A, Kumar R, & Eranki A. (2022). Analysis of single-nucleotide polymorphisms in genes associated with triple-negative breast cancer. Frontiers in Genetics, 13(undefined). https://doi.org/10.3389/fgene.2022.1071352.

36. K N V, Bonthu D, Doddamani M, & Pati F. (2022). Additive Manufacturing of Short Silk Fiber Reinforced PETG Composites. Materials Today Communications, 33(undefined) https://doi.org/10.1016/j.mtcomm.2022.104772.

37. Sasikumar S, Chameettachal S, Kingshott P, Cromer B, & Pati F. (2022). Influence of Liver Extracellular Matrix in Predicting Drug-Induced Liver Injury: An Alternate Paradigm. ACS Biomaterials Science and Engineering, 8(2). https://doi.org/10.1021/acsbiomaterials.1c00994.

38. Kumar A, Sahu R K, Chameettachal S, Pati F, & Kumar A. (2022). Fabrication and analysis of chitosan oligosaccharide-based mucoadhesive patch for oromucosal drug delivery. Drug Development and Industrial Pharmacy, 48(11). https://doi.org/10.1080/03639045.2022.2146705.

39. Ghosh A, Singh V K, Singh V, Basu S, & Pati F. (2022). Recent Advancements in Molecular Therapeutics for Corneal Scar Treatment Cells 11(20). https://doi.org/10.3390/cells11203310.

40. Bojedla S S R, Yeleswarapu S, Alwala A M, Nikzad M, Masood S H, Riza S, & Pati F. (2022). Three-Dimensional Printing of Customized Scaffolds with Polycaprolactone-Silk Fibroin Composites and Integration of Gingival Tissue-Derived Stem Cells for Personalized Bone Therapy. ACS Applied Bio Materials, 5(9). https://doi.org/10.1021/acsabm.2c00560.

41. Bojedla S S R, Chameettachal S, Yeleswarapu S, Nikzad M, Masood S H, & Pati F. (2022). Silk fibroin microfiber-reinforced polycaprolactone composites with enhanced biodegradation and biological characteristics. Journal of Biomedical Materials Research - Part A, 110(7) https://doi.org/10.1002/jbm.a.37380.

42. Khati V, Turkki J A, Ramachandraiah H, Pati F, Gaudenzi G, & Russom A. (2022). Indirect 3D Bioprinting of a Robust Trilobular Hepatic Construct with Decellularized Liver Matrix Hydrogel. Bioengineering, 9(11). https://doi.org/10.3390/bioengineering9110603.

43. Khati V, Ramachandraiah H, Pati F, Svahn H A, Gaudenzi G, & Russom A. (2022). 3D Bioprinting of Multi-Material Decellularized Liver Matrix Hydrogel at Physiological Temperatures. Biosensors, 12(7). https://doi.org/10.3390/bios12070521.

44. Yeleswarapu S, Chameettachal S, Bera A K, & Pati F. (2022). Smooth muscle matrix bioink promotes myogenic differentiation of encapsulated adipose-derived stem cells. Journal of Biomedical Materials Research - Part A, 110(11). https://doi.org/10.1002/jbm.a.37433.

45. Shukla P, Mitruka M, & Pati F. (2022). The effect of the synthetic route on the biophysiochemical properties of methacrylated gelatin (GelMA) based hydrogel for the developing GelMA-based bio inks for 3D bioprinting applications. Materialia, 25(undefined). https://doi.org/10.1016/j.mtla.2022.101542.

46. Shukla P, Yeleswarapu S, Heinrich M A, Prakash J, & Pati F. (2022). Mimicking tumor microenvironment by 3D bioprinting: 3D cancer modeling. Biofabrication, 14(3). https://doi.org/10.1088/1758-5090/ac6d11.

47. Singh A, Kumar P, Yeleswarapu S, Pati F, & John R. (2022). Surface wave elastography using high speed full-field optical interferometry. Biomedical Physics and Engineering Express, 8(2). https://doi.org/10.1088/2057-1976/ac50be.

48. Bhatt A, Dhiman N, Giri P S, Kasinathan G N, Pati F, & Rath S N. (2022). Biocompatibility-on-a-chip: Characterization and evaluation of decellularized tendon extracellular matrix (tdECM) hydrogel for 3D stem cell culture in a microfluidic device. International Journal of Biological Macromolecules, 213(undefined). https://doi.org/10.1016/j.ijbiomac.2022.06.010.

49. Sasikumar S, Boden A, Chameettachal S, Cipolla L, Cromer B, Kingshott P, & Pati F. (2022). Galactose Tethered Decellularized Liver Matrix: Toward a Biomimetic and Biofunctional Matrix for Liver Tissue Engineering. ACS Applied Bio Materials, 5(6). https://doi.org/10.1021/acsabm.2c00330.

50. Bera A K, Sriya Y, & Pati F. (2022). Formulation of Dermal Tissue Matrix Bioink by a Facile Decellularization Method and Process Optimization for 3D Bioprinting toward Translation Research. Macromolecular Bioscience, 22(8). https://doi.org/10.1002/mabi.202200109.

51. Sasikumar S, Chameettachal S, Kingshott P, Cromer B, & Pati F. (2022). Hepatogenic differentiation of adipose-derived mesenchymal stem cells directed by topographical cues: a proof of concept study. Proceedings of the Indian National Science Academy, 88(3). https://doi.org/10.1007/s43538-022-00089-y.

52. Singh A, Pati F, & John R. (2022). Quantifying viscosity and elasticity using holographic imaging by Rayleigh wave dispersion. Optics Letters, 47(9). https://doi.org/10.1364/OL.451464.

53. Kamaraj M, Giri P S, Mahapatra S, Pati F, & Rath S N. (2022). Bioengineering strategies for 3D bioprinting of tubular construct using tissue-specific decellularized extracellular matrix. International Journal of Biological Macromolecules, 223(undefined). https://doi.org/10.1016/j.ijbiomac.2022.11.064.

54. Sarviya N, Basu S M, Mani R, Chauhan M, Kingshott P, & Giri J. (2022). Biomimicking nanofibrous gelatin microspheres recreating the stem cell niche for their ex-vivo expansion and in-vivo-like differentiation for injectable stem cell transplantation. Biomaterials Advances, 139(undefined). https://doi.org/10.1016/j.bioadv.2022.212981.

55. Rajakumara E, Saniya D, Bajaj P, Rajeshwari R, Giri J, Davari MD. (2022). Hijacking Chemical Reactions of P450 Enzymes for Altered Chemical Reactions and Asymmetric Synthesis. Int J Mol Sci. 24, 214. IF: 6.2. https://doi.org/10.3390/ijms24010214.

56. Singh R, Roopmani P, Chauhan M, Basu S M, Deeksha W, Kazem M D, Hazra S, Rajakumara E, & Giri J. (2022). Silver sulfadiazine loaded core-shell airbrushed nanofibers for burn wound healing application. International Journal of Pharmaceutics, 613(undefined). https://doi.org/10.1016/j.ijpharm.2021.121358.

57. Chauhan M, Basu S M, Yadava S K, Sarviya N, & Giri J. (2022). A facile strategy for the preparation of polypropylene sulfide nanoparticles for hydrophobic and base-sensitive cargo. Journal of Applied Polymer

Science, 139(10). https://doi.org/10.1002/app.51767.

58. Koppula A, Barra R R, & Sridharan K S. (2022). Effects of exercise anticipation on cardiorespiratory coherence. Physiological reports, 10(14). https://doi.org/10.14814/phy2.15381.

59. Koppula A, Asif A R, Barra R R, & Sridharan K S. (2022). Feasibility of home-based tracking of insulin resistance from vascular stiffness estimated from the photoplethysmographic finger pulse waveform. Physiological Measurement, 43(6). https://doi.org/10.1088/1361-6579/ac6d3f.

60. Iyengar R S, Mallampalli K, Singh A K, Koppula A, Sridharan K S, & Raghavan M. (2022). The NEUROiD neuromusculoskeletal movement simulation platform. Digital Human Modeling and Medicine: The Digital Twin, undefined(undefined). https://doi.org/10.1016/B978-0-12-823913-1.00015-4.

61. Rizvi M S. (2022). Effect of detachment of motor protein from track on its transport. Journal of Biological Physics, 48(4). https://doi.org/10.1007/s10867-022-09613-z.

62. Rizvi M S, Farutin A, & Misbah C. (2022). Flow driven vesicle unbinding under mechanosensitive adhesion. Soft Matter, 18(6). https://doi.org/10.1039/d1sm01284c.

63. Farutin A, Rizvi M S, Hu W F, Lin T S, Rafaa S, & Misbah C. (2022). A reduced model for a phoretic swimmer. Journal of Fluid Mechanics, 952(undefined). https://doi.org/10.1017/jfm.2022.870.

64. Athilingam T, Parihar S S, Bhattacharya R, Rizvi M S, Kumar A, & Sinha P. (2022). Proximate larval epidermal cell layer generates forces for Pupal thorax closure in Drosophila. Genetics, 221(1). https://doi.org/10.1093/genetics/iyac030.

65. Warnecke J M, Ganapathy N, Koch E, Dietzel A, Flormann M, Henze R, & Deserno T M. (2022). Printed and Flexible ECG Electrodes Attached to the Steering Wheel for Continuous Health Monitoring during Driving. Sensors, 22(11). https://doi.org/10.3390/s22114198.

66. Sukanya V S, & Rath S N. (2022). Microfluidic Biosensor-Based Devices for Rapid Diagnosis and Effective Anti-cancer Therapeutic Monitoring for Breast Cancer Metastasis. Advances in Experimental Medicine and Biology, 1379(undefined). https://doi.org/10.1007/978-3-031-04039-9_13.

67. Selvaraju V, Spicher N, Wang J, Ganapathy N, Warnecke J M, Leonhardt S, Swaminathan R, & Deserno T M. (2022). Continuous Monitoring of Vital Signs Using Cameras: A Systematic Review. Sensors 22(11). https://doi.org/10.3390/s22114097.

68. Alvarez-Romero C, Martanez-Garcaa A, Sinaci A A, Gencturk M, Macndez E, Herna¡ndez-Pacrez T, Liperoti R, Angioletti C, Lobe M, Ganapathy N, Deserno T M, Almada M, Costa E, Chronaki C, Cangioli G, Cornet R, Poblador-Plou B, Carmona-Pirez J, Gimeno-Miguel A, Poncel-Falco A, Prados-Torres A, Kovacevic T, Zaric B, Bokan D, Hromis S, Djekic Malbasa J, Rapallo Fernandez C, Vela¡zquez Fernandez T, Rochat J, Gaudet-Blavignac C, Lovis C, Weber P, Quintero M, Perez-Perez M M, Ashley K, Horton L, & Parra Calderon C L.(2022). FAIR4Health: Findable, Accessible, Interoperable and Reusable data to foster Health Research. Open Research Europe, 2(undefined). https://doi.org/10.12688/openreseurope.14349.2.

69. Veeranki Y R, Ganapathy N, & Swaminathan R. (2022). Analysis of Fluctuation Patterns in Emotional States Using Electrodermal Activity Signals and Improved Symbolic Aggregate Approximation. Fluctuation and Noise Letters, 21(2). https://doi.org/10.1142/S0219477522500134.

70. Singh A, Pati F, & John R. (2022). Quantifying viscosity and elasticity using holographic imaging by Rayleigh wave dispersion. Optics Letters, 47(9). https://doi.org/10.1364/OL.451464.

71. Singh A, Kumar P, Yeleswarapu S, Pati F, & John R. (2022). Surface wave elastography using high speed full-field optical interferometry. Biomedical Physics and Engineering Express, 8(2). https://doi.org/10.1088/2057-1976/ac50be.

72. Kumar P, Mohamed N, & John R. (2022). In vivo depth-resolved morphological analysis of compound eye dioptric system using full-field optical coherence tomography. Optical Engineering, 61(12). https://doi.org/10.1117/1.OE.61.12.121804.

73. Galande A S, Gurram H P R, Kamireddy A P, Venkatapuram V S, Hasan Q, & John R. (2022). Quantitative phase imaging of biological cells using lensless inline holographic microscopy through sparsity-assisted iterative phase retrieval algorithm. Journal of Applied Physics, 132(24). https://doi.org/10.1063/5.0123677.

74. Rath S N, & Sankar S. (2022). 3D printers for surgical practice. 3D Printing in Medicine, undefined. https://doi.org/10.1016/B978-0-323-89831-7.00012-2.

75. Rasineni G K, Panigrahy N, Rath S N, Chinnaboina M, Konanki R, Chirla D K, & Madduri S. (2022). Diagnostic and Therapeutic Roles of the "Omics" in Hypoxic–Ischemic Encephalopathy in Neonates. Bioengineering,

9(10) https://doi.org/10.3390/bioengineering9100498.

76. Priya S, & Rath S N. (2022). Artificial skin: current advanced methods of fabrication and development. Natural Polymers in Wound Healing and Repair: From Basic Concepts to Emerging Trends, undefined(undefined). https://doi.org/10.1016/B978-0-323-90514-5.00014-6.

77. Kamaraj M, Giri P S, Mahapatra S, Pati F, & Rath S N. (2022). Bioengineering strategies for 3D bioprinting of tubular construct using tissue-specific decellularized extracellular matrix. International Journal of Biological Macromolecules, 223(undefined). https://doi.org/10.1016/j.ijbiomac.2022.11.064.

78. Sah M K, Mukherjee S, Flora B, Malek N, & Rath S N. (2022). Advancement in "Garbage in Biomaterials Out (GIBO)" concept to develop biomaterials from agricultural waste for tissue engineering and biomedical applications. https://doi.org/10.1007/s40201-022-00815-0.

79. Kamaraj M, Roopavath U K, Giri P S, Ponnusamy N K, & Rath S N. (2022). Modulation of 3D Printed Calcium-Deficient Apatite Constructs with Varying Mn Concentrations for Osteochondral Regeneration via Endochondral Differentiation. ACS Applied Materials and Interfaces, 14(20). https://doi.org/10.1021/acsami.2c05110.

80. Kumari N, Dalal V, Kumar P, & Rath S N. (2022). Antagonistic interaction between TTA-A2 and paclitaxel for anti-cancer effects by complex formation with T-type calcium channel. Journal of Biomolecular Structure and Dynamics, 40(6). https://doi.org/10.1080/07391102.2020.1839558.

81. Bhatt A, Dhiman N, Giri P S, Kasinathan G N, Pati F, & Rath S N. (2022). Biocompatibility-on-a-chip: Characterization and evaluation of decellularized tendon extracellular matrix (tdECM) hydrogel for 3D stem cell culture in a microfluidic device. International Journal of Biological Macromolecules, 213(undefined). https://doi.org/10.1016/j.ijbiomac.2022.06.010.

Funded Research Projects:

1. Avinash Eranki; Dual-Mode Ultrasound for Soft Tissue Sarcoma Therapy; 33 L. [G411].

2. Avinash Eranki; ICMR Medical Device Secretariat - CoE; 152 L. [G402].

3. Avinash Eranki; Portable Ultrasound Device for Non-Invasive Therapy of Solid Tumors; 50 L. [G000].

4. Falguni Pati; Biomimetic hydrogel for the treatment of blinding corneal diseases; 299.77 L. [SPVF/BME/F165/2022-23/S214].

5. Falguni Pati; Development of advanced healthy and diseased in vitro 3D glomerulus model for drug testing and understanding Kidney disease mechanisms; 47.23 L. [DBT/BME/F165/2022-23/G457].

6. Falguni Pati; Therapeutic potential of decellularized cornea matrix (DCM) hydrogel for corneal scars and stromal replacement in trauma conditions: Pre-clinical study; 33.16 L. [ICMR/BME/F165/2022-23/G494].

7. Harikrishnan Narayanan Unni; Neurological implications of traumatic brain injury – multiscale modeling of brain strain-induced Tau protein aggregation; 6.6 L. [SERB/BME/F108/2022-23/G533].

8. Jyotsnendu Giri; Antibacterial, host-modulating and regenerative nanofibers membrane for guided tissue regeneration; 23 L. [DBT/BME/F122/2022-23/G516].

9. Kousik Sarathy Sridharan; Digital Takshashila; 547 L. [G447].

10. Nagarajan Ganapathy; Development of Quantum Neural Networks for Smart Mental Healthcare; 21 L. [cohort2].

11. Nagarajan Ganapathy; SMART-BEING: Smart Multimodal Enabled Affective Computing to Promote Wellbeing; 20 L. [AC2023-4].

12. Nagarajan Ganapathy; Empowering Elderly with Healthy and Independent Living using Multimodal Sensors, Fusion and Artificial Intelligence Techniques; 25 L. [SG134].

13. Nagarajan Ganapathy; India aircraft Pilot vital sign monitoring and Assessment; 2 L. [Honeywell-SOW].

14. Renu John; ICMR CoE; 1500 L. [g 402].

Awards & Recognitions

1. Aravind Kumar Rengan has been selected as the Associate Fellow - Telangana Academy of Sciences.

2. Aravind Kumar Rengan received an SIRE Fellowship to visit Univ of Alberta.

3. Aravind Kumar Rengan has been selected as a co-opted member of the SERB-PAC committee in Biomedical and Health Science(BHS).

4. Falguni Pati received a cutting-edge, highly competitive Sree Ramakrishna Paramhamsa Research Grant in Biomedical Sciences worth 3 Cr from the Sree Padmavathi Foundation.

5. Ms Ramya, working under the guidance of Falguni Pati, won the Start-up Pitch Challenge at AMTECH Hyderabad on "3D Printing in Craniomaxillofacial Reconstruction."

6. Jyotsnendu Giri received the IIT Hyderabad Research Excellence Award 2022.

7. Sunil Kumar Yadava, working under the guidance of Jyotsnendu Giri, received Moderna's Global Fellowship.

8. Mohd Suhail Rizvi received the IIT Hyderabad Teaching Excellence Award 2022.

9. Nagarajan Ganapathy has been selected as the DAAD Research Ambassador - (2022 -25) - Indo-German Exchange Programme.

10. Renu John has been selected as the Fellow of the Royal Society of Biology London, 2022.

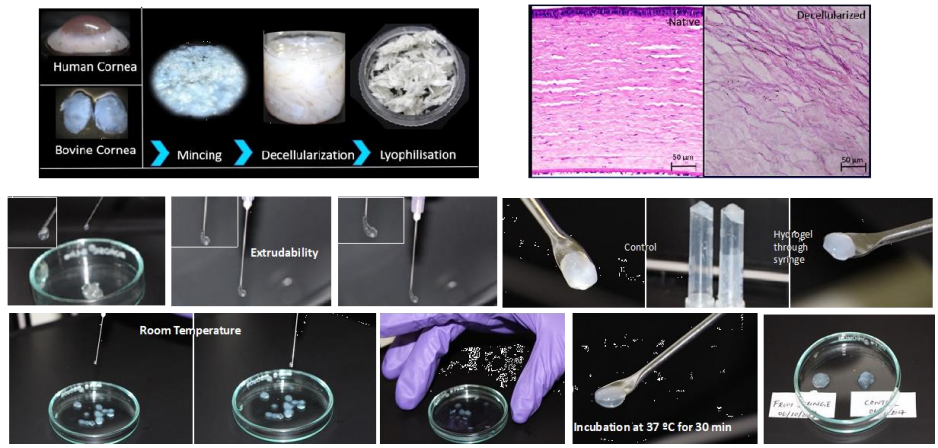
11. Sikandar Shaikh has been conferred with the HALL OF FAME Award by Tamilnadu and Pondicherry State Chapter IRIA Indian Radiological and Imaging Association.

12. Subha Narayan Rath has been selected as a Member of the Expert working group for "alternatives to animal methods" in Indian Pharmacopoeia, IPC, Ministry of Health and Family Welfare, Govt. of India and has also been selected as a Member of Technical Expert Committee on Human Genetics, Genome Engineering & Nanotechnology Applications in Healthcare, Department of Biotechnology, Govt. of India.

Research Highlights

1. Biofabrication and Tissue Engineering (BioFabTE) Lab - Dr Falguni Pati

BioFabTE Lab along with his team has developed a hydrogel from discarded corneas from human and bovine sources using a novel and simple method. Serendipitously, they discovered the most striking feature of this tissue-specific hydrogel to prevent the cells from scar tissue formation, which is attributed to the microenvironment that cannot be offered by any synthetic or other natural material. Capable of being injected owing to its two phases (liquid and gel) based on the incubation temperature, we explored its potential to serve as a material for minimally invasive treatment to replace complicated surgeries. Until now, no strategy is available to prevent corneal scarring following an injury. They demonstrated, for the first time, that this hydrogel can be applied immediately after injury which helps to regenerate the cornea without scarring. Furthermore, no treatment is available other than partial donor corneal graft or corneal transplantation for scarring, which is already present in the visual acuity. This study has immense translation potential for different corneal pathologies including traumatic injuries and subsequent scar formation, corneal ectasia and even regenerating the entire cornea, thereby eliminating the current dependency on the donor corneas. Many works are in the pipeline. Already they completed multiple sets of pre-clinical studies, which provided them with promising results. They are planning for human pilot studies for some of its applications soon" Furthermore, they have explored and initiated a new strategy of excising only the scar tissue and filling the wound bed with DCM hydrogel that can regenerate the corneal tissue to a normal level with fair transparency. They also checked its potential to be a treatment strategy for Ectasia for which only complicated therapeutic strategies and troublesome surgeries including donor cornea transplantation are available. For the first time, they demonstrated that the DCM hydrogel has the potential to thicken the Ectatic cornea to normal thickness. Finally, they develop a complete human cornea to replace the human cadaveric donor cornea by 3D bioprinting technology, first ever in India.

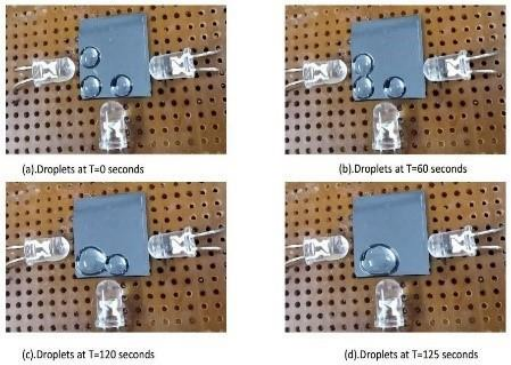


Development of decellularized cornea matrix (DCM) hydrogel and evaluation of the extrudability of DCM hydrogel

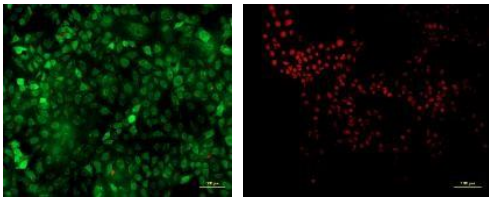
3D Bioprinting of Human cornea with decellularized cornea matrix (DCM) hydrogel and implantation of the same on rabbit surgical depletion model

2. Biomicrofluidics and Biomechanics lab - Dr Harikrishnan Narayanan Unni

BML is focused on the design and development of chip-scale microfluidic systems for various bioanalytical applications, including biosensing and on-chip exploration of disease biology. Another area of focus is the computational modelling of biomechanics and mechanobiological systems. We utilize both continuum and molecular models to study the behaviour of biological elements. During the past year, we published a novel work on the development of chip-scale optowetting droplet devices for cancer drug screening [1]. Another key ongoing work is the molecular model of nano-enabled drug transport in cancer cell membranes. We have obtained interesting simulation results from molecular dynamics simulations of nanoparticle transport in lipid bilayer membranes, which is in process of manuscript preparation. The molecular models will be further validated using tumour-on-chip microfluidic designs.

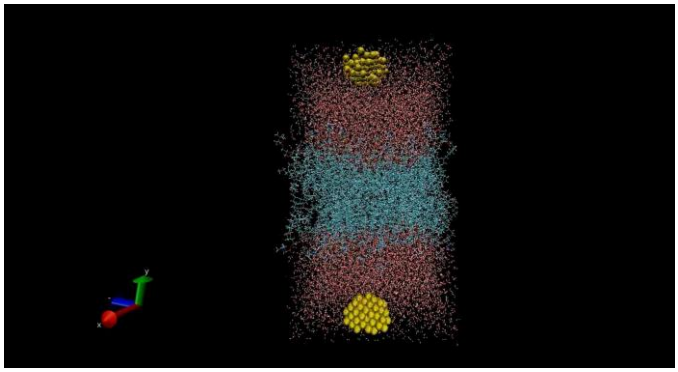


A

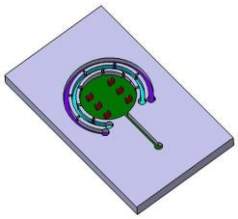


B

(A) Droplet on-chip optowetting system, (B) A549 cancer cells before and after drug treatment



A



B

(A) Molecular model of nanoparticle transport in cell membranes, (B) Biomimicking tumour-on-chip microfluidic platform for validation of molecular model

3. Neurotechnology and Neuroscience Lab - Dr Kousik Sarathy

Stroke is a leading cause of death and disability in India and the world over, with the residual motor deficit after stroke resistant to most available therapies. After the cerebrovascular event, the patients undergo early but limited restoration of lost motor functions, the time scale of which might range from a few weeks to a month. The patients undergo rehabilitation training, which may lead to a slow but steady and partial restoration of lost functions with persistent residual disability. There is an imperative to develop methods and markers to improve overall stroke rehabilitation outcomes and prescribe personalized rehabilitation paradigms. The two overlapping themes of the present work are 1) Development of cost-effective methods for the assessment of recovering stroke patients and 2) Metrics/markers that track valid motor-recovery-affecting-dimensions in stroke (like the CSI) and enable continuous adjustment of rehabilitative regimen (personalization). Electrophysiological assessment was performed while 118-channel EEG, EMG, ECG, and EOG were recorded concurrently with g.HIAmp system(g.Tec GmBH, Austria) with g.SCARABEO active electrodes at a sampling rate of 1200 Hz while patients were administered steady-state vibrotactile stimulation (SSVBT) with the paradigm described in the figure. We were able to elicit a steady-state response to the stimuli reliably. The SSVBT showed a clear dependence on the side of brain injury, where the ipsilesional hemisphere showed a marked reduction in cortical response to the SSVBT stimuli, while the contralesional response remained unaffected. These results pave way for a larger cohort study alongside anatomical characterization for the potential use of VBT stimuli to assess the integrity of the sensory centripetal sensory pathways.

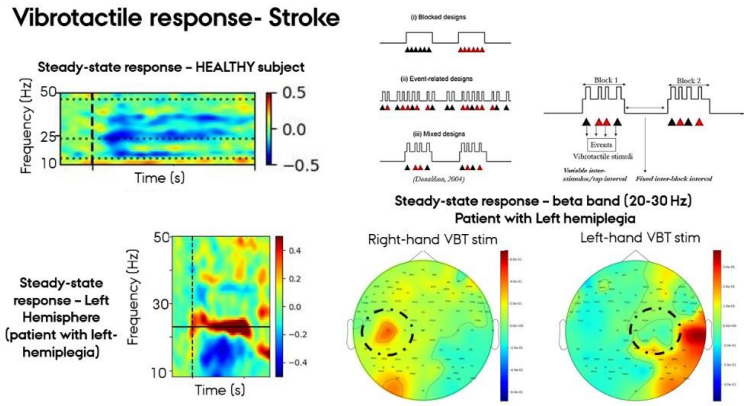
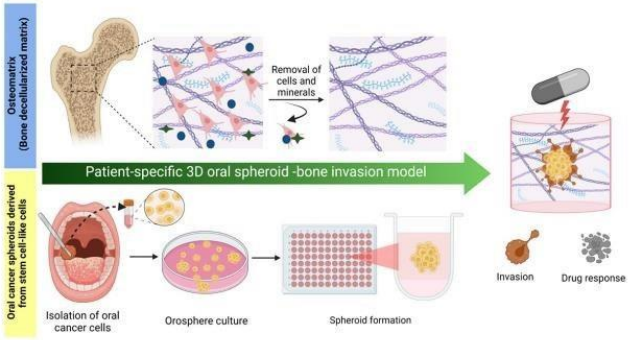


Fig. Vibrotactile response- Stroke

4. Regenerative Medicine and Stem Cell Research (RMS) Lab - Prof Subha Narayan Rath

The RMS Lab have developed a number of research studies. These works contribute to the advancement of biomedical and tissue engineering, showcasing innovations in areas such as microfluidics, bioprinting, and biomimetic materials. Notable works include:

- **CANCER-ON-CHIP:** "Osteomatrix as a personalized 3D tissue-specific invasion test-bed for oral carcinoma" by VS Sukanya et al. The study presents an osteomatrix-based 3D tissue-specific invasion test-bed for oral carcinoma, allowing personalized testing of invasive behaviour. In collaboration with Dr Harikrishnan "On-chip mixing of cancer cells and drug using LED enabled 2D opto-wetting droplet platforms" by T Thomas et al. This paper presents a technique involving LED-enabled 2D opto-wetting droplet platforms for mixing cancer cells and drugs on a chip. In collaboration with Dr Sishir of the EE dept, "Thin Microfluidic Chips with Active Valves" by E Prajapati et al. was published. This work focuses on the development of microfluidic chips with active valves, potentially useful for various applications.



Osteomatrix as personalized patient-specific tissue-specific invasion test bed

- **CARTILAGE Tissue engineering:** "3D Bioprintable Hypoxia-Mimicking PEG-Based Nano Bioink for Cartilage Tissue Engineering" by S Ravi et al. The study introduces a 3D bioprintable nano bioink made from PEG-based materials that mimic hypoxic conditions, suitable for cartilage tissue engineering.

- **dECM-based electrospun tendon:** "Biomimicking tendon by electrospinning tissue-derived decellularized extracellular matrix for tendon tissue engineering" by A Ruhela et al. This paper explores the use of electrospun tissue-derived decellularized extracellular matrix for engineering tendon-like structures.

- **3D biprinted tubular blood vessels:** "Bioengineering strategies for 3D bioprinting of tubular construct using tissue-specific decellularized extracellular matrix" by M Kamaraj et al. This study explores bioengineering strategies for 3D bioprinting tubular constructs using tissue-specific decellularized extracellular matrix derived from discarded patient vein samples, making the construct patient-specific.

Department of Biotechnology

Our vision is to foster a world-class teaching environment and state-of-the-art facilities for cutting-edge biotechnology research to drive an academic space that is dedicated to cultivating innovative opportunities and systemwide collaboration for discovery beyond boundaries. Our mission is to accelerate as an outstanding educational hub with an equal emphasis on excellence in teaching, research, and community engagement. We promote equality and empower our students, staff, and faculty to achieve intellectual rigor, academic leadership, and global recognition to best serve the nation and society. We are committed to the utmost professional and academic standards to ensure intellectual excellence and to create a global impact by transmitting advanced knowledge. We aspire to value the highest academic and professional integrity, scientific ethics, and excellence in teaching and research to realize the full potential of biotechnology.

In addition to research and teaching, the department actively collaborates with industry partners, government organizations, and national/international institutions. These collaborations facilitate the exchange of knowledge, technology transfer, and the translation of research findings into real- world applications.

For more information, please visit: https://biotech.iith.ac.in/

Biotechnology and Biomedical Engineering Departments Building

Faculty

Head of the Department

Anindya Roy
PhD - IISc Bangalore
Professor
Profile page:
https://iith.ac.in/bt/anindya/

Associate Professor

Anamika Bhargava
PhD - Innsbruck Medical University, Austria
Profile page:
https://iith.ac.in/bt/abhargava/

Basant Kumar Patel
PhD - Banaras Hindu University
Profile page:
https://iith.ac.in/bt/basantkpatel/

Raghavendra Nidhanapati K
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/bt/raghunk/

Rajakumara Eerappa
PhD - CCMB, Hyderabad
Profile page:
https://iith.ac.in/bt/eraj/

Rathinavelan Thenmalarchelvi
PhD - University of Madras
Profile page:
https://iith.ac.in/bt/tr/

Assistant Professor

Abhishek Subramanian
PhD - CSIR-National Chemical Laboratory
Profile page:
https://iith.ac.in/bt/abhisheks/

Althuri Avanthi
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/bt/a.avanthi/

Ashish Misra
PhD - IISc Bangalore
Profile page:

https://iith.ac.in/bt/ashishmisra/

Gaurav Sharma
PhD - CSIR-Institute of Microbial Technology (CSIR-IMTECH), Chandigarh, India
Profile page:
https://iith.ac.in/bt/sharmag/

Gunjan Mehta
PhD - IIT Bombay
Profile page:

https://iith.ac.in/bt/gunjanmehta/

Himanshu Joshi
PhD - IISc Banglore
Profile page:
https://iith.ac.in/bt/hjoshi/

Rahul Kumar
PhD - CSIR Institute of Microbial Technology, Chandigarh
Profile page:
https://iith.ac.in/bt/rahulk/

Sandipan Ray
PhD - IIT Bombay
Profile page:
https://iith.ac.in/bt/sandipan.ray/

Adjunct Faculty

Undurti N Das
Consultant Physician & Diabetologist, Clinical Immunologist & Rheumatologist, CEO & CSO, UND Life Sciences, USA
Profile Page:
https://en.wikipedia.org/wiki/Undurti_Narasimha_Das

Prof G Narahari Sastry
Director, CSIR-North East Institute of Science & Technology, Jorhat. Assam
Profile Page:
https://neist.res.in/Biodata.pdf

Affiliated Faculty

Neeraj Kumar
Assistant Professor, Liberal Arts.
IIT Hyderabad
Profile Page:
https://en.wikipedia.org/wiki/Undurti_Narasimha_Das

Publications:

1. Sekar S, Subbamanda Y, Pullaguri N, Sharma A, Sahu C, Kumar R, & Bhargava A. (2022). Isoform-specific expression of T-type voltage-gated calcium channels and estrogen receptors in breast cancer reveals specific isoforms that may be potential targets. Current Research in Biotechnology, Volume 4, 2022, Pages 459-467. **https://doi.org/10.1016/j.crbiot.2022.09.009**.

2. Andrea Kagoo R, Ankush Sharma, Anamika Bhargava. (2022). Interactions between genes altered during cardiotoxicity and neurotoxicity in zebrafish were revealed using induced network modules analysis. bioRxiv, 2022.02. 03.478934. **https://doi.org/10.1101/2022.02.03.478934**.

3. A Bhargava, N Pullaguri, & Y Bhargava. (2022). Zebrafish as a Xenotransplantation Model for Studying Cancer Biology and Cancer Drug Discovery. Zebrafish Model for Biomedical Research, 43-59. **https://doi.org/10.1007/978-981-16-5217-2_3**.

4. Bhargava A & Gorelik J. (2022). Correlating Cardiac Structure to Function Using Nanoscale Resolution Scanning Ion Conductance Microscopy. Bioanalytical Reviews, 3 pp 139–157. **https://doi.org/10.1007/11663_2021_10**.

5. Subbamanda Y D, & Bhargava A. (2022). Intercommunication between Voltage-Gated Calcium Channels & Estrogen Receptor/Estrogen Signaling: Insights into Physiological & Pathological Conditions. Cells. **https://doi.org/10.3390/cells11233850**.

6. Pullaguri N, Kagoo A R, & Bhargava A. (2022). New insights into inhibitory nature of triclosan on acetylcholinesterase activity. Toxicology, 466, (30 January 2022, 153080. **https://doi.org/10.1016/j.tox.2021.153080**.

7. Shaji U P, Tuti N, Das S, Anindya R, & Mohan M. (2022). Interactions between HIV protease inhibitor ritonavir and human DNA repair enzyme ALKBH2: a molecular dynamics simulation study. Molecular Diversity, undefined(undefined). **https://doi.org/10.1007/s11030-022-10444-2**.

8. Anindya R. (2022). Cytoplasmic DNA in cancer cells: Several pathways that potentially limit DNase2 and TREX1 activities. Biochimica et Biophysica Acta - Molecular Cell Research, 1869(8). **https://doi.org/10.1016/j.bbamcr.2022.119278**.

9. Pai S S, Ranjan S, Mathew A R, Anindya R, & Meur G. (2022). Analysis of the long-read sequencing data using computational tools confirms the presence of 5-methylcytosine in the Saccharomyces cerevisiae genome. Access Microbiol. **https://doi.org/10.1099/acmi.0.000363**.

10. Negi R, Jena T K, Jyoti N, Tuti N K, Anindya R, & Khan FA. (2022). Solvent-controlled synthesis of 2,3-diarylepoxy indenones and I ±-hydroxy diarylindanones and their evaluation as inhibitors of DNA alkylation repair. Organic and Biomolecular Chemistry, 20(29). **https://doi.org/10.1039/d2ob00595f**.

11. Althuri A & Venkata Mohan S. (2022). Emerging innovations for sustainable production of bioethanol and other mercantile products from circular economy perspective. Bioresource Technology, 363. **https://doi.org/10.1016/j.biortech.2022.128013**.

12. Bharathi V, Girdhar A, & Patel B K. (2022). TDP-43 proteinopathy mechanisms from non-mammalian model systems. TDP-43 and Neurodegeneration: From Bench to Bedside, undefined(undefined). **https://doi.org/10.1016/B978-0-12-820066-7.00002-3**.

13. Nirwal S, Saravanan P, Bajpai A, Meshram V D, Raju G, Deeksha W, Prabusankar G, & Patel B K. (2022). In Vitro Interaction of a C-Terminal Fragment of TDP-43 Protein with Human Serum Albumin Modulates Its Aggregation. Journal of Physical Chemistry B, 126(45). **https://doi.org/10.1021/acs.jpcb.2c04469**.

14. Bharathi V, Bajpai A, Parappuram I T, & Patel B K. (2022). Elevated constitutive expression of Hsp40 chaperone Sis1 reduces TDP-43 aggregation-induced oxidative stress in Ire1 pathway dependent-manner in yeast TDP-43 proteinopathy model of amyotrophic lateral sclerosis. Biochemical and Biophysical Research Communications, 595(undefined). **https://doi.org/10.1016/j.bbrc.2022.01.073**.

15. Moisander P H, Daley M C, Shoemaker K M, Kolte V, Sharma G, & Garlick K. (2022). Nitrogen Fixation Influenced by Phosphorus and Nitrogen Availability in the Benthic Bloom-forming Cyanobacterium Hydrocoleum sp. Identified in a Temperate Marine Lagoon. J Phycol. 2022 Jun;58(3):377-391. **https://doi.org/10.1111/jpy.13244**.

16. Mahanta U, Saberwal G, & Sharma G. (2022). Are Countries Becoming Better at SARS-CoV-2 Genomic Surveillance? Front Public Health. 2022; 10:887955. **https://doi.org/10.3389/fpubh.2022.887955**.

17. Karmakar K, Bhattacharya R, Sharma A, Parmar K, Nath U, Nataraja K N, N E, Sharma G, & Chakravortty D. (2022). Lysinibacillus macroides-mediated control of cellulose-producing morphotype of Salmonella. J Sci Food Agric. 2022 Nov;102(14):6491-6501. **https://doi.org/10.1002/jsfa.12016**.

18. Sharma G, Islam S T, Rahi P, Silby M W, Giovannelli D, Welander P V, Ehling-Schulz M, Chaudhry V, Molloy E, Hertweck C, Mundra S, Kalia V C, Lal R, Singh Y, Ruby E, Weigel C, & Kolter R. (2022). Reply to Oren et al., "New

Phylum Names Harmonize Prokaryotic Nomenclature". https://doi.org/10.1128/mbio.02323-22.

19. Panda A, Islam S T, & Sharma G. (2022). Harmonizing Prokaryotic Nomenclature: Fixing the Fuss over Phylum Name

Flipping

.

20. https://doi.org/10.1128/mbio.00970-22.

Saıdi F, Gamboa Marin O J, Veytia-Bucheli J I, Vinogradov E, Ravicoularamin G, Jolivet N Y, Kezzo A A, Ramirez Esquivel E, Panda A, Sharma G, Vincent S P, Gauthier C, & Islam S T. (2022). Evaluation of Azido 3-Deoxy-d-manno-oct-2-ulosonic Acid (Kdo) Analogues for Click Chemistry-Mediated Metabolic Labeling of Myxococcus xanthus DZ2 Lipopolysaccharide. ACS Omega. 2022 Oct 4;7(39):34997-35013.

21. https://doi.org/10.1021/acsomega.2c03711.

Mahajan R, Hudson B S, Sharma D, Kolte V, Sharma G, & Goel G. (2022). Transcriptome Analysis of Podoscypha petalodes Strain GGF6 Reveals the Diversity of Proteins Involved in Lignocellulose Degradation and Ligninolytic Function. Indian Journal of Microbiology, 62(4).

22. https://doi.org/10.1007/s12088-022-01037-6.

Saıdi F, Mahanta U, Panda A, Kezzo A A, Jolivet N Y, Bitazar R, John G, Martinez M, Mellouk A, Calmettes C, Chang YW, Sharma G, Islam S T. (2022). Bacterial Outer Membrane Polysaccharide Export (OPX) Proteins Occupy Three Structural Classes with Selective β-Barrel Porin Requirements for Polymer Secretion. Microbiol Spectr. 2022 Oct 26;10(5): e0129022.

23. https://doi.org/10.1128/spectrum.01290-22.

Podh N K, Das A, Dey P, Paliwal S, & Mehta G. (2022). Single-molecule tracking for studying protein dynamics and target-search mechanism in live cells of S. cerevisiae. STAR Protocols, 3(4).

24. https://doi.org/10.1016/j.xpro.2022.101900.

Mehta G, Sanyal K, Abhishek S, Rajakumara E, & Ghosh S K. (2022). Minichromosome maintenance proteins in eukaryotic chromosome segregation. BioEssays, 44(1).

25. https://doi.org/10.1002/bies.202100218.

Shen J, Roy A, Joshi H, Samineni L, Ye R, Tu Y M, Song W, Skiles M, Kumar M, Aksimentiev A, & Zeng H. (2022). Fluorofoldamer-Based Salt- and Proton-Rejecting Artificial Water Channels for Ultrafast Water Transport. Nano Letters, 22(12).

26. https://doi.org/10.1021/acs.nanolett.2c01137.

Li Y, Maffeo C, Joshi H, Aksimentiev A, Menard B, & Schulman R. (2022). Leakless end-to-end transport of small molecules through micron-length DNA nanochannels. Science Advances, 8(36).

27. https://doi.org/10.1126/sciadv.abq4834.

Bal E, Kumar R, Hadigol M, Holmes A B, Hilton L K, Loh J W, Dreval K, Wong J C H, Vlasevska S, Corinaldesi C, Soni R K, Basso K, Morin R D, Khiabanian H, Pasqualucci L, & Dalla-Favera R. (2022). Super-enhancer hypermutation alters oncogene expression in B cell lymphoma. Nature, 607(7920). https://doi.org/10.1038/s41586-022-04906-8.

28. S Shwetha, Y Subbamanda, N Pullaguri, A Sharma, Sahu C, R Kumar, & A Bhargava. (2022). Isoform-specific expression of T-type voltage-gated calcium channels and estrogen receptors in breast cancer reveals specific isoforms that may be potential targets Volume 4, 2022, Pages 459-467. https://doi.org/10.1016/j.crbiot.2022.09.009.

29. Kumar R, Deng Y, Fan J B, & Wei L. (2022). Editorial: Early Detection and Diagnosis of Cancer. Frontiers in Genetics, 13(undefined). https://doi.org/10.3389/fgene.2022.875421.

30. G V, Hasan Q A, Kumar R, & Eranki A. (2022). Analysis of single-nucleotide polymorphisms in genes associated with triple-negative breast cancer. Frontiers in Genetics, 13(undefined). https://doi.org/10.3389/fgene.2022.1071352.

31. Rajakumara E, Abhishek S, Nitin K, Saniya D, Bajaj P, Schwaneberg U, & Davari M D. (2022). Structure and Cooperativity in Substrate-Enzyme Interactions: Perspectives on Enzyme Engineering and Inhibitor Design. ACS Chemical Biology, 17(2). https://doi.org/10.1021/acschembio.1c00500.

32. Mehta G, Sanyal K, Abhishek S, Rajakumara E, & Ghosh S K. (2022). Minichromosome maintenance proteins in eukaryotic chromosome segregation. BioEssays, 44(1). https://doi.org/10.1002/bies.202100218.

33. Manickavasagam P, Abhishek S, & Rajakumara E. (2022). Designing ferritin nanocage based vaccine candidates for SARS-CoV-2 by in silico engineering of its HLA I and HLA II epitope peptides. Journal of Biomolecular Structure and Dynamics, undefined(undefined). https://doi.org/10.1080/07391102.2022.2103027.

34. Singh R, Roopmani P, Chauhan M, Basu S M, Deeksha W, Kazem M D, Hazra S, Rajakumara E, & Giri J. (2022). Silver sulfadiazine loaded core-shell airbrushed nanofibers for burn wound healing application. International Journal of Pharmaceutics, 613(undefined). https://doi.org/10.1016/j.ijpharm.2021.121358.

35. Satish M, Sandhya K, Nitin K, Yashas Kiran N, Aleena B, Satish Kumar A, Guruprasad K, & Rajakumara E. (2022). Computational, biochemical and ex vivo evaluation of xanthine derivatives against phosphodiesterases to enhance the sperm motility. Journal of Biomolecular Structure and Dynamics, undefined(undefined). https://doi.org/10.1080/07391102.2022.2085802.

36. Rajakumara E, Saniya D, Bajaj P, Rajeshwari R, Giri J, & Davari M D. (2022). Hijacking Chemical Reactions of P450 Enzymes for Altered Chemical Reactions and Asymmetric Synthesis. Int. J. Mol. Sci.24(1), 214. https://doi.org/10.3390/ijms24010214.

37. Rando H M, MacLean A L, Lee A J, Lordan R, Ray S, Bansal V, Skelly A N, Sell E, Dziak J J, Shinholster L, Lucy D'Agostino McGowan, Guebila M B, Wellhausen N, Knyazev S, Boca S M, Capone S, Qi Y, Park Y S, Mai D, Sun Y, Boerckel J D, Brueffer C, Byrd J B, Kamil J P, Wang J, Velazquez R, Szeto G L, Barton J P, Goel R R, Mangul S, Lubiana T, Gitter A, & Greene C S. (2022). Pathogenesis, Symptomatology, and Transmission of SARS-CoV-2 through Analysis of Viral Genomics and Structure. https://doi.org/10.1128/msystems.01447-21.

38. Banerjee S & Ray S. (2022). Circadian medicine for aging attenuation and sleep disorders: Prospects and challenges. Progress in Neurobiology, 220, 102387. https://doi.org/10.1016/j.pneurobio.2022.102387.

39. Jha P K, Valekunja U K, Ray S, Nollet M, & Reddy A B. (2022). Single-cell transcriptomics and cell-specific proteomics reveals molecular signatures of sleep. Communications Biology, 5(1). https://doi.org/10.1038/s42003-022-03800-3.

40. Magateshvaren Saras M A, Patro L P P, Uttamrao P P, & Rathinavelan T. (2022). SARS-CoV-2 whole-proteome sequences from the environment as an indicator of community viral distribution, evolution, and epidemiological dynamics: A cohort analysis of Austria. Environmental Microbiology Reports, 14(6). https://doi.org/10.1111/1758-2229.13102.

41. Patro L P P, & Rathinavelan T. (2022). STRIDER: Steric hindrance and metal coordination identifier. Computational Biology and Chemistry, 98(undefined). https://doi.org/10.1016/j.compbiolchem.2022.107686.

42. Bhanjadeo M M, Nial P S, Sathyaseelan C, Singh A K, Dutta J, Rathinavelan T, & Subudhi U. (2022). Biophysical interaction between lanthanum chloride and (CG)n or (GC)n repeats: A reversible B-to-Z DNA transition. International Journal of Biological Macromolecules, 216(undefined). https://doi.org/10.1016/j.ijbiomac.2022.07.020.

43. Magateshvaren Saras M A, Patro L P P, Uttamrao P P, & Rathinavelan T. (2022). Geographical distribution of SARS-CoV-2 amino acids mutations and the concomitant evolution of seven distinct clades in non-human hosts. Zoonoses and Public Health, 69(7). https://doi.org/10.1111/zph.12971.

44. Subramanian A, Zakeri P, Mousa M, Alnaqbi H, Alshamsi FY, Bettoni L, Damiani E, Alsafar H, Saeys Y, & Carmeliet P (2022), Angiogenesis goes computational - The future way forward to discover new angiogenic targets?, 20, 5235-5255, Computational and Structural Biotechnology Journal. https://doi.org/10.1016/j.csbj.2022.09.019.

Funded Research Projects:

1. Anamika Bhargava; Hands-on one to one training in single cell patch-clamp; 1.53 L. [SLSL/BT/F145/2022-23/C944].

2. Anamika Bhargava; Game-changing low-cost, accurate and user-friendly patch-clamp microfluidic chip-based system for measurement of ion-channel activity in live biological cells; 35.8 L. [IITH/BT/F145/SOCH2].

3. Anamika Bhargava; Challenging the paradigm: activating T-type calcium channel isoform Cav3.1 for breast cancer therapy; 8 L. [AC2022-1].

4. Anindya Roy; Molecular Characterization of anti-HIV drug Ritonavir as an inhibitor of DNA alkylation repair protein ALKBH2 (BT/PR43137/BRB/10/2015/2021); 17.16 L. [DBT/BT/F049/2022-23/G487].

5. Anindya Roy; Methyl enol ethers as versatile building blocks for the one pot synthesis of novel fused benzene, furocoumarins, enamides, & benzofurans and evaluation of biological activity; 52.84 L. [SERB/CHY/F042/2022-23/G512].

6. Avanthi Althuri; Integrated platform for lignin-hydrogels and one-pot production of mono-saccharomates and lactic acid from lignocellulosic waste; 30 L. [SG/IITH/F304/2022-23/SG-135].

7. Gaurav Sharma; A systems biology approach to define the host response in SARS-CoV-2 induced multisystem inflammatory syndrome in children (MIS-C) with neurological manifestations; 49 L. [2021-3668].

8. Gunjan Mehta; Role of chromatin remodelers in meiotic recombination and transcriptional switch during yeast meiosis, with emphasis on genetic disorders, infertility, and cancers; 20 L. [AC2023-2].

9. Gunjan Mehta; Mechanistic understanding of functioning of CHD1 remodelers using biochemical, structural and single-Molecule imaging approaches; 54.76 L. [DBT/BT/F131/2022-23/G514].

10. Himanshu Joshi; Computational Exploration of Membrane Spanning DNA Nanostructures for cellular drug Delivery; 26.21 L. [SERB-DST/BT/F286/2022-23/G531].

11. Himanshu Joshi; Understanding DNA-Based Naonstructures using Molecular Simulation; 35 L. [DST/BT/F286/2021-22/G467].

12. Thenmalarchelvi Rathinavelan; Exploring the mechanistic role of Saccharomyces cerevisiae Stm1 protein in apoptosis-like cell death; 30.75 L. [SERB/BT/F087/2022-23/G535].

13. Raghavendra Nidhanapati K; Inhibition of interaction between receptor binding domain of spike protein of SARS-CoV-2 and human ACE2 by protein mimic DNA; 6 L. [G356].

14. Raghavendra Nidhanapati K; Characterization of human E2 enzyme Ube2N response to DNA; 35.13 L. [G396].

15. Rajakumara Eerappa; Mechanistic understanding of functioning of CHD1 remodelers using biochemical, structural and single-Molecule imaging approaches; 54.76 L. [DBT/BT/F131/2022-23/G514].

16. Sandipan Ray; Comprehensive Characterization of the Circadian Regulations of Kinases and Diverse Signaling Pathways; 28.71 L. [SRG/2021/000671].

17. Sandipan Ray; In-Situ Nano-Transformable Hydrogel for Affordable Targeted Therapy of Highly Metastatic Cancers; 100 L. [IITH/BME/F163/SOCH3].

Awards and Recognitions:

1. Avanthi Althuri is the invited Journal Reviewer for Microbial cell factories, Springer Nature (Impact factor: 6.352)-2023-till date.

2. Gaurav Sharma received the AMI Young Scientist Award in the field of Environmental Microbiology.

3. Gaurav Sharma has been inducted as Life Member of 'Association of Microbiologists of India (AMI).

4. Gaurav Sharma has been inducted as Member of 'American Society for Microbiology (ASM).

5. Gaurav Sharma has been inducted as Microbiology Society Full Concessionary Member Worldwide.

6. Sandipan Ray become an Editorial Board Member of Frontiers in Sleep (Frontiers, ISSN: 2813-2890).

Highlights:

1. The department started a unique biannual "hands-on lab training (HLT) program". The program is designed to provide intensive hands-on training in tools and techniques in biotechnology or bioinformatics in advanced research labs. The HLT program aims to bridge the gap between formal education and research/industry needs in the biotechnology sector by imparting skills at the forefront.

2. Biotech Foundation Day was celebrated on 12th Nov'2022 in the esteemed presence of Dr K Thangaraj, Director, Centre for DNA Fingerprinting and Diagnostics – CDFD.

Department of Chemical Engineering

With IIT Hyderabad consistently flying high in the NIRF ranking, ChE@IITH is committed to set new heights for excellence in chemical engineering education, research and expert consulting support to the process industries. With 23 committed faculty members, the department targets to execute this ambitious plan by adopting a holistic approach of (i) fractal and hands-on / project based practical teaching, (ii) connecting interdisciplinary research approaches to the socially relevant problems, (iii) inculcating the start-up culture and making high quality education accessible for all. Broadly, teaching covers various aspects of chemical, biochemical, minerals, materials and process systems engineering. Our electives provide exposure to the state-of-the-art developments in the fields of energy, new materials, nano-science, machine learning and biochemical engineering. ChE@IITH encompasses both BTech and MTech programmes featuring a curriculum that is both comprehensive and as flexible as having the option of exploring internship opportunities. Hosting nearly 57 PhD and 24 MTech students, department's strong commitment towards research is evidenced by ~INR 45 crores extramural funding (through DST, DBT, DRDO, National Supercomputing Mission, National Textile Mission etc. and several corporate organizations) that faculties have obtained so far, many of which have been translated into high TRL level inventions. Faculty bestowed with the prestigious Vasvik award, and several department faculties appearing among top 2% scientists in the world (Stanford University list 2022) bearing the testimonies of quality and research environment in the department.

A large number of faculty from the department are actively involved in hosting / participating in conference and outreach workshops (TEQIP, ATAL-FDP) delivering invited / keynote lectures benefitting the students and faculties across several institutes in India. The department also houses state-of-the-art research and teaching laboratories. The faculty members in the department conduct research in a wide variety of exciting areas such as catalysis, fluid flow, nanotechnology, materials for energy and biological applications, bioengineering, atomistic simulations, efficient energy harvesting and storage, process control and optimization, machine learning, techno-economic analysis, supply chain management, mineral processing and climate change. With such aims, the department aligns itself with the nation's several missions and dedicates itself towards the dream of nation building.

For more information, please visit: **https://che.iith.ac.in/**

Chemical Engineering Departments Building/ Academic Block - A

Faculty

Head of the Department

Kishalay Mitra
PhD - IIT Bombay
Professor
Profile page:
https://iith.ac.in/che/kishalay/

Professor

Chandra Shekhar Sharma
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/che/cssharma/

Giridhar Madras
PhD - Texas A&M University
Profile page:
https://iith.ac.in/che/giridhar/

Kirti Chandra Sahu
PhD - JNCASR, Bangalore
Profile page:
https://iith.ac.in/che/ksahu/

Narasimha Mangadoddy
PhD - JKMRC, University of Queensland - Australia
Profile page:
https://iith.ac.in/che/narasimha/

Saptarshi Majumdar
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/che/saptarshi/

Sunil Kumar Maity
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/che/sunil_maity/

Vinod M Janardhanan
PhD - KIT, Germany
Profile page:
https://iith.ac.in/che/vj/

Associate Professor

Anand Mohan
PhD - Texas A&M, USA
Profile page:
https://iith.ac.in/che/anandm/

Balaji Iyer Vaidyanathan Shantha
PhD - IIT Bombay
Profile page:
https://iith.ac.in/che/balaji/

Debaprasad Shee
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/che/dshee/

Lopamudra Giri
PhD - University of Iowa, USA
Profile page:
https://iith.ac.in/che/giril/

Parag D Pawar
PhD - Johns Hopkins, USA
Profile page:
https://iith.ac.in/che/parag/

Phanindra Varma Jampana
PhD - University of Alberta, Canada
Profile page:
https://iith.ac.in/che/pjampana/

Praveen Meduri
PhD - University of Louisville, USA
Profile page:
https://iith.ac.in/che/meduripraveen/

Santhosh Devarai Kumar
PhD - IIT Madras
Profile page:
https://iith.ac.in/che/devarai/

Satyavrata Samavedi
PhD - Virginia Polytechnic Institute and State University, USA
Profile page:
https://iith.ac.in/che/samavedi/

Assistant Professor

Alan Ranjit Jacob
PhD - University of Crete, Greece
Profile page:
https://iith.ac.in/che/arjacob/

Mahesh Ganesan
PhD - University of Michigan, Ann Arbor
Profile page:
https://iith.ac.in/che/maheshg/

Ramkarn Patne
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/che/ramkarn/

Ranajit Mondal
PhD - IIT Madras
Profile page:
https://iith.ac.in/che/ranajit/

Suhanya Duraiswamy
PhD - NUS, Singapore
Profile page:
https://iith.ac.in/che/suhanya/

Shelaka Gupta
PhD - IIT Delhi
Profile page:
https://iith.ac.in/che/shelaka/

Patents:

Filed:

1. Suhanya Duraiswamy; Bacterial Cellulose Based Microfluidic Poc Device for AST; 202241030646.

Published:

1. Chandra Shekhar Sharma; Methods of Production of Pencil Needle Powder Based Graphite-Silica Composite Electrode; 202141012545.

Granted:

1. Chandra Shekhar Sharma; Cellulose Acetate Based Non-Woven Nanofiber Matrix with High Absorbency Properties for Female Hygiene Products; 3684/CHE/2014.

Publications

1. Garimella S M, Anand M, & Rajagopal K R. (2022). Jeffery-Hamel flow of a shear-thinning fluid mimics the response of viscoplastic materials. International Journal of Non-Linear Mechanics, 144: Article 104084. https://doi.org/10.1016/j.ijnonlinmec.2022.104084.

2. Anand M, Panteleev M A, & Ataullakhanov F I. (2022). Computational models of hemostasis: Degrees of complexity. Applications in Engineering Science, 10: Article 100103. https://doi.org/10.1016/j.apples.2022.100103.

3. Garimella S M, Anand M, & Rajagopal K R. (2022). Start-up shear flow of a shear-thinning fluid that approximates the response of viscoplastic fluids. Applied Mathematics and Computation, 412: Article 126571. https://doi.org/10.1016/j.amc.2021.126571.

4. Andreeva A A, Anand M, Lobanov A I, Nikolaev A V, & Panteleev M A. (2022). Using extended ODE systems to investigate the mathematical model of the blood coagulation. Computer Research and Modeling, 14(4): 931-951. https://doi.org/10.20537/2076-7633-2022-14-4-931-951.

5. Garimella S.M, Anand M, & Rajagopal KR. (2022). A new model to describe the response of a class of seemingly viscoplastic materials. Applications of Mathematics, 67(2): 153-165. https://doi.org/10.21136/AM.2021.0163-20.

6. Phukan M, Haritha P, Roy T R, & Iyer B V S. (2022). Mechanical response of networks formed by end-functionalised spherical polymer grafted nanoparticles. Soft Matter, 128(undefined). https://doi.org/10.1039/d2sm01174c.

7. Iyer B V S. (2022). Effect of functional anisotropy on the local dynamics of polymer grafted nanoparticles. Soft Matter, 18(33). https://doi.org/10.1039/d2sm00710j.

8. Karumban K S, Muley A, Giri B, Kumbhakar S, Kella T, Shee D, & Maji S. (2022). Synthesis, characterization, structural, redox, and electrocatalytic proton reduction properties of cobalt poly pyridyl complexes. Inorganica Chimica Acta, 529(undefined). https://doi.org/10.1016/j.ica.2021.120637.

9. Gupta Y, Zaidi Z, Mehta S, Chandewar P R, Kumar N, Paul A K, Shee D, Mondal A, Sorokhaibam L G, & Banerjee A. (2022). Assembly of a coordination polymer with sulfate-capped pentamolybdate units and copper: synthesis, structure, magnetic and catalytic studies. Dalton Transactions, undefined(undefined). https://doi.org/10.1039/d2dt00816e.

10. Sriramoju S K, Babu V, Dash P S, Majumdar S, & Shee D. (2022). Effective Utilization of Coal Processing Waste: Separation of Low Ash Clean Coal from Washery Rejects by Hydrothermal Treatment. Mineral Processing and Extractive Metallurgy Review, 43(2) https://doi.org/10.1080/08827508.2020.1833196.

11. Raj Kumar Oruganti, Debasis Pal, Tarun K Panda, Debaprasad Shee, Debraj Bhattacharyya. (2022). Green synthesis of calcium-oxide nanoparticles impregnated activated carbon from algal-bacterial activated sludge: its application in ciprofloxacin removal, International Journal of Environmental Science and Technology. https://doi.org/10.1007/s13762-022-04662-2.

12. Vannathan A A, Chandewar P R, Shee D, & Mal S S. (2022). Polyoxovanadate-Activated Carbon-Based Hybrid Materials for High-Performance Electrochemical Capacitors. Journal of the Electrochemical Society, 169(5). https://doi.org/10.1149/1945-7111/ac6c58.

13. Muhammed Anees P K, Vannathan A A, Abhijith M B, Kella T, Shee D, & Mal S S. (2022). Imidazolium cation linkers of polyoxomolybdate-polypyrrole nanocomposite electrode-based energy storage supercapacitors. Materials Chemistry and Physics, 277(undefined). https://doi.org/10.1016/j.matchemphys.2021.125441.

14. Giri B, Mahata A, Kella T, Shee D, De Angelis F, & Maji S. (2022). Tetrazole-Substituted isomeric ruthenium polypyridyl complexes for low overpotential electrocatalytic CO2 reduction. Journal of Catalysis, 405(undefined). https://doi.org/10.1016/j.jcat.2021.11.023.

15. Maity S, Vannathan A A, Chandewar P R, Shee D, Das P P, & Mal S S. (2022). Vanadomanganate as a synergistic component in high-performance symmetric supercapacitor. Journal of Alloys and Compounds,

899(undefined). https://doi.org/10.1016/j.jallcom.2021.163239.

16. Anandan Vannathan A, Chandewar P R, Shee D, & Sankar Mal S. (2022). Asymmetric polyoxometalate-polypyrrole composite electrode material for electrochemical energy storage supercapacitors. Journal of Electroanalytical Chemistry, 904(undefined). https://doi.org/10.1016/j.jelechem.2021.115856.

17. Kella T & Shee D. (2022). Production of aromatics from butanol over Ga-promoted HZSM5 catalysts: tuning of benzene-toluene-xylene and ethylbenzene (BTEX) selectivity. Reaction Chemistry and Engineering, 7(5). https://doi.org/10.1039/d1re00531f.

18. Vannathan A A, Kella T, Shee D, & Mal S S. (2022). Investigations of redox-active polyoxomolybdate embedded polyaniline-based electrode material for energy application. Ionics, 28(3). https://doi.org/10.1007/s11581-021-04390-6.

19. Mandari V, & Devarai S K. (2022). Biodiesel Production Using Homogeneous, Heterogeneous, and Enzyme Catalysts via Transesterification and Esterification Reactions: a Critical Review. Bioenergy Research, 15(2). https://doi.org/10.1007/s12155-021-10333-w.

20. Mandari V, & Devarai S K. (2022). Efficient separation and quantification of methyl palmitate and methyl oleate in biodiesel mixture using reverse-phase high-performance liquid chromatography. Indian Chemical Engineer, 64(4). https://doi.org/10.1080/00194506.2021.1997652.

21. Shanmugam M K, Mandari V, Devarai S K, & Gummadi S N. (2022). Types of bioreactors and important design considerations. Current Developments in Biotechnology and Bioengineering: Advances in Bioprocess Engineering, undefined(undefined). https://doi.org/10.1016/B978-0-323-91167-2.00008-3.

22. Doriya K, Kumar D S, & Thorat B N. (2022). A systematic review on fruit-based fermented foods as an approach to improve dietary diversity. Journal of Food Processing and Preservation, 46(11). https://doi.org/10.1111/jfpp.16994.

23. Pujari N S K, Miriyala S S, & Mitra K. (2022). Comparative study of automated deep learning techniques for wind time-series forecasting, Statistical Modeling in Machine Learning: Concepts and Applications, 2022, pp. 327–356. https://doi.org/10.1016/B978-0-323-91776-6.00003-8.

24. Miriyala S S, Pujari, K N, Naik S, & Mitra K. (2022). Evolutionary neural architecture search for surrogate models to enable optimization of industrial continuous crystallization process. Powder Technology, 2022, 405, 117527. https://doi.org/10.1016/j.powtec.2022.117527.

25. Pantula, P D, Miriyala S S, & Mitra K. (2022). Stochastic optimization of industrial grinding operation through data-driven robust optimization, Statistical Modeling in Machine Learning: Concepts and Applications, 2022, pp. 249–267. https://doi.org/10.1016/B978-0-323-91776-6.00012-9 .

26. Inapakurthi R K & Mitra K. (2022). Optimal surrogate building using SVR for an industrial grinding process, Materials and Manufacturing Processes, 2022, 37(15), pp. 1701–1707. https://doi.org/10.1080/10426914.2022.2039699.

27. Miriyala S S, Inapakurthi R, Mitra K. (2022). Nonlinear system identification of environmental pollutants using recurrent neural networks and Global Sensitivity Analysis. Statistical Modeling in Machine Learning: Concepts and Applications, 2022, pp. 307–326. https://doi.org/10.1016/B978-0-323-91776-6.00002-6.

28. Inapakurthi R K, Naik S S, & Mitra K. (2022). Toward Faster Operational Optimization of Cascaded MSMPR Crystallizers Using Multiobjective Support Vector Regression, Industrial and Engineering Chemistry Research, 2022, 61(31), pp. 11518–11533. https://doi.org/10.1021/acs.iecr.2c00526.

29. Jayanth Krishnan K & Mitra K. (2022). A modified Kohonen map algorithm for clustering time series data, Expert Systems with Applications, 2022, 201, 117249. https://doi.org/10.1016/j.eswa.2022.117249.

30. Miriyala S S, Jadhav P D, Banerjee R, & Mitra K. (2022). Artificial intelligence–based uncertainty quantification technique for external flow computational fluid dynamic (CFD) simulations. Statistical Modeling in Machine Learning: Concepts and Applications, 2022, pp. 79–92. https://doi.org/10.1016/B978-0-323-91776-6.00014-2 .

31. Varghese M M, Vakamalla T R, Gujjula R, & Mangadoddy N. (2022). Prediction of solid circulation rate in an internal circulating fluidized bed: An empirical and ANN approach. Flow Measurement and Instrumentation, 88, 102274. https://doi.org/10.1016/j.flowmeasinst.2022.102274.

32. Kumar M, Vanka S P, Banerjee R, & Mangadoddy N. (2022). Dominant Modes in a Gas Cyclone Flow Field Using Proper Orthogonal Decomposition. Industrial and Engineering Chemistry Research, 61(6). https://doi.org/10.1021/acs.iecr.1c03357.

33. Varghese M M, Aiswaria P, Vakamalla T R, &

Mangadoddy N. (2022). Measurement of solids holdup in a gas–solid fluidized bed: an experimental, statistical and ANN approach. Brazilian Journal of Chemical Engineering. https://doi.org/10.1007/s43153-022-00255-1.

34. Diddi S, Jampana P V, & Mangadoddy N. (2022). Evaluation of Two Non-iterative Electrical Resistance Tomography (ERT) Reconstruction Algorithms for Air-Core Measurements in Hydrocyclone. Industrial and Engineering Chemistry Research, 61(49). https://doi.org/10.1021/acs.iecr.2c02721.

35. Prasad Kopparthi, Vadlakonda B, & Mangadoddy N. (2022). Multi-phase CFD modelling of Slurry Column Flotation – Validation of both Hydrodynamic and Kinetic Parameters. Special Issue on Prof Cilik, Froth flotation, Physicochemical Problems of Mineral Processing, 2022;58(5):156486; doi.org/10.37190/ppmp/156486. https://doi.org/10.37190/ppmp/156486.

36. Sudikondala P, Mangadoddy N, Kumar M, Kumar Tripathy S, & Yanamandra R M. (2022). CFD Modelling of Spiral Concentrator- Prediction of Comprehensive Fluid Flow Field and Particle Segregation. Minerals Engineering, 183(undefined). https://doi.org/10.1016/j.mineng.2022.107570.

37. Padhi M, Vakamalla T R, & Mangadoddy N. (2022). Iron ore slimes beneficiation using optimised hydrocyclone operation. Chemosphere, 301, 134513. https://doi.org/10.1016/j.chemosphere.2022.134513.

38. Beckwith J K, Ganesan M, Vanepps J S, Kumar A, & Solomon M J. (2022). Rheology of Candida albicans fungal biofilms. Journal of Rheology, 66(4). https://doi.org/10.1122/8.0000427.

39. Kao P K, Solomon M J, & Ganesan M. (2022). Microstructure and elasticity of dilute gels of colloidal discoids. Soft Matter, 18(7). https://doi.org/10.1039/d1sm01605a.

40. Velpandian M, Ummethala G, Malladi S K, & Meduri P. (2022). Heterostructures of tin and tungsten selenides for robust overall water splitting. Journal of Colloid and Interface Science, 623, 561-573. https://doi.org/10.1016/j.jcis.2022.05.052.

41. Katta V S, Velpandian M, Challapalli S, Meduri P, & Raavi S S K. (2022). Defect-engineered (Er3+/Nd3+) codoped TiO2 photoanodes for enhanced photoelectrochemical and photovoltaic applications. Sustainable Energy and Fuels, 6(24). https://doi.org/10.1039/d2se01131j.

42. Velpandian M, Ummethala G, Malladi S K, & Meduri P. (2022). Heterogeneous interface-induced electrocatalytic efficiency boosting of bimetallic Cu/Zn selenides for stable water oxidation and oxygen reduction reactions. Catalysis Science and Technology, 12(17). https://doi.org/10.1039/d2cy00472k.

43. Polisetty V G, Varanasi S K, & Jampana P. (2022). Stochastic state-feedback control using homotopy optimization and particle filtering. International Journal of Dynamics and Control, 10(3). https://doi.org/10.1007/s40435-021-00853-w.

44. Patne R & Oron A. (2022). Buoyancy instabilities in a liquid layer subjected to an oblique temperature gradient. Journal of Fluid Mechanics, 937(undefined). https://doi.org/10.1017/jfm.2022.110.

45. Patne R, Ramon G Z, Agnon Y, & Oron A. (2022). Dynamics of a two-layer flow with an interfacial heat source/sink: Viscosity stratification. Journal of Fluid Mechanics, 934(undefined). https://doi.org/10.1017/jfm.2021.1132.

46. Das A, Mondal, R, Sen D, Bahadur J, Satapathy D K, Basavaraj M G. (2022). Jamming of Nano-Ellipsoids in a Microsphere: A Quantitative Analysis of Packing Fraction by Small-Angle Scattering. Langmuir 2022, 38 (12), 3832– 3843. https://doi.org/10.1021/acs.langmuir.2c00018.

47. Mondal R & Kumaraswamy G. (2022). Materials Prepared by Freezing-Induced Self-Assembly of Dispersed Solutes: A Review. Mater. Adv. 2022, 3, 3041– 3054. https://doi.org/10.1039/D1MA01017D.

48. Basu T, Bhutani U, & Majumdar S. (2022). Cross-linker-free sodium alginate and gelatin hydrogels: a multiscale biomaterial design framework. Journal of Materials Chemistry B, 10(19) https://doi.org/10.1039/d2tb00028h.

49. Sriramoju S K, Babu V, Dash P S, Majumdar S, & Shee D. (2022). Effective Utilization of Coal Processing Waste: Separation of Low Ash Clean Coal from Washery Rejects by Hydrothermal Treatment. Mineral Processing and Extractive Metallurgy Review, 43(2). https://doi.org/10.1080/08827508.2020.1833196.

50. Das S, Saha D, Majumdar S, & Giri L. (2022). Imaging Methods for the Assessment of a Complex Hydrogel as an Ocular Drug Delivery System for Glaucoma Treatment: Opportunities and Challenges in Preclinical Evaluation. Molecular Pharmaceutics, 19(3). https://doi.org/10.1021/acs.molpharmaceut.1c00831.

51. Joy N, Venugopal D, & Samavedi S. (2022). Robust strategies to reduce burst and achieve tunable control over extended drug release from uniaxially electrospun composites. European Polymer Journal, 168(111102). https://doi.org/10.1016/j.eurpolymj.2022.111102.

52. Venugopal D, Vishwakarma S, Kaur I, & Samavedi S. (2022). Electrospun fiber-based strategies for controlling early innate immune cell responses: Towards immunomodulatory mesh designs that facilitate robust tissue repair. Acta Biomaterialia, undefined(undefined). https://doi.org/10.1016/j.actbio.2022.06.004.

53. Shaw G S & Samavedi S. (2022). Potent Particle-Based Vehicles for Growth Factor Delivery from Electrospun Meshes: Fabrication and Functionalization Strategies for Effective Tissue Regeneration. ACS Biomaterials Science and Engineering, 8(1). https://doi.org/10.1021/acsbiomaterials.1c00942.

54. Tan L L, Loganathan N, Agarwalla S, Yang C, Yuan W, Zeng J, Wu R, Wang W, & Duraiswamy S. (2022). Current commercial dPCR platforms: technology and market review. Critical Reviews in Biotechnology, undefined(undefined). https://doi.org/10.1080/07388551.2022.2037503.

55. Janardhanan V M, & Monder D S. (2022). Microkinetic modeling of CO2 reduction on Pt in a solid oxide electrolysis cell. Electrochimica Acta, 410(undefined). https://doi.org/10.1016/j.electacta.2021.139742.

56. Ponugoti P V, Garg P, Geddam S N, Nag S, & Janardhanan V M. (2022). Kinetics of iron oxide reduction using CO: Experiments and Modeling. Chemical Engineering Journal, 434(undefined). https://doi.org/10.1016/j.cej.2021.134384.

57. Pawar V, Ponugoti P V, Janardhanan V M, & Appari S. (2022). Experimental studies of catalyst deactivation due to carbon and sulphur during CO2 reforming of CH4 over Ni washcoated monolith in the presence of H2S. https://doi.org/10.1002/cjce.24266.

58. Yenumala, Sudhakara Reddy; Sarkhel, Baishakhi; Maity, Sunil K (2022), Technological Advancements in the Production of Green Diesel from Biomass. In: Green Diesel: An Alternative to Biodiesel and Petrodiesel 219-248. https://link.springer.com/chapter/10.1007/978-981-19-2235-0_7.

59. Mailaram S., & Maity SK (2022), Dual liquidâ€“liquid extraction versus distillation for the production of bio-butanol from corn, sugarcane, and lignocellulose biomass: A techno-economic analysis using pinch technology. Fuel, 312(undefined) https://doi.org/10.1016/j.fuel.2021.122932.

60. Chakraborty, Jyoti Prasad; Singh, Satyansh; Maity, Sunil K (2022), Advances in the conversion of methanol to gasoline. In: Hydrocarbon Biorefinery: Sustainable Processing of Biomass for Hydrocarbon Biofuels 177-200. https://doi.org/10.1016/B978-0-12-823306-1.00008-X .

61. Mailaram S, & Maity SK (2022), Dual liquidâ€“liquid extraction versus distillation for the production of bio-butanol from corn, sugarcane, and lignocellulose biomass: A techno-economic analysis using pinch technology. Fuel, 312(undefined) https://doi.org/10.1016/j.fuel.2021.122932.

62. Kunamalla, Alekhya; Mailaram, Swarnalatha; Shrirame, Bhushan S; Kumar, Pankaj; Maity, Sunil K (2022), Hydrocarbon biorefinery: A sustainable approach. Hydrocarbon Biorefinery: Sustainable Processing of Biomass for Hydrocarbon Biofuels, 1-44. https://doi.org/10.1016/B978-0-12-823306-1.00004-2.

63. Kumar, Pankaj; Verma, Deepak; Sibi, Malayil Gopalan; Butolia, Paresh; Maity, Sunil K (2022), Hydrodeoxygenation of triglycerides for the production of green diesel: Role of heterogeneous catalysis. In: Hydrocarbon Biorefinery: Sustainable Processing of Biomass for Hydrocarbon Biofuels 97-126. https://doi.org/10.1016/B978-0-12-823306-1.00013-3.

64. Kunamalla A, Shrirame BS, & Maity SK (2022), Production of jet fuel-range hydrocarbon biofuel by hydroxyalkylation-alkylation of furfural with 2-methylfuran and hydrodeoxygenation of C<inf>15</inf>fuel precursor over a Ni/I ^{3}- Al<inf>2</inf>0<inf>3</inf>catalyst: a reaction mechanism. Energy Advances, undefined(2) https://doi.org/10.1039/d1ya00078k.

65. Mailaram S, Narisetty V, Ranade VV, Kumar V, & Maity SK (2022), Techno-Economic Analysis for the Production of 2,3-Butanediol from Brewersâ€™ Spent Grain Using Pinch Technology. Industrial and Engineering Chemistry Research, 61(5) https://doi.org/10.1021/acs.iecr.1c04410.

66. Kunamalla A, Shrirame BS, & Maity SK (2022), Production of jet fuel-range hydrocarbon biofuel by hydroxyalkylation-alkylation of furfural with 2-methylfuran and hydrodeoxygenation of C<inf>15</inf>fuel precursor over a Ni/I ^{3}- Al<inf>2</inf>0<inf>3</inf>catalyst: a reaction mechanism. Energy Advances, undefined(2) https://doi.org/10.1039/d1ya00078k.

67. Mailaram S, Narisetty V, Ranade VV, Kumar V, & Maity SK (2022),Techno-Economic Analysis for the Production of 2,3-Butanediol from Brewersâ€™ Spent Grain Using Pinch Technology. Industrial and Engineering Chemistry Research, 61(5) https://doi.org/10.1021/acs.iecr.1c04410.

Funded Research Projects:

1. Alan Ranjit Jacob; 3D printing of energetic materials design & development of 3D printer accompanied by feasibility stu; 25.49 L. [S181].

2. Anand Mohan; An efficient framework for simulating blood flow in a stenosed channel; 39.15 L. [DBT/CHE/F045/2022-23/G486].

3. Debaprasad Shee; The Experimental Investigation and Numerical Modelling of Heat Absorption Efficacy of Additive Enhanced Endothermic Rocket Fuels; 230.58 L. [DRDO/MAE/F219/2022-23/S253].

4. Kishalay Mitra; Prediction of Microstructure & correlating it with mechanical properties for all grades of steel rolled in HSM; 58.26 L. [Tata/CHE/F089/2022-23/S219].

5. Kishalay Mitra; The Experimental Investigation and Numerical Modelling of Heat Absorption Efficacy of Additive Enhanced Endothermic Rocket Fuels; 230.58 L. [DRDO/MAE/F219/2022-23/S253].

6. Mahesh Ganesan; Efficient Control of Elasticity in Dilute Fractal Colloidal Gels; 28.49 L. [SERB/CHE/F288/2022-23/G501].

7. Ranajit Mondal; Industrial energy assessment as part of “Kotak-IITM save energy mission (KISEM)-IIT Hyderabad"; 139.8 L. [S-270].

8. Saptarshi Majumdar; Drug Delivery for Glaucoma Treatment; 90 L. [G244].

9. Saptarshi Majumdar; Biomaterial Development with Cross-linker free polymers; 41 L. [G418].

10. Shelaka Gupta; Rational Design of Transition Metal catalyst for the production of value-added chemicals from biomass Derived 2-pyrone Molecules; 28.91 L. [DST SERB/CHE/F238/2022-23/G495].

11. Suhanya Duraiswamy; Targeting the Splicing and Stability of Androgen Receptor Splice Variants in Castration-Resistant Prostate Cancer; 18.11 L. [ICMR/BT/F188/2022-23/G549].

12. Suhanya Duraiswamy; Label-free molecular spectroscopic studies for accurate and rapid detection of pathogens in urinary tract infection; 20 L.

13. Suhanya Duraiswamy; Microfluidic Chip to Capture and Lyse Pathogen from Body Fluids; 49.82 L. [MHRD-STARS/CHE/F222/2020-21/G288].

14. Suhanya Duraiswamy; Microfluidics enabled Programmable and Controllable Assembly of Plasmonic Nanomaterials – Development of a NanoBioSensor; 31.7 L. [SERB/CHE/F222/2021-22/G408].

15. Suhanya Duraiswamy; Development of laminar flow micro fuel cells for application in low power consuming devices; 10 L. [ID].

16. Vinod M Janardhanan; Development and characterization of unitized regenerative fuel cells for high temperature operation; 38.64 L. [G415].

Awards & Recognitions:

1. Chandra Shekhar Sharma has been featured as one of the 75 under 50 scientists Shaping Today's India in a compendium prepared by DST and published by Vigyan Prasar as a part of Azadi ka Amrit Mahotsav Celebration of India's 75th year of Independence.

2. Chandra Shekhar Sharma has been selected as PAC Member, SERB SRG & NPDF Committee (Engineering Sciences) (2022-24).

3. Chandra Shekhar Sharma has been selected as PAC Member, SERB SURE Scheme (2022-23).

4. Chandra Shekhar Sharma has been selected as Guest Editor-in-chief, 4th Special issue of Proceedings of Indian National Science Academy (PINSA) Journal edited by INYAS, Springer Nature.

5. Giridhar Madras has been awarded with the Research.com Chemistry in India Leader Award for being ranked in the top 10 scientists in India in chemistry.

6. Kirti Chandra Sahu, Kishalay Mitra, and Dr.Narasimha Mangadoddy have been featured in Stanford University's ranking of the world's top 2% of scientists (2022).

7. Kishalay Mitra received IIT Hyderabad Faculty Research Excellence Award presented by Padma Bhushan Senapathi "Krish" Gopalakrishnan on the Foundation Day eve.

8. Kishalay Mitra has been named among World's Top 2% Scientists, according to the latest profile review (2022) conducted by Stanford University.

9. Kishalay Mitra has been chosen as Expert Member, PMRF Review Committee (Interdisciplinary areas in Science and Engineering).

10. Parag Pawar has been awarded with IIT Hyderabad Teaching excellence Award.

11. Satyavrata Samavedi has been selected as the Guest editor for the Special issue of JoVE.

12. Shelaka Gupta has been selected as one of the 75 Women in STEAM to be featured in the second edition of She Is.

13.. M Narasimha appeared in the top 2% Scientists in the world (second time in a row), according to the latest profile review conducted by a group from Stanford University, that has released in September 2022; https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/4.

14. M Narasimha has been the Guest Editor for "Proceedings of the 1st International Conference in Fluid, Thermal and Energy Systems: ICFTES 2022", Springer publication will be released by May, 2023.

15. Suhanya Duraiswamy received the Excellence in teaching, IITH, 2022-23.

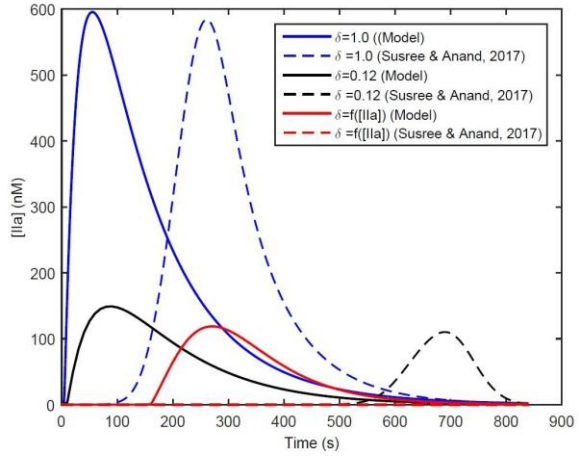
Highlights

- Several department faculties are continued
- As editorial board members of several reputed international journals,
- As member in several technical committees of different ministry (SERB, Coal etc.),
- As member, board of studies of several reputed engineering colleges,
- As organizing committee members of several national / international conferences
- IITH Chem Engg PhD students recruited as faculty members in leading IITs and other CFTIs
- Active participation of department in Joint PhD Program with Deakin University, Australia & Swinburne University of Technology, Australia
- Strong research collaboration with University of Texas, Austin, University of Exeter, UK, University of Cape Town, South Africa.
- Excellent placement for B Tech & M Tech students.
- Department is implementing the First level DST FIST award to improve its current infrastructure.

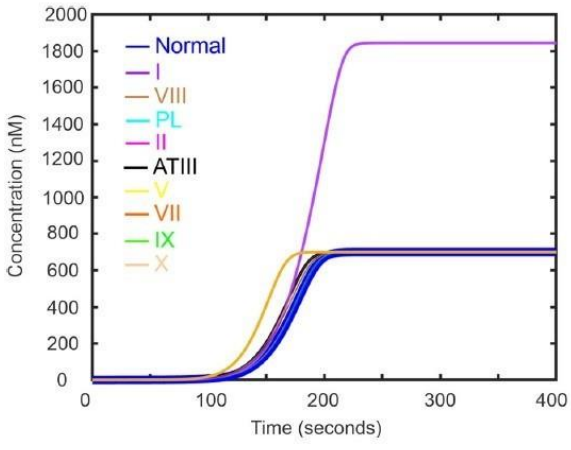
Research Highlights

1. Cardiovascular Mechanics - Dr Anand Mohan

Cardiovascular Mechanics refers to the application of mechanics to understand the structure-function relationships within the cardiovascular system as they pertain to health and disease. A key motif of our research has been that an interdisciplinary or cross-disciplinary approach reveals unique insights into these relationships that a field-restricted approach is not capable of doing. In line with this, our focus is to develop and apply mathematical models and computational tools to propose hypotheses that can be tested by experimental data and clinicians, respectively. Simulations are a cost effective and non-invasive tool that serve to reduce the number of experiments or clinical trials involved in this field. We have demonstrated that mathematical models of coagulation need to incorporate the latest hypotheses governing the role of platelets as elucidated by experimental biochemists (Figure 1). Excitingly, we also demonstrated the potential of mathematical modeling to identify the coagulation factors responsible for the increased clot formation in COVID-19 patients (Figure 2).



Effect of coated platelets on coagulation



Impact of COVID-19 on fibrin conc.

2. Materials Systems Design - Dr Balaji Iyer

We have looked at two different aspects of dynamics of polymer grafted nanoparticle (PGN) systems. In the first study we have looked at the role of functional anisotropy on local dynamics. In the second study, we have extended our understanding on the effect of grafting density to look at bulk mechanical properties of PGN networks. The studies provide a fundamental understanding of broken symmetry observed in anisotropic systems and role of non-bonded/bonded interactions on the dynamic response of particle-polymer hybrid networks.

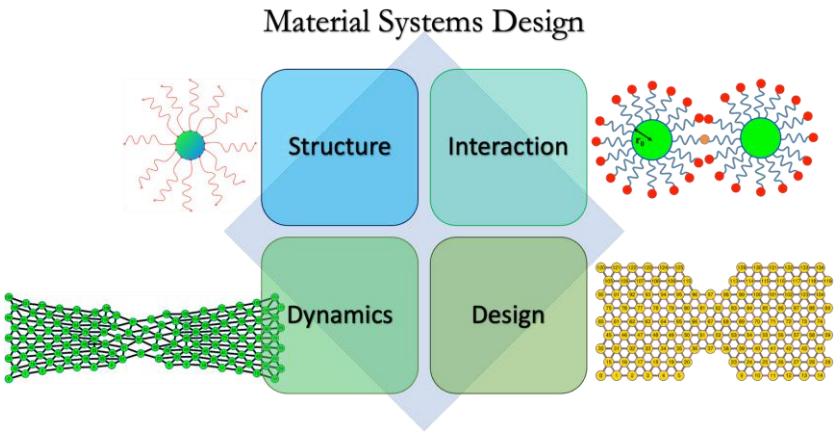
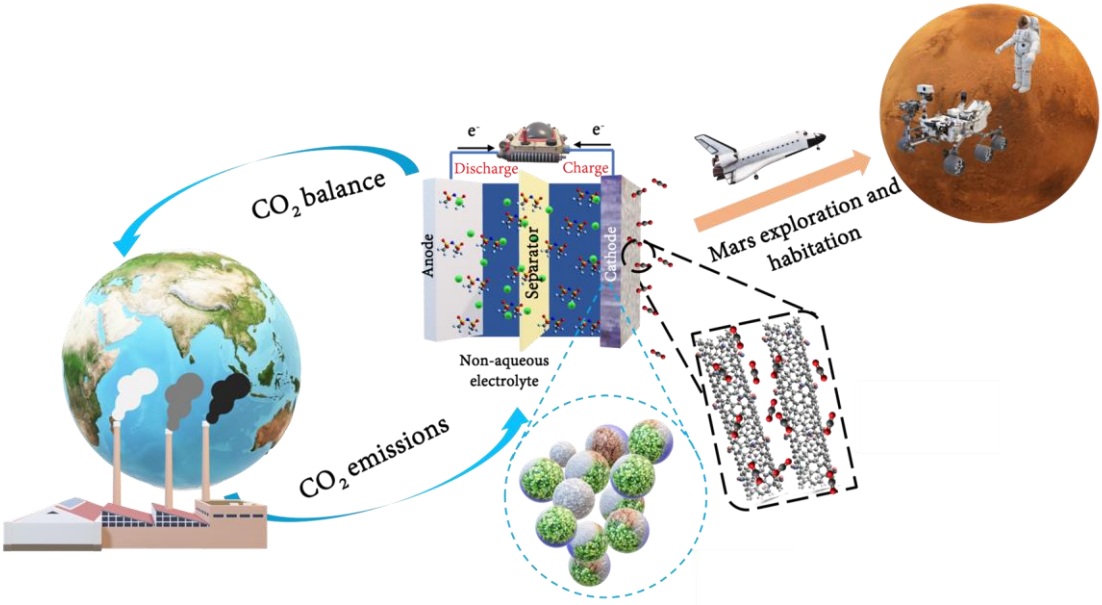


Fig. Materials System Design

3. Metal-CO2 Battery: Bridging the Two Worlds at Earth and Mars - Prof Chandra Shekhar Sharma

"A small step for a man, a giant leap for mankind" fits aptly to our work towards developing the Metal-CO2 battery technology. The technology is significant owing to its capability to recycle CO2 emissions for utilization as an energy storage system and its ability to replace conventional Li-ion batteries due to its nearly three times energy density. As research continues to make human life possible on Mars, energy systems that can sustain life are needed.



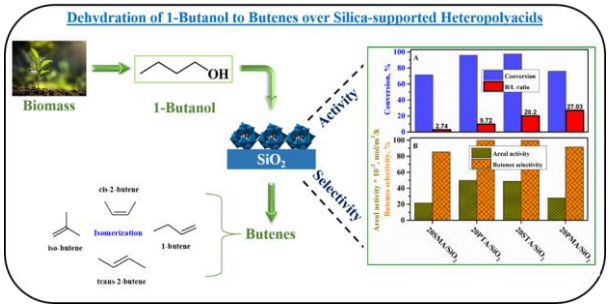
Due to the unique atmosphere consisting of 95% CO2, the Martian atmosphere provides a natural operating condition for the operation of the Metal-CO2 battery and can be used to meet energy requirements.

However, a significant challenge involving the reluctance of the decomposition of the stable discharge product Li2CO3 on the electrode as per the reaction 2Li2CO3 + C → 4Li+ + 3CO2 + 4e- leads to increased potential during charging and reduced cycling life.

Our group aims to solve these challenges and make the battery ready for future utilization on Earth and Mars by engineering different battery system components. We demonstrated the first prototype of a working Li-CO2 battery system in the Martian gas atmosphere in 2021. Further in recent developments, by incorporating carbon and transition metal composite catalysts on the cathode and theoretical understanding using first-principle DFT calculations, we were able to reduce the activation energy for the decomposition of the discharge product and increase the operational battery life to more than 700 hours of continuous operation with a constant discharge and charge voltages of ~ 2.8 V and ~ 4.1 V. Also, the modification of electrolyte and separator is being looked into by us at CARBON Lab to solve the triple challenges of electrolyte loss from the system, ultrawide temperature (-60 °C to 60 °C) operability, and increasing the practically achievable energy density helping us reach the goal of balancing the Earth and sustaining life on Mars.

4. Sustainable production of chemicals - Dr Debaprasad Shee

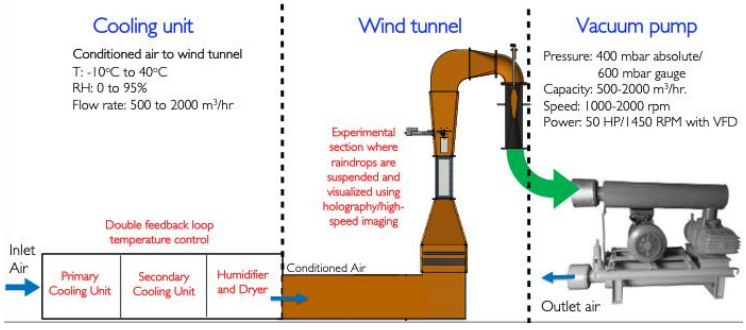
The production of building block chemicals from renewable sources is very much essential to address the sustainability issue of human civilization. Catalytic processes to produce methanol butylene's and building block aromatics are developed. The primary focus is to design and development various types of supported metals and metal oxides which are active and selective for the production of desired products. Specifically, Zn and Ga incorporated HZSM5 zeolite catalyst exhibit higher selectivities of aromatics and BTEX. Furthermore, the selectivity to different aromatics was also affected by the variation of different process parameters. The maximum selectivity of total aromatics (~75%) and BTEX (~69%) were achieved at 723 K, 1 bar pressure and 0.75 h-1 of WHSV over Ga or Zn/HZSM5 catalysts. Moreover, another important building block chemical, butylenes can be produced with high selectivity and yield using metal cluster catalysts called as polyoxometalates which have unique catalytic properties. The dehydration of n-butanol over phosphotungstic acid)/SiO2 and silicotungstic acid)/SiO2 catalysts afforded ~ 99.0% selectivity towards butylenes at quantitative conversion of n-butanol. The selective partial oxidation of methane over supported transition metal oxide catalysts produces methanol. The yield of methanol depends on the desorption of methanol, active metal centre and lattice to adsorbed oxygen concentration ratio which can be considered as important properties of the catalysts. The depolymerization of lignin using supported metal catalysts produces targeted oxygenated aromatics with high yield. The optimization of process parameters and catalyst composition leads to the cleavage of crucial linkages of the lignin. The selective cleavage of lignin linkages produces higher yield of oxygenated aromatics.



Production of butylens from n-butanol

5. Raindrop Research for Accurate Rainfall Prediction - Prof Kirti Chandra Sahu

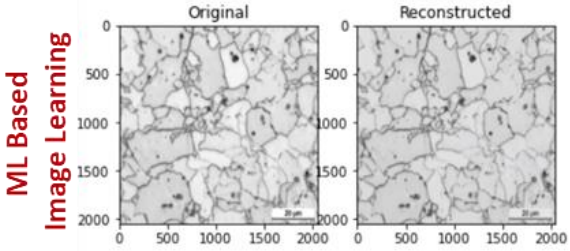
Our research primarily focuses on studying the microphysics of raindrops. We developed a unique experimental facility that mimics the dynamic atmospheric conditions of raindrops descending from cloud to ground (see Figure 1). Accurate rainfall prediction is one of the grand challenges in environmental research due to its relevance in understanding climate change and its accompanying socio-economic impacts, but it is far from perfect. Our research provides important information on the three-dimensional shape, velocity, and size distributions of raindrops for weather forecasting and enables more accurate rainfall prediction.



Raindrop Research Facility (RRF) established at IIT Hyderabad

6. Decoding the Process-Structure-Property Mapping - Prof Kishalay Mitra

Processing condition-Structure-property (P-S-P) correlation development is ongoing research that can be extremely helpful for novel materials discovery. Existing methods, be it experimental or high-fidelity physics driven simulations, require a lot of resources towards unveiling this hidden code. Recent developments in artificial intelligence (AI) & machine learning (ML) and novel research in Global Optimization and Knowledge Unearthing Lab (GOKUL) have shown a possibility in achieving this feat utilizing limited resources. Targeting a very complicated alloy making operation, important ones are identified from a sea of features based on their sensitivities on the overall system. An extremely efficient systematic real plant experimentation generates the data connecting microstructures, product properties and operating conditions without disturbing the plant operation at all. Finally, AI/ML models can be built to have the afore-mentioned three- layer mapping which helps decoding the mystery of P-S-P correlation development. This project is an ongoing one with Tata Steel, a global giant in Steel making and a close collaboration partner in GOKUL's research.



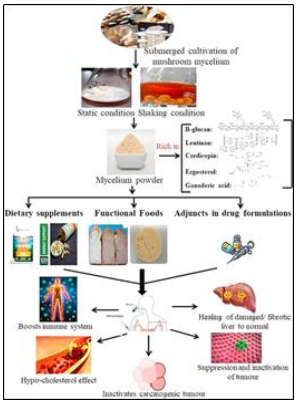
ML Based Image Learning

7. Fluid Flow Modelling and Analysis of Low and High Gravity Spiral Concentrators - Prof Narasimha Mangadoddy

Spiral concentrators, consisting of an open trough that twists vertically downward about a central axis, are used to separate radially thin-film slurry of mineral and gangue material by particle density and size. Flow field of spiral concentrator is very complex due to inherent thin film and various turbulent scales involved. We have explored the flow studies and design parameters on high-gravity spirals, as most of the literature studies are made only on LD9 spirals (low gravity), exclusively used for coal separations. Unless the flow features between low-gravity and high-gravity spirals are compared, their accurate applications and performance levels are not clearly understood. However, a range of the latest spiral designs exists in the mineral industry, which resulted from trial & error approaches, no quantified flow field studies are made on them. The water flow depth and free surface velocity were measured on high-gravity spiral concentrators using a depth gauge and a high-speed camera utilizing tracer particles. The velocity vectors indicate an increase in magnitude from the inner column to the outer edge. High gravity spirals show lower flow depths and free surface velocities but steeper depths on the outer zone than low gravity spirals.

8. Production and Optimization of Mycelium Biomass from P. ostreatus - Dr Santhosh Kumar Devarai

Mycelium biomass and exopolysaccharides (EPS) from Pleurotus ostreatus origin have gained peculiar attention because of their myriad applications in the food and pharmaceutical industries. Mycelial growth is greatly dependent on culture media and physical conditions. The research aims to produce mycelium biomass and exopolysaccharide (EPS) using one factor at a time (OFAT) approach. The current study investigates the effect of the concentration of various carbon, nitrogen sources, metal ions and cell numbers in inoculum for biomass and EPS production. The results revealed that the 5 wt%/v malt extract and 2 wt%/v glucose combined with traces of metal ions gave the maximum yield of biomass and EPS as 31.55 g/l and 6.65 g/l respectively.



Unveiling the biological activities of P. ostreatus and its bioactive compounds

Polysaccharides are a diverse class of bioactive compounds present in mushrooms with repetitive structural characteristics that are polymers of monosaccharide residues joined together by glycosidic bonds. The antitumor effects of mushroom polysaccharides are produced by activating various immune responses in the host. A high protein and total phenolics content has been obtained in the supernatant of media as 5.178 g/l and 104.18 mg GAE/g dw respectively. Moreover, it has been reported that the metal ions and inoculum volume are quite significant factors for biomass and EPS production. Furthermore, the obtained lyophilized biomass powder was investigated by FTIR, SEM-EDS and XRD for their chemical, morphological and structural characterization respectively. Recent studies proved that the β-glucan polysaccharides from mushrooms have antiviral properties and may be able to combat the coronavirus that causes SARS-CoV-2 disease (COVID-19) due to its various immunomodulation mechanisms.

Mushroom based Sustainable Bio-materials

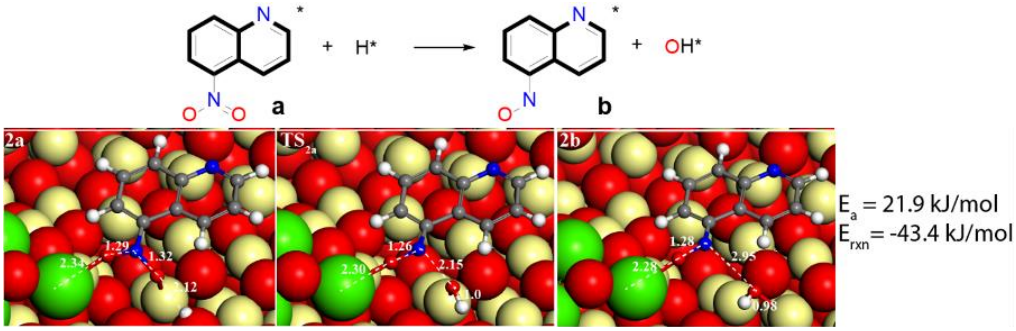
Mushroom are also used in production of various materials such as bio-leather, mycelium bio-composites, mycelium bio-foams etc. The right packaging materials can preserve food quality; for this reason, it is crucial to use safe and green packaging materials. Numerous biomaterials are currently being researched for use in the food industry as packaging materials that might serve as pathogens or bacterial control agents. A compact lattice structure is formed when the mycelium colonizes and binds the substrate completely. This compact structure can be obtained according to the desired shape using the mould.

Production and Purification of Extracellular Lipase and Its Application in Biodiesel Synthesis

Production of lipase using agro-industrial wastes as solid substrates in solid-state fermentation on both flask scale and large scale has been studied. The lipase purification was achieved to homogeneity using different purification techniques such as ammonium sulphate precipitation followed by dialysis and gel filtration chromatography. The enzyme molecular weight was determined using SDS-PAGE. The purified lipase was characterized under different conditions and enzyme kinetics studies were performed. The purified enzyme was immobilized in calcium alginate beads by entrapment. The beads were used as a biocatalyst in biodiesel synthesis by transesterification and esterification reactions using waste cooking oil and methanol. A new HPLC method has been developed to separate and efficiently quantify the fatty acid methyl esters Methyl Oleate and Methyl Palmitate in biodiesel mixture using reverse-phase HPLC.

9. Oxygen vacancy mediated reduction of nitro-N-heterocycles to amino-N-heterocycles - Dr Shelaka Gupta

Copper oxide (CuO) was used as a reusable solid reagent for hydrogenation of nitro-N-heterocycles . In the presence of hydrazine hydrate as the reducing agent, CuO under mild reaction conditions resulted in complete conversion of nitrobenzene and 5-nitroquinoline (5-NQ) to aniline and 5-aminoquinoline respectively. However, the presence of additional ring in 5-NQ slightly impeded the reaction rate on CuO. Further it was observed that during the reaction, CuO was converted to inactive Cu. DFT simulations indicated facile formation of oxygen vacancies (EO,vac = −3.8 kJ/mol) on the surface of CuO (111) under the reducing environment consistent with the XPS analysis. Oxygen vacancies facilitated stronger binding (Eb) and reduced activation barrier (Ea) for N-O bond dissociation of nitrobenzene (Eb = −148.5 kJ/mol, Ea = 36.4 kJ/mol) and nitroquinoline (Eb = -174.4 kJ/mol and Ea = 43 kJ/mol). Addition of CaO to CuO further increased the formation of oxygen vacancies (EO,vac = -43.4 kJ/mol) on the interface of CaO/CuO surface under reducing environment and resulted in an increase in the binding of 5-NQ (−218.4 kJ/mol) on the non-stoichiometric CaO/CuO (111) surface and reduced the activation energy (Ea = 21.9 kJ/mol) for N-O dissociation. The CaO/CuO composite was found to be more stable than CuO during the experiments. The defect induced reactivity by CaO/CuO was therefore found to be an effective synthetic route to amino-N-heterocycles.



Reactant, product and transition state structures for the hydrogenation of 5-NQ on non-stoichiometric CaO/CuOv (111) surface. (In collaboration with IIT Palakkad, IIP Dehradun and IIT Delhi.)

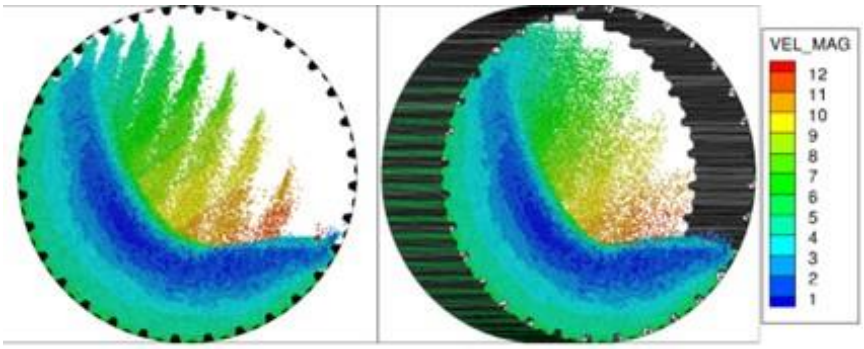
References:

- K Rajendran, J Yadav, T S Khan, M A Haider, S Gupta and D Jagadeesan, "Oxygen mediated reactivity: the curious case of reduction of Nitroquinoline to Aminoquinoline by CuO", J Phys. Chem C 2023, 127, 8576-8584.
- K Rajendran, N Pandurangan, C P Vinod, T S Khan, S Gupta, M A Haider, and D Jagadeesan, "CuO as a reactive and reusable reagent for the hydrogenation of nitroarenes", Applied Catalysis B: Environmental 2021, 297, 120417.

10. Development of GPU based 3D coupled CFD-DEM modelling for spherical particles for application in mineral processing - Dr Narasimha Mangadoddy.

Laboratory-scale testing for particle dynamics is expensive and cumbersome; therefore, computational discrete element simulations (DEM) are a realistic option for aiding in the understanding of particle dynamics. GPU accelerated

simulation allows simulations to be conducted in a fraction of time by massively parallelizing compute-intensive elements of the calculations. The GPU's highly threaded nature makes it an excellent choice for DEM simulations. At IITH, we have developed GPU DEM code for mineral processing applications such as hoppers and tumbling mills. The developed code was used to examine the influence of three lifter profiles and mill speeds on the granular dynamics and power consumption of a laboratory-scale tumbling mill. It was observed that for mill speeds less than 75% of the critical mill speed, the effect of various lifter profiles on particle dynamic behavior is minimal. This gives us the confidence to develop a significantly faster GPU-accelerated DEM code while maintaining reasonable accuracy at the microcontact level. Furthermore, the predictive capability of GPU-based DEM was demonstrated in an industrial-scale mill containing one million particles as shown below Fig.



GPU based 3D coupled CFD-DEM modelling

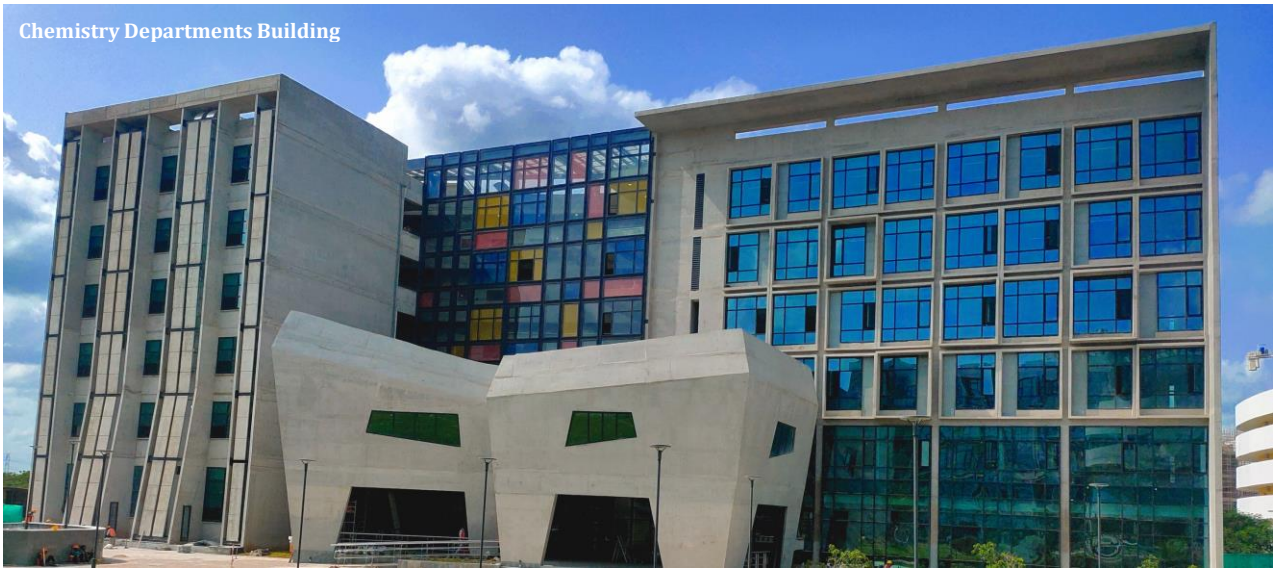
Department of Chemistry

In the fiscal year 2022-2023, the Department of Chemistry at IIT Hyderabad showcased a dynamic and comprehensive approach to cutting-edge research across various domains. Prof F A Khan spearheaded a pivotal exploration into organic chemistry, concentrating on the synthesis of natural products and analogs. This research holds profound implications for pharmaceuticals, materials science, and industrial applications, representing a significant stride in advancing fundamental knowledge and potential breakthroughs in the development of novel materials and drugs.

Under the leadership of Prof G V Satyanarayana, the department delved into remote C-H functionalization for drug diversification, highlighting a forward-looking emphasis on sustainable synthetic tools such as electro-organic synthesis and photocatalysis. This strategic approach aligns with global priorities for sustainable scientific practices, addressing the critical need for diversified drug options while emphasizing environmental responsibility. Dr Ashutosh Kumar Mishra's innovative work added a unique dimension to the department's research portfolio. His design of an efficient synthetic enzymatic model, featuring optimized non-covalent interactions and inducing rare coordination behavior for flavin entities, showcased the department's commitment to interdisciplinary research. The applications spanned from selective organelle tracking to diverse enzymatic processes, reflecting the department's dedication to exploring novel methodologies with potential applications in biotechnology and medicine.

The department's endeavors extended across diverse research areas, including light-mediated organofluorine chemistry and hydrogenation advancements led by Dr Kishore Natte, air pollutant mitigation and hydrogen production by Pro. Ch Subrahmanyam, and the development of an electrochromic device with a novel viologen by Prof M Deepa. Prof S K Martha's breakthroughs in energy storage and Dr Surajit Maity's pioneering work in laser spectroscopic methods further emphasized the department's commitment to advancing knowledge in diverse chemical disciplines. The multifaceted research contributions also encompassed studies by Dr Koyel Banerjee Ghosh on spin-selective charge transfer, Dr Priyadarshi Chakraborty's development of a peptide-based hydrogel, and Prof Tarun Panda's focus on green methods for organic synthesis. These initiatives collectively underscore the department's dedication to exploring new frontiers in chemistry, promising lasting impacts on academic understanding, addressing real-world challenges, and shaping the future landscape of the discipline.

For more information, please visit: https://chemistry.iith.ac.in/


Chemistry Departments Building

Faculty

Head of the Department

Surendra Kumar Martha PhD - IISc Bangalore Associate Professor ***Profile page:*** ***https://iith.ac.in/chy/martha/***

Professor

Bhabani Shankar Mallik
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/chy/bhabani/

Deepa M
PhD - Delhi University
Profile page:
https://iith.ac.in/chy/mdeepa/

Faiz Ahmed Khan
PhD - University of Hyderabad
Profile page:
https://iith.ac.in/chy/faiz/

Prabusankar G
PhD - IIT Bombay
Profile page:
https://iith.ac.in/chy/prabu/

Satyanarayana G
PhD - IISc Bangalore
Profile page:

https://iith.ac.in/chy/gvsatya/

Subrahmanyam Ch
PhD - IIT Madras
Profile page:
https://iith.ac.in/chy/csubbu/

Tarun Kanti Panda
PhD - Free University - Berlin, Germany
Profile page:
https://iith.ac.in/chy/tpanda/

Associate Professor

Jai Prakash
PhD - IIT Delhi
Profile page:

https://iith.ac.in/chy/jaiprakash/

Sivakumar Vaidyanathan
PhD - IIT Madras
Profile page:
https://iith.ac.in/chy/jaiprakash/

Somnath Maji
PhD - IIT Bombay
Profile page:
https://iith.ac.in/chy/smaji/

Assistant Professor

Abhijit Sau
PhD - Bose Institute, Kolkata
Profile page:
https://iith.ac.in/chy/asau/

Annadhasan M
PhD - University of Madras
Profile page:
https://iith.ac.in/chy/annadhasan/

Arup Mahata
PhD - IIT Indore
Profile page:
https://iith.ac.in/chy/arup/

Ashutosh Kumar Mishra
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/chy/akm/

Debasish Koner
PhD - IIT Guwahati
Profile page:
https://iith.ac.in/chy/debasishkoner/

Kishore Natte
PhD - Technical University of Berlin, Germany
Profile page:
https://iith.ac.in/chy/kishore.natte/

Koyel Banerjee Ghosh
PhD - CSIR-Central Glass & Ceramic Research Institute, West Bengal
Profile page:
https://iith.ac.in/chy/koyel/

Krishna Gavvala
PhD - IISER Pune
Profile page:
https://iith.ac.in/chy/kgavvala/

Narendra Kurra
PhD - JNCASR, Bangalore
Profile page:
https://iith.ac.in/chy/narendra/

Priyadarshi Chakraborty
PhD - Indian Association for the Cultivation of Science, Kolkata
Profile page:
https://iith.ac.in/chy/priyadarshi/

Saurabh Kumar Singh
PhD - IIT Bombay
Profile page:
https://iith.ac.in/chy/sksingh/

Sudarsanam Putla
PhD - CSIR-IICT, Hyderabad
Profile page:
https://iith.ac.in/chy/sudarsanam.putla/

Surajit Maity
PhD - IIT Bombay
Profile page:
https://iith.ac.in/chy/surajitmaity/

Venkata Rao Kotagiri
PhD - JNCASR, Bangalore
Profile page:
https://iith.ac.in/chy/kvrao/

Honorary Faculty

Dr Srivari Chandrasekhar
DST Secretary
Profile page:
https://dst.gov.in/secretary

Publications:

1. Sk S, Mondal I, Mahata A, Abraham B M, Nayak C, Bhattacharyya D, Jha S N, Ghosh R, & Pal U. (2022). Function of Defects in NH2-MIL-125@PANI@Co3O4 Photocatalyst for Efficient Hydrogen Evolution. ACS Applied Energy Materials, 5(10). https://doi.org/10.1021/acsaem.2c01899.

2. Chen Y F, Mahata A, Lubio A D, Cinquino M, Coriolano A, Skokan L, Jeong Y G, Razzari L, De Marco L, Ruediger A, De Angelis F, Colella S, & Orgiu E. (2022). Phonon Analysis of 2D Organic-Halide Perovskites in the Low- and Mid-IR Region. Advanced Optical Materials, 10(16). https://doi.org/10.1002/adom.202100439.

3. Giri B, Mahata A, Kella T, Shee D, De Angelis F, & Maji S. (2022). Tetrazole-Substituted isomeric ruthenium polypyridyl complexes for low overpotential electrocatalytic CO2 reduction. Journal of Catalysis, 405(undefined). https://doi.org/10.1016/j.jcat.2021.11.023.

4. Mouli M S S V, Agrawal H G, Kumar M, & Mishra A K. (2022). Luminescence and morphological behavior of the aromatic dipeptide pair having singular structural variability. Luminescence, undefined(undefined). https://doi.org/10.1002/bio.4275.

5. Mouli M S S V, Agrawal H G, Maddeshiya T, Tamrakar A, Tripathy S R, Pandey M D, & Mishra A K. (2022). Investigating the spectral and electrochemical properties of novel flavin-pyrene dyads separated via a variable spacer. Luminescence, undefined(undefined). https://doi.org/10.1002/bio.4339.

6. Mouli M S S V & Mishra A K. (2022). Modulating catalytic activity of a modified flavin analog: Via judicially positioned metal ion toward aerobic sulphoxidation. RSC Advances, 12(7). https://doi.org/10.1039/d1ra06558k.

7. Mouli M S S V & Mishra A K. (2022). Synthesis, characterization, and photophysical studies of the flavopeptide conjugate as a model for the covalently linked flavoenzymes. Journal of Chemical Sciences, 134(2). https://doi.org/10.1007/s12039-022-02050-4.

8. Vinod Mouli M S S, Katyal S, & Mishra A K. (2022). Design and synthesis of Flavin-Samarium complex as efficient photocatalyst for sulphoxidation reactions. Synlett, undefined(undefined).https://doi.org/10.1055/a19283417.

9. M S S V Mouli and A K Mishra. (2022). Divergent crystallographic architecture for silver-flavin complexes induced via pH variation. Chemistry Select, 2022. https://doi.org/10.1002/slct.202202126.

10. Mouli M S S V & Mishra A K. (2022). Formation of the silver-flavin coordination polymers and their morphological studies. CrystEngComm, 24(12). https://doi.org/10.1039/d2ce00071g.

11. Aritri Biswas and Bhabani S Mallik. (2022). Microheterogeneity-Induced Vibrational Spectral Dynamics of Aqueous 1-Alkyl-3-methylimidazolium Tetrafluoroborate Ionic Liquids of Different Cationic Cationic Chain Lengths. J Phys Chem B, 2022, 126, 5523. https://doi.org/10.1021/acs.jpcb.2c03561.

12. ritri Biswas and Bhabani S Mallik. (2022). Vibrational Spectral Dynamics and Ion-Probe Interactions of the Hydrogen-Bonded Liquids in 1-Ethyl-3-methylimidazolium is(trifluoromethylsulfonyl)imide. Chem. Phys, 2022, 559,111519.https://doi.org/10.1016/j.chemphys.202159.

13. Santosh Kumar Sahu, Prabhupada Choudhury, Pradyota Kumar Behera, Tanmayee Bisoyi, Rashmi Ranjan Sahu, Abinash Bisoyi, Koteswara Rao Gorantla, Bhabani S Mallik, Manoj Mohapatra, & Laxmidhar Rout. An oxygen-Bridged Bimetallic [Cu-O-Se] Catalyst for Csp-Csp2 Sonogashira Cross-Coupling. New J. Chem, 2022, 46, 1650. https://doi.org/10.1039/D1NJ04485K.

14. Aritri Biswas and Bhabani S Mallik. (2022). 2D IR spectra of the intrinsic vibrational probes of ionic liquid from dispersion-corrected DFT-MD simulations. J Mol Liq 2022, 348, 118390. https://doi.org/10.1016/j.molliq.2021.118390.

15. Aritri Biswas and Bhabani S Mallik. (2022). Ionic Dynamics and Vibrational Spectral Diffusion of a Protic Alkylammonium Ionic Salt through Intrinsic Cationic N-H Vibrational Probe from FPMD Simulations. J Phys Chem A, 2022, 126, 5134. https://doi.org/10.1021/acs.jpca.2c03387.

16. Koteswar R Gorantla and Bhabani S Mallik. (2022). Surface-chemistry-driven water dissociation on cobalt-based graphene hybrid from molecular dynamics simulations. Phys Chem, 2022, 24, 29004. https://doi.org/10.1039/D2CP03184A.

17. Aritri Biswas and Bhabani S Mallik. (2022). Multiple Ensembles of the Hydrogen-bonded Network in Ethylammonium Nitrate versus Water from Vibrational Spectral Dynamics of SCN- Probe. Phys Chem, 2022, 23, e202200497. https://doi.org/10.1002/cphc.202200497.

18. Sathish Dasari and Bhabani S Mallik. (2022). Conformational dynamics of polymers in ethylammonium nitrate from advanced sampling methods. Comp Mat Sc, 2022, 203, 111072. https://doi.org/10.1016/j.commatsci.2021.111072.

19. Sipun Sethi, Rachita Panigrahi, Bhabani S Mallik, & Nabakrushna Behera. (2022). Novel Heteroleptic Uranyl(VI) Complexes Incorporating Tetradentate and Bidentate Chelating Ligands: Deviation from the Oyl-U-Oyl Linearity. Chemistry Select, 2022, 7, e202201784. https://doi.org/10.1002/slct.202201784.

20. Koteswar Rao Gorantla and Bhabani S Mallik. (2022). Mechanistic Insights into Cobalt-Based Water Oxidation Catalysis by DFT-based Molecular Dynamics Simulations. J Phys Chem A, 2022, 126, 3301. https://doi.org/10.1021/acs.jpca.2c01043.

21. R Behura, S Behera, P Mohanty, P P Dash, R Panigrahi, Bhabani S Mallik, S Sahoo, & B R Jali J. (2022). Fluorescent sensing of water in DMSO by 2, 4-dinitrophenyl hydrazine derived Schiff base. Mol. Struc, 2022, 1251, 132086. https://doi.org/10.1016/j.molstruc.2021.132086.

22. Bhabani S Mallik and Adyasa Priyadarsini. (2022). Structure and rotational dynamics of water around hydrogen peroxide. J Mol Liq 2022, 348, 118054. https://doi.org/10.1016/j.molliq.2021.118054.

23. Aritri Biswas and Bhabani S Mallik. (2022). Molecular Simulation-guided Spectroscopy of Imidazolium-based Ionic Liquids and Effects of Methylation on Ion-Cage and Pair Dynamics. J Phys Chem B, 2022, 126, 8838. https://doi.org/10.1021/acs.jpcb.2c04901.

24. Nipu Kumar Das, Papu Kumar Naik, Dhileep N Reddy, Bhabani S Mallik, Surya Sarathi Bose, & Tamal Banerjee. (2022). Experimental and Molecular Dynamic Insights on the Thermophysical properties for MWCNT-Phosphonium based Eutectic Thermal Media. J Mol Liq 2022, 354, 118892. https://doi.org/10.1016/j.molliq.2022.118892.

25. Koteswar Rao Gorantla and Bhabani S Mallik. (2022). Catalytic Mechanism of Competing Proton Transfer Events from Water and Acetic Acid by [CoII (bpbH2) Cl2] for Water Splitting Processes. J Phys Chem A, 2022, 126, 1321. https://doi.org/10.1021/acs.jpca.1c07353.

26. Aritri Biswas and Bhabani S Mallik. (2022). Revisiting OD-Stretching dynamics of methanol-d4, ethanol-d6 and dilute HOD/H2O mixture with predefined potentials and wavelet transform Spectra. Chem Phys, 2022, 553, 111385. https://doi.org/10.1016/j.chemphys.2021.111385.

27. Adyasa Priyadarsini and Bhabani S Mallik. (2022). Site dependent catalytic water dissociation on anisotropic buckled black phosphorous surface. Phys Chem Chem Phys, 2022, 24, 2582. https://doi.org/10.1039/D1CP05249G.

28. Koteswar R Gorantla and Bhabani S Mallik. (2022). Non-heme oxoiron complexes as active intermediates in water oxidation process with hydrogen/ oxygen atom transfer reactions. Dalton Transactions, 2022, 51, 11899. https://doi.org/10.1039/D2DT01295B.

29. P Ramesh, C Sreenivasulu, D K Ravi, D Srinivas, K R Gorantla, Bhabani S Mallik, Gedu Satyanarayana. (2022). Recyclable Aliphatic Nitrile-Template Enabled Remote meta-C-H Functionalization at Room Temperature. J Org Chem 2022, 87, 2204. https://doi.org/10.1021/acs.joc.1c02865.

30. Ramesh A, Gavaskar D S, Nagaraju P, Duvvuri S, Vanjari S R K, & Subrahmanyam C. (2022). Mn-doped ZnO microspheres prepared by solution combustion synthesis for room temperature NH<inf>3</inf> sensing. Applied Surface Science Advances, 12(undefined). https://doi.org/10.1016/j.apsadv.2022.100349.

31. Kumar M, Ghosh C C, Meena B, Ma T, & Subrahmanyam C. (2022). Plasmonic Au nanoparticle sandwiched CuBi2O4/Sb2S3 photocathode with multi-mediated electron transfer for efficient solar water splitting. Sustainable Energy and Fuels, 6(17). https://doi.org/10.1039/d2se00600f.

32. Gudipati N S, Vanjari S, Korutla S, Tammineni R R, & Challapalli S. (2022). Electrochemical detection of 4-nitrophenol on nanostructured CuBi2O4 with plausible mechanism supported by DFT calculations. Journal of Environmental Chemical Engineering, 10(6) https://doi.org/10.1016/j.jece.2022.108758.

33. Kumar M, Meena B, Subramanyam P, Suryakala D, & Subrahmanyam C. (2022). Emerging Copper-Based Semiconducting Materials for Photocathodic Applications in Solar Driven Water Splitting. Catalysts, 12(10). https://doi.org/10.3390/catal12101198.

34. Lakshminarayana B, Selvaraj M, Satyanarayana G, & Subrahmanyam C. (2022). Switching of support materials for the hydrogenation of nitroarenes: A review. Catalysis Reviews - Science and Engineering, undefined(undefined). https://doi.org/10.1080/01614940.2022.2057045.

35. Bhargavi K, Ray D, Chawdhury P, Malladi S, Shashidhar T, & Subrahmanyam C. (2022). Oxidation of Toluene by Ozone over Surface-Modified γ-Al2O3: Effect of Ag Addition. Catalysts, 12(4) https://doi.org/10.3390/catal12040421.

36. Gangwar R, Rao K T, Khatun S, Rengan A K, Subrahmanyam C, & Krishna Vanjari S R. (2022). Label-free miniaturized electrochemical nanobiosensor triaging platform for swift identification of the bacterial type. Analytica Chimica Acta, 1233(undefined).https://doi.org/10.1016/j.aca.2022.3402.

37. Manojkumar P, Premchand C, Lokeshkumar E, Subrahmanyam C, Viswanathan A, Krishna L R, & Rameshbabu N. (2022). Development of immobilised sunlight active W-Mo/Mo-V/V-W co-doped TiO2 photocatalyst by plasma electrolytic oxidation. Journal of Alloys and Compounds, 919(undefined). https://doi.org/10.1016/j.jallcom.2022.165781 .

38. Meena B, Kumar M, Gupta S, Sinha L, Subramanyam P, & Subrahmanyam C. (2022). Rational design of TiO2/BiSbS3 heterojunction for efficient solar water splitting. Sustainable Energy Technologies and Assessments, 49(undefined). https://doi.org/10.1016/j.seta.2021.101775.

39. Chawdhury P, Bhanudas Rawool S, Umamaheswara Rao M, & Subrahmanyam C. (2022). Methane decomposition by plasma-packed bed non-thermal plasma reactor. Chemical Engineering Science, 258(undefined). https://doi.org/10.1016/j.ces.2022.117779.

40. Mypati V N K, Saride S, & Challapalli S. (2022). Durability of fly ash geopolymer Binder in Deep Mixed Expansive Soils. Proceedings of the Institution of Civil Engineers: Ground Improvement, undefined(undefined). https://doi.org/10.1680/jgrim.22.00015.

41. Gangwar R, Ray D, Rao K T, Khatun S, Subrahmanyam C, Rengan A K, & Vanjari S R K. (2022). Plasma Functionalized Carbon Interfaces for Biosensor Application: Toward the Real-Time Detection of Escherichia coli O157: H7. ACS Omega, 7(24). https://doi.org/10.1021/acsomega.2c01802.

42. Kumar M, Meena B, Subramanyam P, Suryakala D, & Subrahmanyam C. (2022). Recent trends in photoelectrochemical water splitting: the role of cocatalysts. NPG Asia Materials, 14(1). https://doi.org/10.1038/s41427-022-00436-x.

43. Gudipati N S, Sinha L, Korutla S, Vanjari S, Tammineni R R, & Challapalli S. (2022). Co3O4 and CuBi2O4 Hybrid Nanostructures for Efficient Nonenzymatic Glucose Detection in Human Blood and Serum Samples with Mechanistic Insights. ChemElectroChem, 9(20). https://doi.org/10.1002/celc.202200707.

44. Bhargavi K V S S, Ray D, Chawdhury P, Selvaraj M, Shashidhar T, & Subrahmanyam C. (2022). Room-Temperature Toluene Decomposition by Catalytic Non-Thermal Plasma Reactor. IEEE Transactions on Plasma Science, 50(6). https://doi.org/10.1109/TPS.2022.3153667 .

45. Zhang Z, Ghimire S, Okamoto T, Sachith B M, Sobhanan J, Subrahmanyam C, & Biju V. (2022). Mechano-optical Modulation of Excitons and Carrier Recombination in Self-Assembled Halide Perovskite Quantum Dots. ACS Nano, 16(1). https://doi.org/10.1021/acsnano.1c04944.

46. Goutham C, Ashok Kumar K V, Kumar Raavi S S, Subrahmanyam C, & Asthana S. (2022). Enhanced electrical and photocatalytic activities in Na0.5Bi0.5TiO3 through structural modulation by using anatase and rutile phases of TiO2. Journal of Materiomics, 8(1). https://doi.org/10.1016/j.jmat.2021.06.003.

47. Katta V S, Velpandian M, Challapalli S, Meduri P, & Raavi S S K. (2022). Defect engineered (Er3+/Nd3+) codoped TiO2 photoanodes for enhanced photoelectrochemical and photovoltaic applications. Sustainable Energy and Fuels, 6(24) https://doi.org/10.1039/d2se01131j.

48. Meena B, Kumar M, Kumar A, Sinha G N, Nagumothu R, Subramanyam P, Suryakala D, & Subrahmanyam C. (2022). Integrated p-n Junctions for Efficient Solar Water Splitting upon TiO2/CdS/BiSbS3 Ternary Hybrids for Improved Hydrogen Evolution and Mechanistic Insights. Catalysts, 12(10). https://doi.org/10.3390/catal12101117.

49. Subramanyam P, Meena B, Biju V, Misawa H, & Challapalli S. (2022). Emerging materials for plasmon-assisted photoelectrochemical water splitting. Journal of Photochemistry and Photobiology C: Photochemistry Reviews, 51(undefined). https://doi.org/10.1016/j.jphotochemrev.2021.100472.

50. Chandana L, Ray D, & Subrahmanyam C. (2022). Physicochemical process of non-thermal plasma at gas-liquid interface and synergistic effect of plasma with catalyst. Current Applied Physics, 36(undefined). https://doi.org/10.1016/j.cap.2022.01.006.

51. Patra S, San Vicente Veliz J C, Koner D, Bieske E J, & Meuwly M. (2022). Photodissociation dynamics of N+3. Journal of Chemical Physics, 156(12). https://doi.org/10.1063/5.0085081.

52. Arnold J, San Vicente Veliz J C, Koner D, Singh N, Bemish R J, & Meuwly M. (2022). Machine learning product state distributions from initial reactant states for a reactive atom-diatom collision system. Journal of Chemical Physics, 156(3). https://doi.org/10.1063/5.0078008.

53. Negi R, Jena T K, Jyoti N, Tuti N K, Anindya R, & Khan F A. (2022). Solvent controlled synthesis of 2,3-diarylepoxy indenones and I ±-hydroxy diarylindanones and their evaluation as inhibitors of DNA alkylation repair. Organic and Biomolecular Chemistry, 20(29). https://doi.org/10.1039/d2ob00595f.

54. Naik V & Khan F A. (2022). One-pot synthesis of indenobenzofurans via tandem Michael addition-elimination and palladium-catalysed C-H activation. Arkivoc, 2022(6). https://doi.org/10.24820/ark.5550190.p011.870.

55. Ahmad S A Z & Khan F A. (2022). One-Pot Transition-Metal-Free Synthesis of Polysubstituted Fused Benzene Derivatives from Methyl Enol Ethers and Alkynes. ChemistrySelect, 7(33). https://doi.org/10.1002/slct.202201921.

56. Ahmad S A Z & Khan F A. (2022). Boron Trifluoride Etherate-Controlled Reactions of Methyl Enol Ethers: Selective Synthesis of Dihydrofuro [3,2-c] chromenone and Furo [3,2-c]chromenone Derivatives. https://doi.org/10.1055/a-1912-3884 .

57. Sathyanarayana A, Siddhant K, Yamane M, Hisano K, Prabusankar G, & Tsutsumi O. (2022). Tuning the Au-Au interactions by varying the degree of polymerisation in linear polymeric Au(i) N-heterocyclic carbene complexes. Journal of Materials Chemistry C, 10(15). https://doi.org/10.1039/d2tc00534d.

58. D Ravichandran, M Ranjani, G Prabu Sankar, R Shankar, M Karthi, S Selvakumar, and R Prabhakaran. (2022). Coumarin-Picolinohydrazone derived Schiff base as fluorescent sensor(OFF-ON) for detection of Al3+ ion: Synthesis, Spectral and theoretical studies. Journal of Molecular Structure, 2022, 1273, 134329. https://doi.org/10.1016/j.molstruc.2022.134329.

59. Adinarayana M, Siddhant K, Vaddamanu M, Sathyanarayana A, Rengan A K, Hisano K, Tsutsumi O, & Prabusankar G. (2022). A simple and efficient approach for the clickability of super-bulky aryl azides. Journal of Heterocyclic Chemistry, 59(6). https://doi.org/10.1002/jhet.4450.

60. Tejaswini Appidi, P S Rajalakshmi, Shubham A Chinchulkar, Arpan Pradhan, Hajera Begum, Veeresh Bantal, Rohit Srivastava, Ganesan Prabusankar, and Aravind Kumar Rengan. Plasmon-enhanced fluorescent gold coated novel lipo-polymeric hybrid nanosystem: Synthesis, characterization and application for imaging and photothermal therapy of breast cancer. Nanoscale, 2022, 14, 9112-9123. https://doi.org/10.1039/D2NR01378A .

61. Ramakant G A, Ahmed N, Tarannum I, Mehta S, Nandeshwar M, Mondal A, Singh S K, & Prabusankar G. (2022). LnIII (Ln = La, Gd, and Dy) Benzimidazolium Tricarboxylate Coordination Polymers with Hydrogen Bonding Modulated Magnetic Relaxation. Crystal Growth and Design, 22(10). https://doi.org/10.1021/acs.cgd.2c00674.

62. Mannarsamy M & Prabusankar G. (2022). Highly Active Copper(I)-Chalcogenone Catalyzed Knoevenagel Condensation Reaction Using Various Aldehydes and Active Methylene Compounds. Catalysis Letters, 152(8). https://doi.org/10.1007/s10562-021-03810-6.

63. Mannarsamy M, Nandeshwar M, Muduli G, & Prabusankar G. (2022). Highly Active Cyclic Zinc(II) Thione Catalyst for C–C and C–N Bond Formation Reactions. Chemistry - An Asian Journal, 17(18). https://doi.org/10.1002/asia.202200594.

64. Siddhant K, Prabusankar G, & Tsutsumi O. (2022). Luminescent Behavior of Liquid–Crystalline Gold(I) Complexes Bearing a Carbazole Moiety: Effects of Substituent Bulkiness. Crystals, 12(6) https://doi.org/10.3390/cryst12060810.

65. Nandeshwar M, Tarannum I, Kumar Singh S, & Prabusankar G. (2022). Antimony(III)-selenium complexes with synergetic effect between Sbsingle bondSe bond and Sb···π interactions. Polyhedron, 225(undefined) https://doi.org/10.1016/j.poly.2022.116069.

66. Nirwal S, Saravanan P, Bajpai A, Meshram V D, Raju G, Deeksha W, Prabusankar G, & Patel B K. (2022). In Vitro Interaction of a C-Terminal Fragment of TDP-43 Protein with Human Serum Albumin Modulates Its Aggregation. Journal of Physical Chemistry B, 126(45). https://doi.org/10.1021/acs.jpcb.2c04469.

67. Mannarsamy M, Nandeshwar M, Veerapathiran S, Mandal S, Harijan D, Subramaniyam K, Muduli G, & Prabusankar G. (2022). Dinuclear complexes, a one dimensional chain and a two dimensional layer of bismuth(iii) chalcogenones for C-S cross coupling reactions. New Journal of Chemistry, 46(21). https://doi.org/10.1039/d2nj01151d.

68. Mannarsamy M, & Prabusankar G. (2022). Remote hydroxyl group induced structural diversities in antimony(III) chalcogenones. Polyhedron, 219(undefined). https://doi.org/10.1016/j.poly.2022.115795.

69. Kalaivanan S, Moulali V, Siddhant K, Velappan K, Hisano K, Tsutsumi O, & Prabusankar G. (2022). Thermally stable carbazole tagged Au(i)-mesoionic N-heterocyclic carbene complexes with diverse gold-hydrogen bonds. New Journal of Chemistry, 47(1). https://doi.org/10.1039/d2nj03215e.

70. Sreenivasulu C, & Satyanarayana G. (2022). A Metal-Free Path to 2-Iodo-3-alkyl-1-arylbut-2-en-1-ones and Their Application to the Domino Synthesis of Functionalized 2H-Pyran-2-ones. Journal of Organic Chemistry, 87(5). https://doi.org/10.1021/acs.joc.1c03061.

71. Rao L B, Sreenivasulu C, Kishore D R, & Satyanarayana G. (2022). Trending strategies for the synthesis of quinolinones and isoquinolinones. Tetrahedron, 127(undefined). https://doi.org/10.1016/j.tet.2022.133093.

72. Dapkekar A B, Sreenivasulu C, Ravi Kishore D, & Satyanarayana G. (2022). Recent Advances Towards the Synthesis of Dihydrobenzofurans and Dihydroisobenzofurans. Asian Journal of Organic Chemistry, 11(5). https://doi.org/10.1002/ajoc.202200012.

73. Lakshminarayana B, Selvaraj M, Satyanarayana G, & Subrahmanyam C. (2022). Switching of support materials for the hydrogenation of nitroarenes: A review. Catalysis Reviews - Science and Engineering, undefined(undefined). https://doi.org/10.1080/01614940.2022.2057045.

74. Kishore D R, Mounika K, Goel K, Naveen J, & Satyanarayana G. (2022). Microwave-Assisted Domino Povarov-Type [4+2] Cycloaddition: A Rapid Access to 7-Phenyl-6H-chromeno[4,3-b]quinolines. Synthesis (Germany), undefined(undefined). https://doi.org/10.1055/s-0041-1738429.

75. Kishore D R & Satyanarayana G. (2022). Intermolecular Sonogashira Coupling and Intramolecular 5- Exo- dig Cycloisomerization Cascade: A One-Pot Pathway for Accessing (3-Benzylbenzofuran-2-yl) (phenyl) methanones. Journal of Organic Chemistry, 87(15) https://doi.org/10.1021/acs.joc.2c01101.

76. Ravi Kishore D, Sreenivasulu C, Dapkekar A B, & Satyanarayana G. (2022). Recent Applications on Dual-Catalysis for C-C and C-X Cross-Coupling Reactions. SynOpen, 6(3). https://doi.org/10.1055/a-1896-4168.

77. Kishore D R, Goel K, Shekhar C, & Satyanarayana G. (2022). An Access to Benzo[a] fluorenes, Benzo[b] fluorenes, and Indenes Triggered by Simple Lewis Acid. Journal of Organic Chemistry, 87(5). https://doi.org/10.1021/acs.joc.1c02724.

78. Shekhar C, & Satyanarayana G. (2022). Palladium-Catalyzed Suzuki Coupling and NIS-Mediated Dehydrogenative Cylcoetherification: A Concise Approach to 6,6-Disubstituted 6H-benzo[c]chromenes and Total Synthesis of Didehydroconicol. European Journal of Organic Chemistry, 2022(18). https://doi.org/10.1002/ejoc.202101444.

79. Ramesh P, Sreenivasulu C, Kishore D R, Srinivas D, Gorantla K R, Mallik B S, & Satyanarayana G. (2022). Recyclable Aliphatic Nitrile-Template Enabled Remote meta-C-H Functionalization at Room Temperature. Journal of Organic Chemistry, 87(5). https://doi.org/10.1021/acs.joc.1c02865.

80. Ghouse S, Sreenivasulu C, Kishore D R, & Satyanarayana G. (2022). Recent developments by zinc based reagents/catalysts promoted organic transformations. Tetrahedron, 105(undefined).https://doi.org/10.1016/j.tet.2021.13258.

81. Ghora S, Sreenivasulu C, & Satyanarayana G. (2022). A Domino Heck Coupling-Cyclization-Dehydrogenative Strategy for the One-Pot Synthesis of Quinolines. Synthesis (Germany), 54(2). https://doi.org/10.1055/a-1589-7548.

82. Jana S, Panigrahi G, Yadav S, Niranjan M K, & Prakash J. (2022). Synthesis, crystal structure, optical bandgap, and electronic structure of Cs2FeP2S6. Solid State Sciences, 128(undefined). https://doi.org/10.1016/j.solidstatesciences.2022.10681.

83. Jana S, Panigrahi G, Ummethala G, Ghosh A, Malladi S K, Niranjan M K, & Prakash J. (2022). Extremely low thermal conductivity in BaSb2Se4: Synthesis, characterization, and DFT studies. Journal of Solid State Chemistry, 315(undefined). https://doi.org/10.1016/j.jssc.2022.123524.

84. Jana S, Panigrahi G, Tripathy B, Malladi S K, Sundaramoorthy M, Arumugam S, Niranjan M K, & Prakash J. (2022). Synthesis, characterization, and electronic structure of SrBi2S4. Journal of Solid State Chemistry, 312(undefined). https://doi.org/10.1016/j.jssc.2022.123250.

85. Jana S, Panigrahi G, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). A new non-stoichiometric quaternary sulfide Ba3.14(4) Sn0.61(1) Bi2.39(1)S8: Synthesis, crystal structure, physical properties, and electronic structure. Journal of Solid State Chemistry, 308(undefined). https://doi.org/10.1016/j.jssc.2022.122914.

86. Yadav S, Jana S, Panigrahi G, Malladi S K, Niranjan M K, & Prakash J. (2022). Five coordinated Mn in Ba<inf>4</inf>Mn<inf>2</inf>Si<inf>2</inf>Te<inf>9</inf>: synthesis, crystal structure, physical properties, and electronic structure. Dalton Transactions, 51(24). https://doi.org/10.1039/d2dt01167k.

87. Barman S, Jana S, Panigrahi G, Yadav S, Niranjan M K, & Prakash J. (2022). Ba3Zr2Cu4S9: the first quaternary phase of the Ba–Zr–Cu–S system. New Journal of Chemistry, 46(33). https://doi.org/10.1039/d2nj02972c.

88. Panigrahi G, Jana S, Ishtiyak M, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). Chalcogen dependent metal vacancies and disorder in Ba2Ln1−xMn2−yS5 and Ba2−δLn1−xMn2−ySe5 (Ln = Pr, Nd, and Gd) structures. Journal of Alloys and Compounds, 901(undefined). https://doi.org/10.1016/j.jallcom.2021.163607.

89. Panigrahi G, Yadav S, Jana S, Ghosh A, Niranjan M K, & Prakash J. (2022). Syntheses and characterization of two new layered ternary chalcogenides NaScQ2 (Q = Se and Te). New Journal of Chemistry, 46(46). https://doi.org/10.1039/d2nj04783g.

90. Jana S, Panigrahi G, Ishtiyak M, Narayanswamy S, Bhattacharjee P P, Niranjan M K, & Prakash J. (2022). Germanium Antimony Bonding in Ba4Ge2Sb2Te10 with Low Thermal Conductivity. https://doi.org/10.1021/acs.inorgchem.1c02990.

91. Jana S, Ishtiyak M, Govindaraj L, Arumugam S, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). Metal to insulator transition in Ba2Ge2Te5: Synthesis, crystal structure, resistivity, thermal conductivity, and electronic structure. Materials Research Bulletin, 147(undefined). https://doi.org/10.1016/j.materresbull.2021.111641.

92. Panigrahi G, Yadav S, Jana S, Ramanujachary K V, Niranjan M K, & Prakash J. (2022). Ba4FeAgS6: a new antiferromagnetic and semiconducting quaternary sulfide. Dalton Transactions, 52(3). https://doi.org/10.1039/d2dt03209k.

93. Ghosh S, Banerjee-Ghosh K, Levy D, Scheerer D, Riven I, Shin J, Gray H B, Naaman R, & Haran G. (2022). Control of protein activity by photoinduced spin polarized charge reorganization. Proceedings of the National Academy of Sciences of the United States of America, 119(35). Impact Factor: 12.78, Q1 Journal. https://doi.org/10.1073/pnas.2204735119.

94. Sharma S, Takkella D, Kumar P, & Gavvala K. (2022). Spectroscopic analysis to identify the binding site for Rifampicin on Bovine Serum Albumin. Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy, 283(undefined).https://doi.org/10.1016/j.saa.2022.12171.

95. Takkella D, Sharma S, Martinez-Fernandez L, & Gavvala K. (2022). Excited-state dynamics of imiquimod in aqueous solutions. Journal of Photochemistry and Photobiology A: Chemistry, 431(undefined). https://doi.org/10.1016/j.jphotochem.2022.113998.

96. Bhujbalrao R, Gavvala K, Singh R K, Singh J, Boudier C, Chakrabarti S, Patwari G N, Yves Mely, & Anand R. (2022). Identification of allosteric hotspots regulating the ribosomal RNA binding by antibiotic resistance-conferring Erm methyltransferases. Journal of Biological Chemistry, 298(8). https://doi.org/10.1016/j.jbc.2022.102208.

97. Ciaco S, Gavvala K, Greiner V, Mazzoleni V, Didier P, Ruff M, Martinez-Fernandez L, Improta R, & Yves Mely. (2022). Thienoguanosine brightness in DNA duplexes is governed by the localization of its ππ* excitation in the lowest energy absorption band. Methods and Applications in Fluorescence, 10(3). https://doi.org/10.1088/2050-6120/ac6ab6.

98. Naskar I, Ghosal P, & Deepa M. (2022). Efficient charge storage by ZnCo2S4 nanoflakes@MgCo2O4 nanorods composite in Mg2+/Zn2+/K+ conducting electrolytes. Journal of Energy Storage, 55(undefined). https://doi.org/10.1016/j.est.2022.105389.

99. Kumar P N, Das A, Kolay A, & Deepa M. (2022). Simple strategies deployed for developing efficient and stable solution processed quantum dot solar cells. Materials Advances, 3(5). https://doi.org/10.1039/d1ma00851j.

100. Kolay A, Maity D, Flint H, Gibson E A, & Deepa M. (2022). Self-switching photoelectrochromic device with low cost, plasmonic and conducting Ag nanowires decorated V2O5 and PbS quantum dots. Solar Energy Materials and Solar Cells, 239(undefined). https://doi.org/10.1016/j.solmat.2022.111674.

101. Kolay A, Flint H, Gibson E A, & Deepa M. (2022). Efficient charge separation and transport in a tandem solar cell with photoconducting Se sub-microtubes and AgBiS2 quantum dots. Chemical Engineering Journal, 437(undefined). https://doi.org/10.1016/j.cej.2022.135223.

102. Maity D, Ghosal P, & Deepa M. (2022). Effect of Cuprous Oxide Nanocubes and Antimony Nanorods on the Performance of Silicon Nanowire-Based Quasi-Solid-State Solar Cell. ACS Omega, 7(50).https://doi.org/10.1021/acsomega.2c04850.

103. Divya R, Vineeth V T, Bijini B R, Deepa M, Kumar B S, & Babu K R. (2022). Synthesis and characterization of biologically active novel structured cadmium barbiturate single crystal with good thermal stability. Journal of Molecular Structure, 1263(undefined). https://doi.org/10.1016/j.molstruc.2022.133132.

104. Deshagani S, Naskar I, Padval G G, Ghosal P, & Deepa M. (2022). Electrical Conduction in CoWO4 Flanked by Carbon and ZnFe2O4 Nanoparticulate Assembly and a Poly (ethylene oxide) Gel for Enhanced Electrochemical Activity. ACS Applied Energy Materials, 5(11). https://doi.org/10.1021/acsaem.2c02189.

105. Naskar S, & Deepa M. (2022). ZnV2O4-Textured Carbon Composite Contacting a ZIF-8 MOF Layer for a High Performance Non-Aqueous Zinc-Ion Battery. Batteries and Supercaps, 5(3). https://doi.org/10.1002/batt.202100364.

106. Maity D, Kaur B, Ghosal P, & Deepa M. (2022). CoS Nanoflakes on Textured Silicon Coupled with Antimony-Decorated Tungsten Oxide for Efficient Liquid Junction Solar Cells. ACS Applied Nano Materials, 5(8). https://doi.org/10.1021/acsanm.2c02301.

107. Kurra N, & Jenjeti R N. (2022). Micro-electrochemical capacitors: Progress and future status. Journal of Energy Storage, 55(undefined). https://doi.org/10.1016/j.est.2022.105702.

108. Kurra N, & Jiang Q. (2022). Supercapacitors. Storing Energy: with Special Reference to Renewable Energy Sources. undefined(undefined). https://doi.org/10.1016/B978-0-12-824510-1.00017-9 .

109. Zhao S, Wang X, Kurra N, Gogotsi Y, & Gao Y. (2022). Effect of pinholes in Nb4C3 MXene sheets on its electrochemical behavior in aqueous electrolytes. Electrochemistry Communications, 142(undefined). https://doi.org/10.1016/j.elecom.2022.107380.

110. Sarki N, Goyal V, Narani A, Jagadeesh R V, & Natte K. (2022). Amination of biomass to nitrogen-containing compounds. Biomass, Biofuels, Biochemicals: Biochemicals and Materials Production from Sustainable Biomass Resources. undefined(undefined). https://doi.org/10.1016/B978-0-12-824419-7.00014-5 .

111. Chandrashekhar V G, Natte K, Alenad A M, Alshammari A S, Kreyenschulte C, & Jagadeesh R V. (2022). Reductive Amination, Hydrogenation and Hydrodeoxygenation of 5-Hydroxymethylfurfural using Silica-supported Cobalt-Nanoparticles. ChemCatChem, 14(1). https://doi.org/10.1002/cctc.202101234.

112. ingh B, Rawat S, Natte K, & Narani A. (2022). Thermochemical methods for upgrading of lignin to aromatic chemicals.

Biomass, Biofuels, Biochemicals: Biochemicals and Materials Production from Sustainable Biomass Resources. undefined(undefined). https://doi.org/10.1016/B978-0-12-824419-7.00010-8 .

113. Cauwenbergh R, Goyal V, Maiti R, Natte K, & Das S. (2022). Challenges and recent advancements in the transformation of CO2 into carboxylic acids: straightforward assembly with homogeneous 3d metals. Chemical Society Reviews, 51(22). https://doi.org/10.1039/d1cs00921d.

114. V Goyal, N Sarki, A Narani, G Naik, K Natte, R V Jagadeesh. (2022). Recent Advances in the Catalytic N-Methylation and N-Trideuteromethylation Reactions Using Methanol and Deuterated Methanol, Coord. Chem. Rev., 2022, 474, 214827. https://doi.org/10.1016/j.ccr.2022.214827.

115. Rawat S, Singh B, Kumar R, Pendem C, Bhandari S, Natte K, & Narani A. (2022). Value addition of lignin to zingerone using recyclable AlPO4 and Ni/LRC catalysts. Chemical Engineering Journal, 431(undefined). https://doi.org/10.1016/j.cej.2021.134130.

116. Natte K & Jagadeesh R V. (2022). Surface-modified nanomaterials for synthesis of pharmaceuticals. Surface Modified Nanomaterials for Applications in Catalysis: Fundamentals, Methods and Applications. undefined(undefined). https://doi.org/10.1016/B978-0-12-823386-3.00011-8 .

117. Naik G, Sarki N, Goyal V, Narani A, & Natte K. (2022). Recent Trends in Upgrading of CO2 as a C1 Reactant in N- and C-Methylation Reactions. Asian Journal of Organic Chemistry, 11(8). https://doi.org/10.1002/ajoc.202200270.

118. N Sarki, A Narani, G Naik, D Tripathi, S L Jain, & K Natte. (2022). Biowaste carbon supported manganese nanoparticles as an active catalyst for the selective hydrogenation of bio-based aldehydes. Catal Tod, 2022, 408, 127-138. https://doi.org/10.1016/j.cattod.2022.07.018.

119. Poovan F, Chandrashekhar V G, Natte K, & Jagadeesh R V. (2022). Synergy between homogeneous and heterogeneous catalysis. Catalysis Science and Technology, 12(22). https://doi.org/10.1039/d2cy00232a.

120. Sarki N, Kumar R, Singh B, Ray A, Naik G, Natte K, & Narani A. (2022). Lignin Residue-Derived Carbon-Supported Nanoscale Iron Catalyst for the Selective Hydrogenation of Nitroarenes and Aromatic Aldehydes. ACS Omega, 7(23). https://doi.org/10.1021/acsomega.2c01566.

121. Senthamarai T, Poovan F, Alenad A M, Rockstroh N, Rabeah J, Bartling S, BarA¡th E, Natte K, & Jagadeesh R V. (2022). Cu- Oxide Nanoparticles Catalyzed Synthesis of Nitriles and Amides from Alcohols and Ammonia in Presence of Air. Advanced Sustainable Systems, 6(11). https://doi.org/10.1002/adsu.202200263.

122. B Singh, R Kumar, N Singh, D Tripathi, K Natte, & A Narani. (2022). Hydrogenation of Lignin- Derived Feedstocks and Bio-oil using Active and Stable Ruthenium Catalyst. Catal Tod, 2022, 408, 139-149. https://doi.org/10.1016/j.cattod.2022.07.013.

123. Rajkumar Misra, Yiming Tang, Yujie Chen, Priyadarshi Chakraborty, Francesca Netti, Thangavel Vijayakanth, Linda JW Shimon, Guanghong Wei, Lihi Adler-Abramovich Macromol. (2022). Exploiting Minimalistic Backbone Engineered γ-Phenylalanine for the Formation of Supramolecular Co-Polymer. Rapid Commun, 2022, 43, 2200223. https://doi.org/10.1002/marc.202200223.

124. Priyadarshi Chakraborty, Moran Aviv, Francesca Netti, Dana Cohen-Gerassi and Lihi Adler- Abramovich Macromol. (2022). Molecular co-assembly of two building blocks harnesses both their attributes into a functional supramolecular hydrogel. (2022). Biosci, 2022, 22, 2100439 https://doi.org/10.1002/mabi.202100439.

125. Rajkumar Misra, Francesca Netti, Gil Koren, Yoav Dan, Priyadarshi Chakraborty, Sidney R Cohen, Linda JW Shimon, Roy Beck, Lihi Adler-Abramovich. (2022). An atomistic view of rigid crystalline supramolecular polymers derived from short amphiphilic, α, β hybrid peptide Polym Chem, 2022, 13, 6223-6228. https://doi.org/10.1002/mabi.202100439.

126. Kumar G S, Moorthy S. Karmakar H, Singh S K, & Panda T K. (2022). Neosilyllithium-Catalyzed Hydroboration of Alkynes and Alkenes in the Presence of Pinacolborane (HBpin). European Journal of Inorganic Chemistry, 2022(2). https://doi.org/10.1002/ejic.202100895.

127. Ramakant G A, Ahmed N, Tarannum I, Mehta S, Nandeshwar M, Mondal A, Singh S K, & Prabusankar G. (2022). LnIII (Ln = La, Gd, and Dy) Benzimidazolium Tricarboxylate Coordination Polymers with Hydrogen Bonding Modulated Magnetic Relaxation. Crystal Growth and Design, 22(10). https://doi.org/10.1021/acs.cgd.2c00674.

128. Ingle D S, Yadav A C, Kumari K, Singh S K, Babu D J, & Rao K V. (2022). Post-synthetic π-extension of perylene conjugated porous polymer via APEX reactions: tunable optical and gas storage properties. Chemical Communications, 59(4). https://doi.org/10.1039/d2cc05340c.

129. Roy S, Shukla P, Ahmed N, Du M H, Tarannum I, Kong X J, Gupta T, Singh S K, & Das S. (2022). Interplay between anisotropy and magnetic exchange to modulate the magnetic relaxation behaviours of phenoxo bridged Dy2 dimers with axial β-diketonate o-ligands.https://doi.org/10.1039/d2dt03117e.

130. Tian Z, Moorthy S, Xiang H, Peng P, You M, Zhang Q, Yang S Y, Zhang Y L, Wu D Q, Singh S K, & Shao D. (2022). Tuning chain topologies and magnetic anisotropy in one-dimensional cobalt(ii) coordination polymers via distinct dicarboxylates. CrystEngComm, 24(21). https://doi.org/10.1039/d2ce00437b.

131. Kumar G S, Bhattacharjee J, Kumari K, Moorthy S, Bandyopadhyay A, Singh S K, Panda T K. (2022). Hydroboration of nitriles, esters, and amides catalyzed by simple neosilyllithium, Polyhedron, 219, 115784. https://doi.org/10.1016/j.poly.2022.115784.

132. Shao D, Moorthy S, Yang X, Yang J, Shi L, Singh S K, & Tian Z. (2022). Tuning the structure and magnetic properties: Via distinct pyridine derivatives in cobalt(ii) coordination polymers. Dalton Transactions, 51(2). https://doi.org/10.1039/d1dt03489h.

133. Shao D, Moorthy S Y, Xiadong, Yang J, Shi L, Singh S K, Tian Z F. (2022). Tuning the structure and magnetic properties via distinct pyridine derivatives in cobalt(ii) coordination polymers, Dalton Trans., 51, 695. https://doi.org/10.1039/D1DT03489H.

134. Shao D, Moorthy S, Zhou Y, Wu S T, Zhu J Y, Yang J, Wu D Q, Tian Z, & Singh S K. (2022). Field-induced slow magnetic relaxation behaviours in binuclear cobalt(ii) metallocycles and exchange-coupled clusters. Dalton Transactions, 51(24). https://doi.org/10.1039/d2dt01620f.

135. Srideep D, Sriram K, Kotha S, Babu D J, Singh S K, & Rao K V. (2022). Synthesis and Self-assembly of Benzoperylene Benzimidazoles: Tunable Morphology with Aggregation-Induced Enhanced Emission. Chemistry - An Asian Journal, 17(8). https://doi.org/10.1002/asia.202200099.

136. Nandeshwar M, Tarannum I, Singh S K, Prabusankar G. (2022). Antimony(III)-selenium complexes with synergetic effect between SbSe bond and Sb···π interactions. Polyhedron, 225, 116069 https://doi.org/10.1016/j.poly.2022.116069.

137. Moseley D H, Liu Z, Bone A N, Stavretis S E, Singh S K, Atanasov M, Lu Z, Ozerov M, Thirunavukkuarasu K, Cheng Y, Daemen L L, Lubert-Perquel D, Smirnov D, Neese F, Ramirez-Cuesta A J, Hill S, Dunbar K R, & Xue Z L. (2022). Comprehensive Studies of Magnetic Transitions and Spin–Phonon Couplings in the Tetrahedral Cobalt Complex Co(AsPh3)2I2. Inorganic Chemistry, 61(43). https://doi.org/10.1021/acs.inorgchem.2c02604.

138. Das K S, Saha S, Pal B, Adhikary A, Moorthy S, Bala S, Akhtar S, Ghose P K, Singh S K, Ray P P, & Mondal R. (2022). A Nd6 molecular butterfly: a unique all-in-one material for SMM, MCE and maiden photosensitized opto-electronic device fabrication. Dalton Transactions, 51(4). https://doi.org/10.1039/d1dt02364k.

139. Shao D, Tang W J, Ruan Z, Yang X, Shi L, Wei X Q, Tian Z, Kumari K, & Singh S K. (2022). Water-driven reversible switching of single-ion magnetism and proton conduction in a dysprosium sulfonate. Inorganic Chemistry Frontiers, 9(23). https://doi.org/10.1039/d2qi01761j.

140. Kumar P, Flores Gonzalez J, Sahu P P, Ahmed N, Acharya J, Kumar V, Cador O, Pointillart F, Singh S K, & Chandrasekhar V. (2022). Magnetocaloric effect and slow magnetic relaxation in peroxide-assisted tetranuclear lanthanide assemblies. Inorganic Chemistry Frontiers, 9(19). https://doi.org/10.1039/d2qi01260j.

141. Zhou Y, Moorthy S, Wei X Q, Singh S K, Tian Z, & Shao D. (2022). A porous cobalt(ii)-organic framework exhibiting high room temperature proton conductivity and field-induced slow magnetic relaxation. Dalton Transactions, 52(4). https://doi.org/10.1039/d2dt03383f.

142. Shao D, Sahu P P, Tang W J, Zhang Y L, Zhou Y, Xu F X, Wei X Q, Tian Z, Singh S K, & Wang X Y. (2022). A single-ion magnet building block strategy toward Dy2 single-molecule magnets with enhanced magnetic performance. Dalton Transactions, 51(48) https://doi.org/10.1039/d2dt03046b.

143. Chauhan R S, Moorthy S, Tyagi A, Torubaev Y, Butcher R J, & Singh S K. (2022). Solvent mediated synthesis of homoleptic tri and tetranuclear nickel complex derived from [Ni2(μ-SeC5H4N)2(dppe)2]2+ and theoretical studies. Journal of Organometallic Chemistry, 957(undefined) https://doi.org/10.1016/j.jorganchem.2021.122177.

144. Ferrier M G, Valdez C A, Singh S K, Hok S, Ray D, Gagliardi L, & Despotopulos J D. (2022). Unsaturated Sulfur Crown Ethers Can Extract Mercury(II) and Show Promise for Future Copernicium(II) Studies: A Combined Experimental and Computational Study. Inorganic Chemistry, 61(2). https://doi.org/10.1021/acs.inorgchem.1c01869.

145. Chakraborty A, Ahmed N, Ali J, Moorthy S, Goura J, Singh S K, Rogez G, & Chandrasekhar V. (2022). Exchange-driven slow relaxation of magnetization in Ni II2Ln III2 (LnIII = Y, Gd, Tb and Dy) butterfly complexes: experimental and theoretical studies. Dalton Transactions, 51(38). https://doi.org/10.1039/d2dt00237j.

146. Girase J D, Shahnawaz, Nagar M R, Jayakumar J, Jou J H, & Vaidyanathan S. (2022). New deep blue fluorophores based on benzo[d]thiazole group as acceptor core: Theoretical, synthesis, photophysical and electroluminescent investigation. Journal of Luminescence, 248(undefined). https://doi.org/10.1016/j.jlumin.2022.118992.

147. Nayak S R, The L, Alam M I, Nagar M R, Jou J H, Patel S, & Vaidyanathan S. (2022). Molecular Modulation by I ƒ Conjugated Spacer Enables Efficient Ultraviolet/Deep-Blue Emissive Organic Light-Emitting Diodes. Journal of Physical Chemistry C, undefined(undefined). https://doi.org/10.1021/acs.jpcc.2c08679.

148. Pradhan P, Priya S, Rajendran M, Singh K, & Vaidyanathan S. (2022). Efficient and ultra-thermally stable Eu3+ and Sm3+-activated narrow-band red/deep red-emitting phosphors and their versatile applications. Dalton Transactions, 51(2). https://doi.org/10.1039/d1dt04036g.

149. Devesing Girase J, Rani Nayak S, Tagare J, Shahnawaz, Ram Nagar M, Jou J H, & Vaidyanathan S. (2022). Solution-processed deep-blue (yáˆ¼0.06) fluorophores based on triphenylamine-imidazole (donor-acceptor) for OLEDs: computational and experimental exploration. Journal of Information Display, 23(1). https://doi.org/10.1080/15980316.2021.1959429.

150. Devesing Girase J, Mukherjee S, Chakrabarti T, Patel S, Perumal A, & Vaidyanathan S. (2022). Mild donor-I €-mild acceptor (mD-I €-mA) benzimidazole-based deep blue fluorophores with hybridized local and charge transfer (HLCT) excited states for OLEDs. Journal of Information Display, 23(3). https://doi.org/10.1080/15980316.2022.2075042.

151. Mund S, Singh K, Panda M, Biswal B K, Subuddhi U, & Vaidyanathan S. (2022). Thiabendazole: a new class of antenna core structure for multifunctional trivalent organo-europium (Eu^{III}) complexes. Journal of Materials Chemistry C, 10(29). https://doi.org/10.1039/d2tc01078j.

152. Mund S & Vaidyanathan S. (2022). New isomeric ancillary ligands and their Eu^{III} complexes: a single component white light emissive phosphor and their applications in red/white smart LEDs, electronic noses, and temperature sensing. Journal of Materials Chemistry C, undefined(undefined).https://doi.org/10.1039/d2tc0066b.

153. Alam M I, Nagar M R, Nayak S R, Choudhury A, Jou J H, & Vaidyanathan S. (2022). Acceptor Interlocked Molecular Design for Solution-Processed Stable Deep-Blue TADF and Hyper Fluorescence Organic LED Enabling High-Efficiency. Advanced Optical Materials, 10(18). https://doi.org/10.1002/adom.202200376.

154. Singh K & Vaidyanathan S. (2022). Stable and efficient narrow-band red emitters with high colour purity for white LEDs and plant growth applications. Dalton Transactions, 51(30).

https://doi.org/10.1039/d2dt01042a.

155. Devesing Girase J, Tagare J, Mukherjee S, Chakrabrati T, Perumal A, & Vaidyanathan S. (2022). Efficient deep blue (CIE âˆ¼0.08) fluorophore-based benzimidazole with hybridized local and charge transfer (HLCT) excited state for OLEDs. Journal of Information Display, 23(2). https://doi.org/10.1080/15980316.2022.2029592.

156. Girase J D, Shahnawaz, Jou J H, Patel S, & Vaidyanathan S. (2022). Solution-processed deep-blue fluorophores based on phenanthroimidazole integrated with benzimidazole with HLCT character for efficient deep-blue organic light emitting devices. Dyes and Pigments, 206(undefined). https://doi.org/10.1016/j.dyepig.2022.110623.

157. Tagare J, Kajjam A B, Singh K, Patel S, & Vaidyanathan S. (2022). Acenaphthene-triphenylamine (acceptor-donor) based luminophores for organic light emitting diodes: Combined experimental and theoretical study. Materials Advances, 3(1). https://doi.org/10.1039/d1ma00583a.

158. Sudheendran Swyamprabha S, Kishore Kesavan K, Siddiqui I, Blazevicius D, Jayachandran J, Eidimtas M, Nayak S R, Nagar M R, Yadav R A K, Krucaite G, Vaidyanathan S, Grigalevicius S, & Jou J H. (2022). Novel carbazole host materials for solution processed TADF Organic Light Emitting Diodes. Dyes and Pigments, 208(undefined). https://doi.org/10.1016/j.dyepig.2022.110821.

159. Girase J D, Kajjam A B, Dubey D K, Kesavan K K, Jou J H, & Vaidyanathan S. (2022). Unipolar 1-phenylimidazo[1,5-a] pyridine: a new class of ultra-bright sky-blue emitters for solution-processed organic light emitting diodes. New Journal of Chemistry, 46(35).https://doi.org/10.1039/d2nj01938h.

160. Girase J D, Shahnawaz, Jou J H, & Vaidyanathan S. (2022). Deep-blue Fluorophores Based on Phenanthroimidazole Integrated with Benzo[d]thiazole: Experimental and Theoretical Investigation. ChemistrySelect, 7(27). https://doi.org/10.1002/slct.202201514.

161. Girase J D, Nagar M R, Shahnawaz, Choudhury A, Jou J H, & Vaidyanathan S. (2022). Highly Efficient Multifunctional Luminogens for Near UV/Deep Blue (CIEy ∼0.02) and Hybrid White OLEDs (CIE ∼0.33, 0.37) with Superior Color Stability. ACS Applied Electronic Materials, 4(9). https://doi.org/10.1021/acsaelm.2c00648.

162. Singh K, Rajendran M, Devi R, & Vaidyanathan S. (2022). Narrow-Band Red-Emitting Phosphors with High Color Purity, Trifling Thermal and Concentration Quenching for Hybrid White LEDs and Li3Y3BaSr(MoO4)8:Sm3+, Eu3+-Based Deep-Red LEDs for Plant Growth Applications. Inorganic Chemistry, 61(6). https://doi.org/10.1021/acs.inorgchem.1c02836.

163. Kumbhakar S, Giri B, Muley A, Karumban K S, Biswas C, Raavi S S K, & Maji S. (2022). Synthesis, characterization, structural and photophysical properties of heteroleptic ruthenium complexes containing 2-(1H-benzo[d]imidazol-2-yl) quinoline ligand towards electrocatalytic CO2 reduction. Journal of Chemical Sciences, 134(3). https://doi.org/10.1007/s12039-022-02063-z.

164. Muley A, Karumban K S, Kumbhakar S, Giri B, & Maji S. (2022). High phenoxazinone synthase activity of two mononuclear: Cis -dichloro cobalt(ii) complexes with a rigid pyridyl scaffold. New Journal of Chemistry, 46(2). https://doi.org/10.1039/d1nj03992j.

165. Giri B, Mahata A, Kella T, Shee D, De Angelis F, & Maji S. (2022). Tetrazole-Substituted isomeric ruthenium polypyridyl complexes for low overpotential electrocatalytic CO2 reduction. Journal of Catalysis, 405(undefined). https://doi.org/10.1016/j.jcat.2021.11.023.

166. Karumban K S, Muley A, Raut R, Gupta P, Giri B, Kumbhakar S, Misra A, & Maji S. (2022). Mononuclear Co(ii) polypyridyl complexes: synthesis, molecular structure, DNA binding/cleavage, radical scavenging, docking studies and anticancer activities. Dalton Transactions, undefined(undefined). https://doi.org/10.1039/d1dt04144d

167. Kumbhakar S, Gupta P, Giri B, Muley A, Karumban K S, Misra A, & Maji S. (2022). Photolability of NO in ruthenium nitrosyls with pentadentate ligand induces exceptional cytotoxicity towards VCaP, 22Rv1 and A549 cancer cells under therapeutic condition. Journal of Molecular Structure, 1265(undefined). https://doi.org/10.1016/j.molstruc.2022.133419.

168. Karumban K S, Raut R, Gupta P, Muley A, Giri B, Kumbhakar S, Misra A, & Maji S. (2022). Mononuclear cobalt(II) complexes with polypyridyl ligands: Synthesis, characterization, DNA interactions and in vitro cytotoxicity towards human cancer cells. Journal of Inorganic Biochemistry, 233(undefined). https://doi.org/10.1016/j.jinorgbio.2022.111866.

169. Karumban K S, Muley A, Giri B, Kumbhakar S, Kella T, Shee D, & Maji S. (2022). Synthesis, characterization, structural, redox and electrocatalytic proton reduction properties of cobalt polypyridyl complexes. Inorganica Chimica Acta, 529(undefined).https://doi.org/10.1016/j.ica.2021.12067.

170. Sudarsanam P, Yamauchi Y, & Bharali P. (2022). Preface. Heterogeneous Nanocatalysis for Energy and Environmental Sustainability, 1-2(undefined). https://doi.org/10.1002/9781119772057.fmatter1.

171. Sudarsanam P, Singh N, & Kalbande P N. (2022). Shape-controlled nanostructured MoO3/CeO2 catalysts for selective cyclohexene epoxidation. Catalysis Communications, 164(undefined). https://doi.org/10.1016/j.catcom.2022.106433.

172. Wu H, Li H, Zhao W, Sudarsanam P, & Yang S. (2022). Protophilic solvent-impelled quasi-catalytic CO<inf>2</inf> valorization to formic acid and N-formamides. Fuel, 326(undefined).https://doi.org/10.1016/j.fuel.2022.12504

173. Sudarsanam P, Yamauchi Y, & Bharali P. (2022). Heterogeneous Nanocatalysis for Energy and Environmental Sustainability. Heterogeneous Nanocatalysis for Energy and Environmental Sustainability, 1-2(undefined). https://doi.org/10.1002/9781119772057.

174. Sudarsanam P & Brueckner A. (2022). Preface to the special issue on “Analysis of solid-liquid interfaces in heterogeneous catalysis”. Catalysis Communications, 170(undefined). https://doi.org/10.1016/j.catcom.2022.106489.

175. Singh N, Kalbande P N, Umbarkar S, & Sudarsanam P. (2022). Efficient cascade C-N coupling reactions catalyzed by a recyclable MoOx/Nb2O5 nanomaterial for valuable N-heterocycles synthesis. Molecular Catalysis, 532(undefined). https://doi.org/10.1016/j.mcat.2022.112742.

176. Sarkar S, Singh N, Khan M, & Sudarsanam P. (2022). Nanostructured graphene oxide-based catalysts for fischer-tropsch synthesis. Heterogeneous Nanocatalysis for Energy and Environmental Sustainability, 1-2(undefined). https://doi.org/10.1002/9781119772057.ch10.

177. Sudarsanam P, Yamauchi Y, & Bharali P. (2022). Preface. Heterogeneous Nanocatalysis for Energy and Environmental Sustainability, 2-2(undefined). https://doi.org/10.1002/9781119772057.fmatter2.

178. Baweja S, Chowdhury P R, & Maity S. (2022). Excited state hydrogen atom transfer pathways in 2,7-diazaindole – S1-3 (S = H2O and NH3) clusters. Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy, 265, 120386. https://doi.org/10.1016/j.saa.2021.120386.

179. Khodia S, Jarupula R, & Maity S. (2022). Accurate measurement of sequential Ar desorption energies from the dispersion-dominated Ar1–3 complexes of aromatic molecules. Physical Chemistry Chemical Physics, 25, 2510. https://doi.org/10.1039/d2cp04676h.

180. Roy Chowdhury P, Khodia S, & Maity S. (2022). Solvent assisted excited-state deactivation pathways in isolated 2,7-diazaindole-S1-3 (S = Water and Ammonia) complexes. Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy, 278, 121285. https://doi.org/10.1016/j.saa.2022.121285.

181. Khodia S & Maity S. (2022). A combined experimental and computational study on the deactivation of a photo-excited 2,2-pyridylbenzimidazole-water complex via excited-state proton transfer. Physical Chemistry Chemical Physics, 24, 12043. https://doi.org/10.1039/d2cp01121b.

182. Bhar M, Dey A, Ghosh S, van Spronsen M A, Selvaraj V, Kaliprasad Y, Krishnamurthy S, & Martha S K. (2022). Plasma jet printing induced high-capacity graphite anodes for sustainable recycling of lithium-ion batteries. Carbon, 198(undefined). https://doi.org/10.1016/j.carbon.2022.07.027.

183. Muduli S, Pati S K, & Martha S K. (2022). Bio-waste derived carbon nano-onions as an efficient electrode material for symmetric and lead-carbon hybrid ultracapacitors. International Journal of Energy Research, 46(10). https://doi.org/10.1002/er.8123.

184. Vangapally N, V K K, Kumar A, & Martha S K. (2022). Charge storage behavior of sugar derived carbon/MnO<inf>2</inf> composite electrode material for high-performance supercapacitors. Journal of Alloys and Compounds, 893(undefined). https://doi.org/10.1016/j.jallcom.2021.162232.

185. Pappu S, Muduli S, Katchala N, Tata N R, Bulusu S V, & Martha S K. (2022). Easy and Scalable Synthesis of NiMnCo-Oxalate Electrode Material for Supercapacitors from Spent Li-Ion Batteries: Power Source for Electrochromic Devices. Energy and Fuels, 36(21). https://doi.org/10.1021/acs.energyfuels.2c03006.

186. Pappu S, Anandan S, Rao T N, Martha S K, & Bulusu S V. (2022). High-performance hybrid supercapacitor with electrochemically exfoliated graphene oxide incorporated NiCo2O4 in aqueous and non-aqueous electrolytes. Journal of Energy Storage, 50(undefined). https://doi.org/10.1016/j.est.2022.104598.

187. Surendra K. Martha, Liju Elias, Sourav Ghosh. (2022). Silicon Anode Systems for Lithium-Ion Batteries (Eds Prashant N Kumta, Aloysius F Hepp, Moni K Datta, Oleg I Velikokhatnyi) (Chapter 8: Nanostructured 3D Electrode Architectures of Silicon for High Performance Li-Ion Batteries). 331-371, Elsevier (2022). https://doi.org/10.1016/B978-0-12-819660-1.00013-X

188. Elias L, Bhar M, Ghosh S, & Martha S K. (2022). Effect of alloying on the electrochemical performance of Sb and Sn deposits as an anode material for lithium-ion and sodium-ion batteries. Ionics, 28(6). https://doi.org/10.1007/s11581-022-04539-x .

189. Muduli S, Kaliprasad Y, & Martha S K. (2022). Lead–carbon hybrid ultracapacitors fabricated by using sulfur, nitrogen-doped reduced graphene oxide as anode material derived from spent lithium-ion batteries. Journal of Solid State Electrochemistry, 26(9). https://doi.org/10.1007/s10008-022-05188-w .

190. Kumar V K, Ghosh S, Ghosh S, Behera P S, Biswas S, & Martha S K. (2022). Enhanced electrochemical performance of O3-type NaNi0.5Mn0.3Co0.2O2 cathodes for sodium-ion batteries via Al-doping. Journal of Alloys and Compounds, 924(undefined). https://doi.org/10.1016/j.jallcom.2022.166444.

191. S K Martha, S Pappu, B V Sarada, & T N Rao. (2022). Concept of Thermodynamic Studies in Electrochemical Storage and Conversion Systems. https://doi.org/10.1016/B978-0-12-819723-3.00135-9 .

192. Bhattacharjee U, Bhowmik S, Ghosh S, & Martha S K. (2022). Effect of in-situ derived sulfur dispersion on dual carbon lithium-ion capacitors. Journal of Power Sources, 542(undefined). https://doi.org/10.1016/j.jpowsour.2022.231768.

193. Pappu S, Rao T N, Martha S K, & Bulusu S V. (2022). Electrodeposited Manganese Oxide based Redox Mediator Driven 2.2 V High Energy Density Aqueous Supercapacitor. Energy, 243(undefined). https://doi.org/10.1016/j.energy.2021.122751.

194. Muduli S, Das Chakraborty R, Verma P, & Martha S K. (2022). Bio-Waste Derived Honeycomb Structured Activated Carbons as Anode Materials for Lead-Carbon Hybrid Ultracapacitors. Journal of the Electrochemical Society, 169(9). https://doi.org/10.1149/1945-7111/ac8eda.

195. Bhattacharjee U, Ghosh S, Bhar M, & Martha S K. (2022). Electrochemical energy storage part I: development, basic principle and conventional systems. Emerging Trends in Energy Storage Systems and Industrial Applications, undefined(undefined). https://doi.org/10.1016/B978-0-323-90521-3.00001-6 .

196. Muduli S, Pappu S, Bulusu S V, Rao T N, & Martha S K. (2022). Electrochemically Exfoliated Layered Carbons as Sustainable Anode Materials for Lead Carbon Hybrid Ultracapacitor. ChemElectroChem, 9(11). https://doi.org/10.1002/celc.202200230.

197. Bhattacharjee U, Ghosh S, Bhar M, & Martha S K. (2022). Electrochemical energy storage part II: hybrid and future systems. Emerging Trends in Energy Storage Systems and

Industrial Applications, undefined(undefined). https://doi.org/10.1016/B978-0-323-90521-3.00023-5.

198. Bhattacharjee U, Bhowmik S, Ghosh S, Vangapally N, & Martha S K. (2022). Boron-doped graphene anode coupled with microporous activated carbon cathode for lithium-ion ultracapacitors. Chemical Engineering Journal, 430(undefined).https://doi.org/10.1016/j.cej.2021.13285.

199. S K Martha and S Muduli. (2022). Thermodynamic Studies on Energy Density of Batteries. Oxford: Elsevier. https://doi.org/10.1016/B978-0-12-819723-3.00136-0.

200. Aamani S, Das C R, Martha S K, Albert S K, & Panigrahi B B. (2022). Influence of Nitrogen on Grain Size-Dependent Sensitisation and Corrosion Resistance of 316L (N) Austenitic Stainless Steels. Transactions of the Indian Institute of Metals, 75(8). https://doi.org/10.1007/s12666-022-02598-2.

201. Kumar V K, Ghosh S, Naresh V, Ummethala G, Malladi S R K, & Martha S K. (2022). Binder and conductive diluents free NaVPO4F based free-standing positive electrodes for sodium-ion batteries. Journal of the Electrochemical Society, 169(1). https://doi.org/10.1149/1945-7111/ac47eb.

202. Bhar M, Ghosh S, Krishnamurthy S, Yalamanchili K, & Martha S K. (2022). Electrochemical Compatibility of Graphite Anode from Spent Li-Ion Batteries: Recycled via a Greener and Sustainable Approach. ACS Sustainable Chemistry and Engineering, 10(23). https://doi.org/10.1021/acssuschemeng.2c00554.

203. Narvariya R, Gupta S, Jain A, Rawal P, Gupta P, & Panda T K. (2022). One-Pot Reductive Amination of Aromatic Aldehydes in [Et3NH] [HSO4] using Sodium Borohydride and A Mechanistic Investigation using Computational Method. ChemistrySelect, 7(4). https://doi.org/10.1002/slct.202200052.

204. Das S, Maity J, & Panda T K. (2022). Metal/Non-Metal Catalyzed Activation of Organic Nitriles. Chemical Record, 22(12). https://doi.org/10.1002/tcr.202200192.

205. Kumar G S, Moorthy S, Karmakar H, Singh S K, & Panda T K. (2022). Neosilyllithium-Catalyzed Hydroboration of Alkynes and Alkenes in the Presence of Pinacolborane (HBpin). European Journal of Inorganic Chemistry, 2022(2). https://doi.org/10.1002/ejic.202100895.

206. Bhattacharjee J, Rawal P, Das S, Harinath A, Gupta P, & Panda T K. (2022). A highly efficient Ti-catalyst for the deoxygenative reduction of esters under ambient conditions: experimental and mechanistic insights from DFT studies. Dalton Transactions, 51(15).https://doi.org/10.1039/d2dt00076h.

207. Das A, Rej S, & Panda T K. (2022). Aluminium complexes: next-generation catalysts for selective hydroboration. Dalton Transactions, 51(8). https://doi.org/10.1039/d1dt03703j.

208. Kumar R, Rawal P, Banerjee I, Pada Nayek H, Gupta P, & Panda T K. (2022). Catalytic Hydroboration and Reductive Amination of Carbonyl Compounds by HBpin using a Zinc Promoter. Chemistry - An Asian Journal, 17(5). https://doi.org/10.1002/asia.202200013.

209. Oruganti R K, Pal D, Panda T K, Shee D, & Bhattacharyya D. (2022). Green synthesis of calcium oxide nanoparticles impregnated activated carbon from algal–bacterial activated sludge: its application in ciprofloxacin removal. International Journal of Environmental Science and Technology, undefined(undefined). https://doi.org/10.1007/s13762-022-04662-2 .

210. Bano K, Kisan D A, & Panda T K. (2022). Facile Synthesis of Benzimidazole and Benzothiazole Compounds Mediated by a Zinc Precatalyst Supported by an Iminopyrrole-Morpholine Ligand. European Journal of Inorganic Chemistry, 2022(10). https://doi.org/10.1002/ejic.202200023.

211. Gundupalli M P, Bano K, Panda T K, Sriariyanun M, & Bhattacharyya D. (2022). Understanding the effect of low-concentrated protic ionic liquids (PILs) on coconut (Cocos nucifera) residues. Biomass Conversion and Biorefinery, undefined(undefined). https://doi.org/10.1007/s13399-022-02572-4 .

212. Sai Kumar G, Bhattacharjee J, Kumari K, Moorthy S, Bandyopadhyay A, Kumar Singh S, & Panda T K. (2022). Hydroboration of nitriles, esters, and amides catalyzed by simple neosilyllithium. Polyhedron, 219(undefined). https://doi.org/10.1016/j.poly.2022.115784.

213. Mahato S, Rawal P, Devadkar A K, Joshi M, Roy Choudhury A, Biswas B, Gupta P, & Panda T K. (2022). Hydroboration and reductive amination of ketones and aldehydes with HBpin by a bench stable Pd(ii)-catalyst. Organic and Biomolecular Chemistry, 20(5). https://doi.org/10.1039/d1ob02339j.

214. Karmakar H, Anga S, Panda T K, & Chandrasekhar V. (2022). Aluminium alkyl complexes supported by imino-phosphanamide ligand as precursors for catalytic guanylation reactions of carbodiimides. RSC Advances, 12(8). https://doi.org/10.1039/d2ra00242f.

215. Banerjee I, Sagar S, Lorber C, & Panda T K. (2022). Catalytic addition reactions of amines, thiols, and diphenyl-phosphine oxides to heterocumulenes using a bridging Sulfonylimido titanium(IV) complex. Zeitschrift fur Anorganische und Allgemeine Chemie, 648(18). https://doi.org/10.1002/zaac.202200188.

216. Sagar S, Bano K, Sarkar A, Pal K, & Panda T K. (2022). Magnesium Promoted Active and Isoselective ROP of rac-Lactide and I µ-Caprolactone Under Mild Conditions. European Journal of Inorganic Chemistry, 2022(34). https://doi.org/10.1002/ejic.202200494.

217. Srideep D, Sriram K, Kotha S, Babu D J, Singh S K, & Rao K V. (2022). Synthesis and Self-assembly of Benzoperylene Benzimidazoles: Tunable Morphology with Aggregation-Induced Enhanced Emission. Chemistry - An Asian Journal, 17(8). https://doi.org/10.1002/asia.202200099.

218. Kotha S, Sahu R, Srideep D, Yamijala S S R K C, Kumar Reddy S, & Venkata Rao K. (2022). Cooperative Supramolecular Polymerization Guided by Dispersive Interactions. Chemistry - An Asian Journal, 17(16). https://doi.org/10.1002/asia.202200494.

219. Chen Z, Suzuki Y, Imayoshi A, Ji X, Rao K V, Omata Y, Miyajima D, Sato E, Nihonyanagi A, & Aida T. (2022). Solvent-free autocatalytic supramolecular polymerization. Nature Materials, 21(2). https://doi.org/10.1038/s41563-021-01122-z.

Funded Research Projects:

1 Abhijit Sau; Design and synthesis of Bleomycin carbohydrate; 25 L. [SG-132].

2. Ashutosh Kumar Mishra; Bioinspired novel design built around neutral flavin core skeleton as fluorescent probes for bioimaging and sensing applications; 47.26 L. [SERB/CHY/F198/2022-23/G530].

3. Bhabani Shankar Mallik; Ionic Transport, Solvation and Interfacial Interactions of Electrolytes from computer Simulations; 31.06 L. [SERB/CHY/F079/2022-23/G515].

4. Bhabani Shankar Mallik; Understanding the mechanism of molecular dissociation for the generation of renewable fuel through the computational catalysis approach; 30.56 L. [SERB/CHY/F079/2022-23/G525].

5. Ch Subrahmanyam; Research and Development of Low GWP Chemicals; 50 L. [Ozone cell/F019/2022-23/S256].

6. Ch Subrahmanyam; Research and Development of Low GWP Chemicals; 50 L. [Ozone cell/F019/2022-23/G528].

7. Debasish Koner; Exploring the reaction dynamics and molecular spectroscopy in gas phase for systems relevant to atmospheric and astro-chemistry; 7 L. [IFA19-CH318].

8. Faiz Ahmed Khan; Methyl enol ethers as versatile building blocks for the one pot synthesis of novel fused benzene, furocoumarins, enamides, benzofurans, and evaluation of biological activity; 52.84 L. [SERB/CHY/F042/2022-23/G512].

9. G Prabusankar; N-Heterocyclic Neutral Donor Ligands and AIE Assisted Luminescent Organometallic Complexes with Higher Quantum; 35.68 L. [DST CRG/CHY/F043/2022-23/S255].

10. G Satyanarayana; Research and Development of Low GWP Chemicals; 50 L. [Ozone cell/F019/2022-23/S256].

11. G Satyanarayana; Research and Development of Low GWP Chemicals; 50 L. [Ozone cell/F019/2022-23/G528].

12. Jai Prakash; Syntheses of New Layered 3DTransition Metal Based Chalcogenides for Superconducting and Magnetic Applications; 39.36 L. [SERB/CHY/F180/ 2021-22/G413].

13. Koyel Banerjee Ghosh; Spin-Controlled charge transfer at chiral electrodes and its application in the oxygen reduction reaction; 30.9 L. [SERB/CHY/F284/2022-23/G491].

14. Krishna Gavvala; Exploring Novel Nucleoside Analogues to Probe the Key Protein-DNA Interactions Using Spectroscopic Tools; 27.6 L. [G319].

15. Priyadarshi Chakraborty; DBT Ramalingaswami Fellowship; 52.5 L. [DBT/CHY/F322/2022-23/G496].

16. Priyadarshi Chakraborty; Seed Grant; 25 L. [SG/IITH/F322/2022-23/SG-146].

17. Sivakumar V; Molecular engineering of organic antennas and their impact on dual emissive lanthanide complexes for smart white LEDs and Molecular Thermometers; 46.46 L. [SERB-DST/CHY/F324/2022-23/G519].

18. Sudarsanam Putla; Catalytic production of bio-polymer precursors using active site-tailored zeolites; 34.69 L. [SERB/CHY/F292/2022-23/G510].

19. urajit Maity; Excited State Hydrogen Transfer in Microsolvated N-H Bearing Molecules: Determination of The Hydrogen Bonded Structures, Properties and Tautomerization Reaction Products; 10 L. [G269].

20. Surendra Kumar Martha; Fully Standalone type Photovoltaic fed Zero carbon battery charging station for institute's EVs (without grid connectivity); 29.52 L. [IITH/DES/F257/2022-23/G470].

21. Surendra Kumar Martha; Preparation of Working draft of the BIS standard for Requirements for communication protocol for Light EV(LEV)Battery Swap; 1.92 L. [ARCI/EE/F150/2022-23/G476].

22. Tarun Kanti Panda; Development of Earth-abundant Metal catalyzed Hydrosilylation of unsaturated compounds for the synthesis of functional materials; 45.71 L. [SERB/CE/F038/2022-23/G513].

23. Tarun Kanti Panda; Production of Polycarbonates as an alternative to engineering plastic employing bio-based monome; 20 L. [JICA-Friendship 2.0].

24. Venkat Rao Kotagiri; Harnessing pure spin current by tailoring molecular spinterface; 30.03 L. [BRNS/2022-23/G472].

25. Venkat Rao Kotagiri; Investigation of dispersion-driven cooperative supramolecular polymerization in organicsemiconductors using high performance computing and experiments; 12.65 L. [SERB/CHY/F203/2022-23/G518].

Awards & Recognitions:

1 Deepa M has been inducted as a Member of the Expert Committee on Clean Energy for Greener Future for Science 20 in India 2023: S-20 for G-20 Secretariat.

2. Deepa M is continuing as Member of Selection Committee for DST Inspire Faculty (Materials Science)

3. Deepa M has been inducted as a Board Member for School of Chemistry, University of Hyderabad.

4. Deepa M has been Ranked 124 among Indian Scientists in Materials Science by Research.com in 2022.

5. Narendra Kurra received Rising Star of Science Award 2022 by Research.com.

6. Priyadarshi Chakraborty received the Ramanujan Fellowship.

7. Sivakumar V has received the SERB International Research Experience (SIRE) Fellowship to conduct research at Kyushu University with Prof C Adachi.

8. Sudarsanam Putla has been elected as an Early Career Board Member of Molecular Catalysis Journal (Elsevier, IF: 5.062).

9. Sudarsanam Putla has been elected as a Guest editor for a special issue (Title: Analysis of solid-liquid interfaces in heterogeneous catalysis) in the Catalysis Communications journal (Elsevier, IF: 3.51).

10. Sudarsanam Putla edited a book (Title: Heterogeneous Nanocatalysis for Energy and Environmental Sustainability) in Wiley.

11. Sudarsanam Putla has been elected as the Scientific Advisor Committee, Environment, and Sustainability Event, November, 2022, Indian National Science Academy, Delhi.

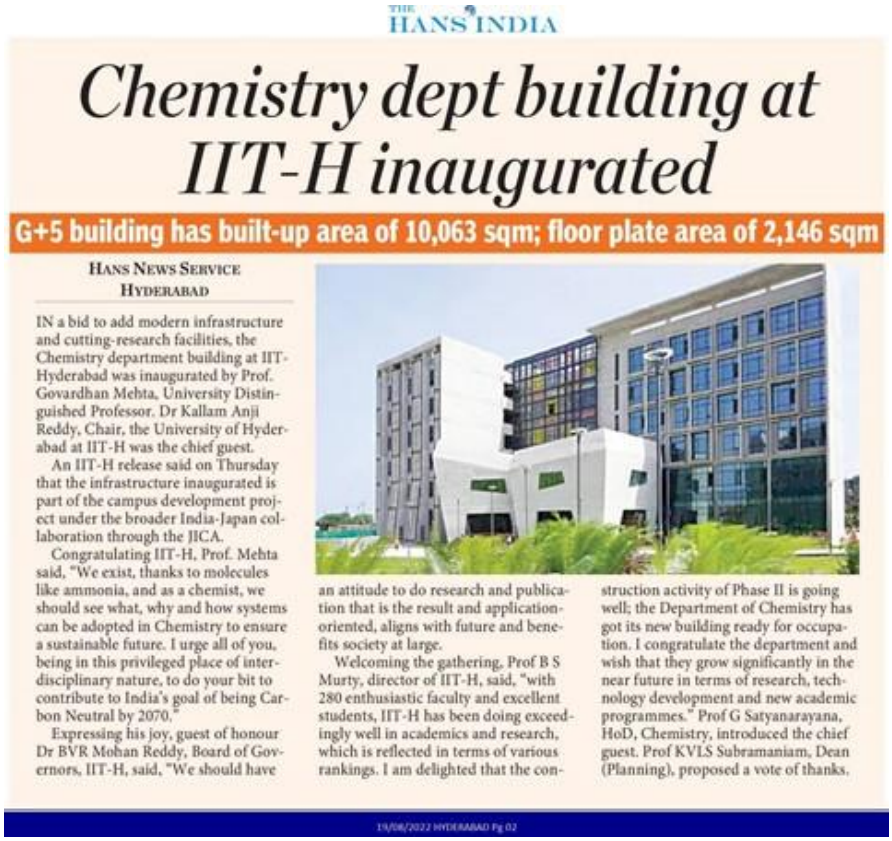
12. Tarun Kanti Panda received the Research Excellence Award 2022 from IIT Hyderabad.

Highlights:

Inauguration of Department of Chemistry Facility:

A perfect illustration of Modernistic Infrastructure and Cutting - Research Facilities, the Chemistry Department Building inaugurated by Distinguished Professor Goverdhan Mehta at IIT Hyderabad. The building is a (G+5) structure with a built-up area of 10,063 sqm & a floor plate area of 2,146 sqm. Another day to be framed in the historical journey of IIT Hyderabad (IITH) when a perfect illustration of Modernistic Infrastructure and Cutting-Research Facilities, the Chemistry Department Building inaugurated by Professor Goverdhan Mehta, University Distinguished Professor & Dr Kallam Anji Reddy Chair, University of Hyderabad at IIT Hyderabad Chief Guest; in the august presence of beloved BoG Chairman Dr BVR Mohan Reddy as Guest of Honor; hosted by Prof BS Murty Director, Deans, HoDs, Faculty, Staff & Students of IIT Hyderabad. The infrastructure inaugurated today is a part of the campus development project under the broader India-Japan collaboration through the JICA. Prof G Satyanarayana, HoD - Chemistry, introduced the Chief Guest, and the event concluded with a Vote-of- thanks, by Prof KVLS Subramaniam, Dean (Planning).

Read more: https://pr.iith.ac.in/pressrelease/CDB.pdf



THE HANS INDIA

Chemistry dept building at IIT-H inaugurated

G+5 building has built-up area of 10,063 sqm; floor plate area of 2,146 sqm

HANS NEWS SERVICE
HYDERABAD

IN a bid to add modern infrastructure and cutting-research facilities, the Chemistry department building at IIT-Hyderabad was inaugurated by Prof. Govardhan Mehta, University Distinguished Professor. Dr Kallam Anji Reddy, Chair, the University of Hyderabad at IIT-H was the chief guest.

An IIT-H release said on Thursday that the infrastructure inaugurated is part of the campus development project under the broader India-Japan collaboration through the JICA.

Congratulating IIT-H, Prof. Mehta said, "We exist, thanks to molecules like ammonia, and as a chemist, we should see what, why and how systems can be adopted in Chemistry to ensure a sustainable future. I urge all of you, being in this privileged place of interdisciplinary nature, to do your bit to contribute to India's goal of being Carbon Neutral by 2070."

Expressing his joy, guest of honour Dr BVR Mohan Reddy, Board of Governors, IIT-H, said, "We should have an attitude to do research and publication that is the result and application-oriented, aligns with future and benefits society at large.

Welcoming the gathering, Prof B S Murty, director of IIT-H, said, "with 280 enthusiastic faculty and excellent students, IIT-H has been doing exceedingly well in academics and research, which is reflected in terms of various rankings. I am delighted that the construction activity of Phase II is going well; the Department of Chemistry has got its new building ready for occupation. I congratulate the department and wish that they grow significantly in the near future in terms of research, technology development and new academic programmes." Prof G Satyanarayana, HoD, Chemistry, introduced the chief guest. Prof KVLS Subramaniam, Dean (Planning), proposed a vote of thanks.

19/08/2022 HYDERABAD Pg 02

Department of Chemistry Facility

Department of Civil Engineering

Welcome to the Department of Civil Engineering at IIT Hyderabad, one of the largest departments with 370 enrolled students and 27 active faculty members, including three adjuncts and three distinguished faculties. We also have a dedicated team of 7 Technical Superintendents (TS) and 3 Junior Technicians (JTs), along with one Executive Assistant.
Our department boasts five specializations, each represented by faculties engaged in diverse areas of research. As of July 15th, the department has an impressive record of more than 1000 publications, with a departmental h-index of 59. We are actively involved in numerous projects, including 13 Grant-in and Sponsored projects valued at 17 Crores and 260 Consultancy projects worth 11.8 Crores during the last financial year.

In the previous academic year, we organized several outreach activities, including the Interpore Kimberly-Clark Lecture Series Talk by Prof Jacques M Huyghe. Our faculty members also conducted various workshops, such as the India-Japan workshop on "Seismic Vulnerability" by Prof Amirtham Rajagopal, the national level short course on "Understanding Structural Steel Design - A Stability Perspective" by Prof Mahendrakumar Madhavan, and the 14th International Precipitation Conference (IPC14): India virtual workshop organized by Dr Shruti Upadhyaya.

Our esteemed faculties are actively involved in editorial boards and are fellows in reputed organizations. For instance, Dr R Maheswaran has become an editorial board member in Earth Science Informatics Journal, Prof Amirtham Rajagopal serves as an Advisory Editorial Board Member in the International Journal of Impact Engineering, and Prof Mahendra K Madhavan has been elected as a Fellow of the Institution of Civil Engineers (ICE), London, UK, and the American Society of Civil Engineers (ASCE).

We take immense pride in our academic community and continuously strive to create an environment that fosters excellence in research, innovation, and education.

For more information, please visit: https://civil.iith.ac.in/

Civil Engineering Departments Building/ Academic Block - B

Faculty

Head of the Department

Suriya S Prakash
PhD - Missori University of Science & Technology – Rolla, USA
Professor
Profile page:
https://iith.ac.in/ce/suriyap/

Professor

Amirtham Rajagopal
PhD - IIT Madras
Profile page:
https://iith.ac.in/ce/rajagopal/

Mahendrakumar M
PhD - University of Alabama – Birmingham, USA
Profile page:
https://iith.ac.in/ce/mkm/

Shashidhar T
PhD - IIT Madras
Profile page:
https://iith.ac.in/ce/shashidhar/

Sireesh S
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ce/sireesh/

Subramaniam Kolluru V L
PhD - Northwestern University, USA
Profile page:
https://iith.ac.in/ce/kvls/

Umashankar B
PhD - Purdue University, USA
Professor
Profile page:
https://iith.ac.in/ce/buma/

Associate Professor

Anil Agarwal
PhD - Purdue University, USA
Profile page:
https://iith.ac.in/ce/anil/

Asif Qureshi
PhD - Swiss Federal Institute of Technology, Switzerland
Profile page:
https://iith.ac.in/ce/asif/

Debraj Bhattacharyya
PhD - University of New Brunswick, Canada
Profile page:

https://iith.ac.in/ce/debrajb/

Digvijay S Pawar
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ce/dspawar/

Munwar B Basha
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ce/basha/

Phanindra K B V N
PhD - New Mexico State University, USA
Profile page:
https://iith.ac.in/ce/phanindra/

Surendra Nadh Somala
PhD - California Institute of Technology, USA
Profile page:
https://iith.ac.in/ce/surendra/

Satish Kumar Regonda
PhD - University of Colorado at Boulder,USA
Profile page:
https://iith.ac.in/ce/satishr/

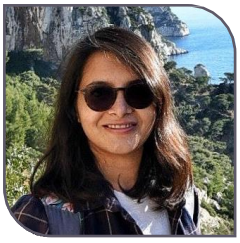
Assistant Professor

Ambika S
PhD - IIT Madras
Profile page:
https://iith.ac.in/ce/ambika/

Biswarup Bhattacharyya
PhD - Université Claude Bernard Lyon 1, France
Profile page:
https://iith.ac.in/ce/biswarup/

Maheswaran R
PhD - IIT Delhi
Profile page:
https://iith.ac.in/ce/rmaheswaran/

Meenakshi
PhD - IIT Delhi
Profile page:
https://iith.ac.in/ce/meenakshi/



Pritha Chatterjee
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/ce/pritha/

Ramya Sri Mullapudi
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/ce/ramyamullapudi/

Roshan Khan M
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ce/roshan/

Seetha N
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ce/seetha/

Shruti Upadhyaya
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ce/shrutiau/

Shwetabh Yadav
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ce/shwetabh/

S k Zeeshan Ali
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/ce/zeeshan/

Suvin P. Venthuruthiyil
PhD - IIT Guwahati
Profile page:
https://iith.ac.in/ce/pv.suvin/

Adjunct Faculty

Majid Hassanizadeh S
Emeritus Professor at Dept of Earth Sciences, Utrecht University
Profile page:
https://www.uu.nl/en/organisation/faculty-ofgeosciences/majid-hassanizadeh

Adjunct Professor

Tarun Kant
Emeritus Professor, IIT Bombay
Profile page:
https://www.iitb.ac.in/en/employee/prof-tarun-kant

Patents:

Filed:

1. Debraj Bhattacharyya; A Novel Anaerobic-Aerobic Algal-Bacterial Photo Bio-Reactor for wastewater Treatment; 202241048455.

2. T Shashidhar; A Non-Thermal Plasma Incinerator to Remove Dilute Volatile Organic Compounds in Indoor Concentrations; 202241039380.

Published:

1. Debraj Bhattacharyya; An Improved Sequential Batch Reactor for Wastewater Treatment; 202041031706.

Granted:

1. Subramaniam Kolluru V L; Lateral reinforcement system and method for concrete structures; 3001/CHE/2015.

Book Chapters:

1. Seetha N; Horta M J, Krishna Y S R, & Seetha N. (2022). Colloid Transport in Porous Media at Multiple Length Scales. Energy, Environment, and Sustainability, Springer, Singapore. **https://doi.org/10.1007/978-981-16-8367-1_23**.

Publications

1. Ambika S, Kumar M, Pisharody L, Malhotra M, Kumar G, Sreedharan V, Singh L, Nidheesh P V, & Bhatnagar A. (2022). Modified biochar as a green adsorbent for removal of hexavalent chromium from various environmental matrices: Mechanisms, methods, and prospects. Chemical Engineering Journal, 439. **https://doi.org/10.1016/j.cej.2022.135716**.

2. Ambika S. (2022). Integrated sustainability impact assessment of trickling filter. Risk, Reliability and Sustainable Remediation in the Field of Civil and Environmental Engineering, undefined(undefined). **https://doi.org/10.1016/B978-0-323-85698-0.00003-4**.

3. Nippatlapalli N & Selvaraj A. (2022). A study on the removal of long chain perflourodecanoic acid in simulated aqueous solution using enhanced electrochemical technique: Metabolites, kinetic and isotherm model analysis. Journal of Water Process Engineering, 49(undefined). **https://doi.org/10.1016/j.jwpe.2022.103045**.

4. Manish K, Ambika S, Aydin H, P V Nidheesh. (2022). Waste to catalyst: Role of agricultural waste in water and wastewater treatment, Science of The Total Environment, 26, 2022, 159762. **https://doi.org/10.1016/j.scitotenv.2022.159762**.

5. Pranavi D & Rajagopal A. (2022). Nonlocal Diffused Approach to Model Delamination in Composites. Lecture Notes in Mechanical Engineering, undefined(undefined). **https://doi.org/10.1007/978-981-16-8724-2_13**.

6. Dhaladhuli P, Amirtham R, & Reddy J N. (2022). Interaction between interfacial damage and crack propagation in quasi-brittle materials. Mechanics of Advanced Materials and Structures, 29(22). **https://doi.org/10.1080/15376494.2021.1891356**.

7. Pranavi D, Rajagopal A, & Reddy J N. (2022). A note on the applicability of Eringen's nonlocal model to functionally graded materials. Mechanics of Advanced Materials and Structures, undefined(undefined). **https://doi.org/10.1080/15376494.2022.2150340**.

8. Basak A, Amirtham R, & Basappa U. (2022). The use of contravariant tensor invariants to model damage in anisotropic soft tissues. Mechanics of Advanced Materials and Structures, 29(27). **https://doi.org/10.1080/15376494.2021.1963019**.

9. Basak A & Amirtham R. (2022). On the choice of mathematical functions to model damage in anisotropic soft tissues. Materials Today: Proceedings, 68(undefined). **https://doi.org/10.1016/j.matpr.2022.08.315**.

10. Karthik S, Nasedkina A, Nasedkin A, & Rajagopal A. (2022). Framework and Numerical Algorithm for a Phase Field Fracture Model. East Asian Journal on Applied Mathematics, 13(1). **https://doi.org/10.4208/eajam.280921.270722**.

11. Akshaya Gomathi K, Rajagopal A, & Suriya Prakash S. (2022). Predicting the failure mechanism of RC slabs under combined blast and impact loading. Theoretical and Applied Fracture Mechanics, 119. **https://doi.org/10.1016/j.tafmec.2022.103357**.

12. Balakrishnan B, Rajagopal A, & Raja S. (2022). Vibroacoustic performance assessment of aircraft panels in low, mid, and high-frequency regimes. Mechanics of Advanced Materials and Structures, 29(20). **https://doi.org/10.1080/15376494.2021.1882015**.

13. Chinthapalli H K & Agarwal A. (2022). Fire performance of earthquake-damaged reinforced concrete columns: an experimental study. Journal of Structural Fire Engineering, 13(1). **https://doi.org/10.1108/JSFE-03-2021-0015**.

14. Natesh P S, Agarwal A, & Choe L. (2022). Behavior and design of double angle beam-column connection in fire conditions. Fire Safety Journal, 134(undefined). **https://doi.org/10.1016/j.firesaf.2022.103707**.

15. Chinthapalli H K, Sharma S, & Agarwal A. (2022). Fire Behavior and Modeling of Short RC Columns in Pure Axial Compression: Role of Volume, Configuration, and Spacing of Lateral Reinforcement. Journal of Structural Engineering (United States), 148(1). https://doi.org/10.1061/(ASCE)ST.1943-541X.0003224.

16. Bhatia M, Khan M L, & Qureshi A. (2022). Microbial remediation of mercury-contaminated soils. Microbes and Microbial Biotechnology for Green Remediation, undefined(undefined). https://doi.org/10.1016/B978-0-323-90452-0.00039-6.

17. Parmar J & Qureshi A. (2022). Accounting of the Use and Emissions of Polychlorinated Biphenyl Compounds (PCBs) in India, 1951-2100. Environmental Science and Technology, undefined(undefined). https://doi.org/10.1021/acs.est.2c09438.

18. Maheshwarkar P, Ralhan A, Sunder Raman R, Tibrewal K, Venkataraman C, Dhandapani A, Kumar R N, Mukherjee S, Chatterje A, Rabha S, Saikia B K, Bhardwaj A, Chaudhary P, Sinha B, Lokhande P, Phuleria H C, Roy S, Imran M, Habib G, Azharuddin Hashmi M, Qureshi A, Qadri A M, Gupta T, Lian Y, Pandithurai G, Prasad L, Murthy S, Deswal M, Laura J S, Chhangani A K, Najar T A, & Jehangir A. (2022). Understanding the Influence of Meteorology and Emission Sources on PM<inf>2.5</inf> Mass Concentrations Across India: First Results from the COALESCE Network. Journal of Geophysical Research: Atmospheres, 127(4). https://doi.org/10.1029/2021JD035663.

19. Shende P, & Qureshi A. (2022). Burden of diseases in fifty-three urban agglomerations of India due to particulate matter (PM2.5) exposure. Environmental Engineering Research, 27(3). https://doi.org/10.4491/eer.2021.042.

20. Qureshi A. (2022). Mercury in the Environment Around Industrially Impacted Locations in India: A Mini-Review. Bulletin of Environmental Contamination and Toxicology, 109(6). https://doi.org/10.1007/s00128-022-03548-w.

21. Ray T, Khan M L, Qureshi A, & Verma S. (2022). MODIS-Derived Fire Characteristics and Greenhouse Gas Emissions from Cropland Residue Burning in Central India. Sustainability (Switzerland), 14(24). https://doi.org/10.3390/su142416612.

22. Majumdar A & Qureshi A. (2022). Thinking about infertility from a mixed-methods perspective: the need to look at toxicity in rural India. Sexual and Reproductive Health Matters, 29(2). https://doi.org/10.1080/26410397.2021.1999565.

23. Basha B M & Raghuram A S S. (2022). First- and Second-Order Reliability Analysis of Rainfall-Induced Kotropi Slope Failure. Indian Geotechnical Journal, undefined(undefined). https://doi.org/10.1007/s40098-022-00700-5.

24. Vydehi K V, Moghal A A B, & Basha B M. (2022). Target Reliability-Based Design of Embankments Using Biopolymer-Modified Cohesive Soil. International Journal of Geomechanics, 22(8). https://doi.org/10.1061/(ASCE)GM.1943-5622.0002429.

25. Venkata Vydehi K, Moghal A A B, & Basha B M. (2022). Reliability-Based Design Optimization of Biopolymer-Amended Soil as an Alternative Landfill Liner Material. Journal of Hazardous, Toxic, and Radioactive Waste, 26(3). https://doi.org/10.1061/(ASCE)HZ.2153-5515.0000697.

26. Ashfaq M, Moghal A A B, & Basha B M. (2022). The Sustainable Utilization of Coal Gangue in Geotechnical and Geoenvironmental Applications. Journal of Hazardous, Toxic, and Radioactive Waste, 26(3). https://doi.org/10.1061/(ASCE)HZ.2153-5515.0000705.

27. Amulya G, Moghal A.A.B, Basha BM, & Almajed A. (2022). Coupled Effect of Granite Sand and Calcium Lignosulphonate on the Strength Behavior of Cohesive Soil. Buildings, 12(10). https://doi.org/10.3390/buildings12101687.

28. Karnamprabhakara B K, Umashankar B, Arulrajah A, & Evans R. (2022). Evaluation of interaction properties of uniaxial geogrids with waste foundry sand. Geosynthetics International, undefined(undefined). https://doi.org/10.1680/jgein.21.00005a.

29. Goud G N, Ramu B, Umashankar B, Sireesh S, & Madhav M R. (2022). Evaluation of layer coefficient ratios for geogrid-reinforced bases of flexible pavements. Road Materials and Pavement Design, 23(1). https://doi.org/10.1080/14680629.2020.1812424.

30. Chowdepalli B, Karnamprabhakara B K, & Umashankar B. (2022). Mechanical and environmental characteristics of geogrid-reinforced waste foundry sand beds. Proceedings of the Institution of Civil Engineers: Ground Improvement. https://doi.org/10.1680/jgrim.21.00022.

31. Baadiga R, Balunaini U, & Saride S. (2022). Performance of Reinforced Base Courses of Flexible Pavements overlying Soft Subgrades: Insights from Large-Scale Model Experiments. International Journal of GEOMATE, 22(89). https://doi.org/10.21660/2022.89.gxi361.

32. Saride S, Baadiga R, Balunaini U, & Madhira M R. (2022). Modulus Improvement Factor-Based Design Coefficients for Geogrid- and Geocell-Reinforced Bases.

Journal of Transportation Engineering Part B: Pavements, 148(3). https://doi.org/10.1061/JPEODX.0000380.

33. Ramu Baadiga, Umashankar Balunaini. (2022). Closure to "Influence of Geogrid Properties on Rutting and Stress Distribution in Reinforced Flexible Pavements under Repetitive Wheel Loading" Journal of Materials in Civil Engineering /Volume 35 Issue 2 - February 2023 https://doi.org/10.1061/(ASCE)MT.1943-5533.0004600.

34. Dram A, Balunaini U, Benmebarek S, & Madhav M R. (2022). Seismic Performance of Cantilever Retaining Walls with Tire Shreds as Compressible Inclusion. Geotechnical and Geological Engineering, 40(7). https://doi.org/10.1007/s10706-022-02128-3.

35. Parhi P S, Balunaini U, & Sravanam S M. (2022). Seismic site characterization of a few Indian coal ash deposits using multichannel analysis of surface waves. Soil Dynamics and Earthquake Engineering, 155(undefined). https://doi.org/10.1016/j.soildyn.2022.107192.

36. Baadiga R, Balunaini U, Saride S, & Madhav M R. (2022). Behavior of Geogrid- and Geocell-Stabilized Unpaved Pavements Overlying Different Subgrade Conditions Under Monotonic Loading. International Journal of Geosynthetics and Ground Engineering, 8(3). https://doi.org/10.1007/s40891-022-00379-x.

37. Narendra Goud G & Umashankar B. (2022). Assessment of Embodied Carbon for Geogrid-Reinforced Flexible Pavements. Transportation Infrastructure Geotechnology, 9(2). https://doi.org/10.1007/s40515-021-00169-4.

38. Rojimol J & Umashankar B. (2022). Three-Dimensional Analysis of Geogrid Reinforced Flexible Pavement Using Finite Difference Program Flac3d. International Journal of GEOMATE, 22(92) https://doi.org/10.21660/2022.92.1720.

39. Bhattacharyya B, Jacquelin E, and Brizard D. (2022). Stochastic analysis of a crash box under impact loading by an adaptive POD-PCE model. Structural and Multidisciplinary Optimization, 65: 229, pp. 1-26. https://doi.org/10.1007/s00158-022-03299-6.

40. Bhattacharyya B. (2022). Uncertainty quantification and reliability analysis by an adaptive sparse Bayesian inference based PCE model. Engineering with Computers, Vol. 38, pp. 1437-1458. https://doi.org/10.1007/s00366-021-01291-0.

41. Bhattacharyya B. (2022). Uncertainty quantification of dynamical systems by a POD-Kriging surrogate model. Journal of Computational Science, Vol. 60, 101602, pp. 1-12. https://doi.org/10.1016/j.jocs.2022.101602.

42. Oruganti R K, Pal D, Panda T K, Shee D, & Bhattacharyya D. (2022). Green synthesis of calcium oxide nanoparticles impregnated activated carbon from algal–bacterial activated sludge: its application in ciprofloxacin removal. International Journal of Environmental Science and Technology, undefined(undefined). https://doi.org/10.1007/s13762-022-04662-2.

43. Gundupalli M P, Kajiura H, Ishimizu T, & Bhattacharyya D. (2022). Alkaline hydrolysis of coconut pith: process optimization, enzymatic saccharification, and nitrobenzene oxidation of Kraft lignin. Biomass Conversion and Biorefinery, 12(7). https://doi.org/10.1007/s13399-020-00890-z.

44. Oruganti R K, Gungupalli M P, & Bhattacharyya D. (2022). Alkaline hydrolysis for yield of glucose and kraft lignin from de-oiled Jatropha curcas waste: multiresponse optimization using response surface methodology. Biomass Conversion and Biorefinery, undefined(undefined). https://doi.org/10.1007/s13399-022-03204-7.

45. Shanmugam K, Gadhamshetty V, Tysklind M, Bhattacharyya D, & Upadhyayula V K K. (2022). A sustainable performance assessment framework for circular management of municipal wastewater treatment plants. Journal of Cleaner Production, 339(undefined). https://doi.org/10.1016/j.jclepro.2022.130657.

46. Bhattacharyya D & Sriariyanun M. (2022). Poly- And Per-fluoroalkyl Substances (PFAS) in Water Environment. Applied Science and Engineering Progress, 15(3). https://doi.org/10.14416/j.asep.2021.08.001.

47. Gundupalli M P, Bano K, Panda T K, Sriariyanun M, & Bhattacharyya D. (2022). Understanding the effect of low-concentrated protic ionic liquids (PILs) on coconut (Cocos nucifera) residues. Biomass Conversion and Biorefinery, undefined(undefined). https://doi.org/10.1007/s13399-022-02572-4.

48. Tantayotai P, Gundupalli M P, Panakkal E J, Sriariyanun M, Rattanaporn K, & Bhattacharyya D. (2022). Differential Influence of Imidazolium Ionic Liquid on Cellulase Kinetics in Saccharification of Cellulose and Lignocellulosic Biomass Substrate. Applied Science and Engineering Progress, 15(3) https://doi.org/10.14416/j.asep.2021.11.003.

49. Oruganti R K, Katam K, Show P L, Gadhamshetty V, Upadhyayula V K K, & Bhattacharyya D. (2022). A comprehensive review on the use of algal-bacterial systems for wastewater treatment with emphasis on nutrient and micropollutant removal. Bioengineered, 13(4). https://doi.org/10.1080/21655979.2022.2056823.

50. Gundupalli M P, Tantayotai P, Chuetor S, Cheenkachorn K, Joshi S, Bhattacharyya D, & Sriariyanun M. (2022). Improvement of Water Hyacinth Bioconversion by Different Organic and Mineral Acid Pretreatment and the Effect of Post-pretreatment Washing. Bioenergy Research, undefined(undefined). https://doi.org/10.1007/s12155-022-10528-9.

51. Malaghan V & Pawar D S. (2022). A Short-Term Naturalistic Driving Study on Predicting Comfort Thresholds for Horizontal Curves on Two-Lane Rural Highways. Journal of Transportation Engineering Part A: Systems, 148(8) https://doi.org/10.1061/JTEPBS.0000703.

52. Chandrashekar C, Chatterjee P, & Pawar D S. (2022). Estimation of CO2 and CO emissions from auto-rickshaws in Indian heterogeneous traffic. Transportation Research Part D: Transport and Environment, 104(undefined). https://doi.org/10.1016/j.trd.2022.103202.

53. Malaghan V, Pawar D S, & Dia H. (2022). Speed prediction models for heavy passenger vehicles on rural highways based on an instrumented vehicle study. Transportation Letters, 14(1). https://doi.org/10.1080/19427867.2020.1811005.

54. Akinapalli P K, Pawar D S, & Dia H. (2022). Evaluation of motorized two-wheeler rider responses towards jaywalking pedestrians through mockup control studies for urban streets. Transportation Research Part F: Traffic Psychology and Behaviour, 84(undefined). https://doi.org/10.1016/j.trf.2021.12.016.

55. Yarlagadda J & Pawar D S. (2022). Heterogeneity in the Driver Behavior: An Exploratory Study Using Real-Time Driving Data. Journal of Advanced Transportation, 2022(undefined). https://doi.org/10.1155/2022/4509071.

56. Pawar D S, Pathak D, & Patil G R. (2022). Modeling dynamic distribution of dilemma zone at signalized intersections for developing world traffic. Journal of Transportation Safety and Security, 14(5). https://doi.org/10.1080/19439962.2020.1852464.

57. Patil G R, Dhore R, Bhavathrathan B K, Pawar D S, Sahu P, & Mulani A. (2022).Consumer responses towards essential purchases during COVID-19 pan-India lockdown. Research in Transportation Business and Management, 43(undefined). https://doi.org/10.1016/j.rtbm.2021.100768.

58. Pawar D S & Yadav A K. (2022). Modelling the pedestrian dilemma zone at uncontrolled midblock sections. Journal of Safety Research, 80(undefined). https://doi.org/10.1016/j.jsr.2021.11.006.

59. Akinapalli P K, Pawar D S, & Dia H. (2022). Evasive action characteristics of motorcycle riders towards occluded-surprise and expected pedestrians: A pedestrian mock-up study. Transportation Research Part F: Traffic Psychology and Behaviour, 90(undefined). https://doi.org/10.1016/j.trf.2022.09.006.

60. Yaswanth K, Kona M, Andra S K, & Rathinasamy M. (2022). Understanding the impact of changes in land-use land-cover and rainfall patterns on soil erosion rates using the RUSLE model and GIS techniques: A study on the Nagavali River basin. Journal of Water and Climate Change, 13(7). https://doi.org/10.2166/wcc.2022.016.

61. Yeditha P K, Rathinasamy M, Neelamsetty S S, Bhattacharya B, & Agarwal A. (2022). Investigation of satellite precipitation product driven rainfall-runoff model using deep learning approaches in two different catchments of India. Journal of Hydroinformatics, 24(1). https://doi.org/10.2166/HYDRO.2021.067.

62. Pinninti R, Kasi V, Sallangi L K S V P, Landa S R, Rathinasamy M, Sangamreddi C, & Dandu Radha P R. (2022). Performance of Canna Indica based microscale vertical flow constructed wetland under tropical conditions for domestic wastewater treatment. International Journal of Phytoremediation, 24(7). https://doi.org/10.1080/15226514.2021.1962800.

63. Jarajapu D C, Rathinasamy M, Agarwal A, & Bronstert A. (2022). Design flood estimation using extreme Gradient Boosting-based on Bayesian optimization. Journal of Hydrology, 613(undefined). https://doi.org/10.1016/j.jhydrol.2022.128341.

64. Setti S, Barik K K, Merz B, Agarwal A, & Rathinasamy M. (2022). Investigating the impact of calibration timescales on streamflow simulation, parameter sensitivity and model performance for Indian catchments. Hydrological Sciences Journal, 67(5). https://doi.org/10.1080/02626667.2022.2036340.

65. Venkatesh K, Maheswaran R, & Devacharan J. (2022). Framework for developing IDF curves using satellite precipitation: a case study using GPM-IMERG V6 data. Earth Science Informatics, 15(1). https://doi.org/10.1007/s12145-021-00708-0.

66. Yeditha P K, Pant T, Rathinasamy M, & Agarwal A. (2022). Multi-scale investigation on streamflow temporal variability and its connection to global climate indices for unregulated rivers in India. Journal of Water and Climate Change, 13(2). https://doi.org/10.2166/wcc.2021.189.

67. Yumnam K, Kumar Guntu R, Rathinasamy M, & Agarwal A. (2022). Quantile-based Bayesian Model Averaging approach towards merging of precipitation products. Journal of Hydrology, 604(undefined).

https://doi.org/10.1016/j.jhydrol.2021.127206.

68. Sharma M, Bhushan R, Medepalli S, & Bishnoi S. (2022). Investigating the physical and chemical contribution of ground low-quality fly ash particles to cementitious composites. Advances in Cement Research, 34(9). https://doi.org/10.1680/jadcr.21.00173.

69. Gupta M, Sharma M, & Shashank Bishnoi. (2022). Multiscale modelling of uniaxial compressive stress-strain behaviour of concrete using analytical homogenisation and damage mechanics. Mechanics of Materials, 173(undefined). https://doi.org/10.1016/j.mechmat.2022.104430.

70. Gottumukkala B, Mullapudi R S, Reddy K K, & Kusam S R. (2022). A method for the determination of mixing temperatures of different components of recycled hot mix asphalt mixtures. International Journal of Pavement Research and Technology, 16(3), 606-620. https://doi.org/10.1007/s42947-022-00151-4.

71. Gottumukkala B, Mullapudi R S, Reddy K K, & Kusam S R. (2022). A Method for the Determination of Mixing Temperatures of Different Components of Recycled Hot Mix Asphalt Mixtures. International Journal of Pavement Research and Technology, undefined(undefined). https://doi.org/10.1007/s42947-022-00151-4.

72. Sobhi S, Hesami S, Poursoltani M, Ayar P, & Mullapudi R S. (2022). Coupled Effects of Gilsonite and Sasobit on Binder Properties: Rheological and Chemical Analysis. Journal of Materials in Civil Engineering, 34(3). https://doi.org/10.1061/(ASCE)MT.1943-5533.0004110.

73. Mullapudi R S, Chowdhury P S, & Kusam S R. (2022). Evaluation of Fatigue Damage and Healing Capability of RAP Mixtures Using Time Lag: An ITSM Test Parameter. International Journal of Pavement Research and Technology, undefined(undefined). https://doi.org/10.1007/s42947-022-00188-5.

74. Saha Chowdhury P, Mullapudi R S, & Reddy M A. (2022). An Investigation on the Effect of Aging on Chemical and Mechanical Properties of Asphalt Binders. Journal of Materials in Civil Engineering, 34(10). https://doi.org/10.1061/(ASCE)MT.1943-5533.0004396.

75. Reddy N G, Vidya A, & Sri Mullapudi R. (2022). Review of the Utilization of Plastic Wastes as a Resource Material in Civil Engineering Infrastructure Applications. Journal of Hazardous, Toxic, and Radioactive Waste, 26(4). https://doi.org/10.1061/(ASCE)HZ.2153-5515.0000717.

76. Chandrashekar, Chatterjee P, and Pawar D S. (2022). Estimation of CO2 and CO Emissions from Auto-Rickshaws in Indian Heterogeneous Traffic. Transportation Research Part D: Transport and Environment.104, 103202. https://doi.org/10.1016/j.trd.2022.103202.

77. Hamalainen A, Kokko M, Chatterjee P, Kinnunen V, & Rintala J. (2022). The effects of digestate pyrolysis liquid on the thermophilic anaerobic digestion of sewage sludge — Perspective for a centralized biogas plant using thermal hydrolysis pretreatment. Waste Management, 147, 73–82. https://doi.org/10.1016/j.wasman.2022.05.013.

78. Fathima J & Chatterjee P. (2022). A techno-economic assessment of nutrient recovery from wastewater using microalgae: scenario in India collected from published literature. Water Science and Technology, 86(6), 1325 – 1341. https://doi.org/10.2166/wst.2022.260.

79. Khan M R & Dasaka S M. (2022). High-speed train vibrations in the sub-soils supporting ballasted rail corridors. Transportation Infrastructure Geotechnology, 1-24. https://doi.org/10.1007/s40515-021-00218-y.

80. Krishna Y S R, Seetha N, & Hassanizadeh S M. (2022). Experimental and numerical investigation of the effect of temporal variation in ionic strength on colloid retention and remobilization in saturated porous media. Journal of Contaminant Hydrology, 251(undefined). https://doi.org/10.1016/j.jconhyd.2022.104079.

81. Seetha N & Hassanizadeh S M. (2022). A two-way coupled model for the co-transport of two different colloids in porous media. Journal of Contaminant Hydrology, 244(undefined). https://doi.org/10.1016/j.jconhyd.2021.103922.

82. Krishna Y S R & Seetha N. (2022). Predicting the Rate Coefficients of Attachment and Detachment of Colloids in Saturated Porous Media. Frontiers in Water, 4(undefined). https://doi.org/10.3389/frwa.2022.827923.

83. Dey S, Mahato R K, & Ali S Z. (2022). Linear stability of sand waves sheared by a turbulent flow. Environmental Fluid Mechanics, 22(2-3). https://doi.org/10.1007/s10652-021-09813-6.

84. Ali S Z & Dey S. (2022). Discovery of the zeroth law of helicity spectrum in the pre-inertial range of wall turbulence. Physics of Fluids, 34(7). https://doi.org/10.1063/5.0093998.

85. Mahato R K, Dey S, & Ali S Z. (2022). Planform evolution of a sinuous channel triggered by curvature and autogenic width oscillations due to generic grain transport. Physics of Fluids, 34(4).

https://doi.org/10.1063/5.0087971.

86. Ali S Z & Dey S. (2022). Origin of the scaling laws of developing turbulent boundary layers. Physics of Fluids, 34(7). https://doi.org/10.1063/5.0096255.

87. Mahato R K, Dey S, & Ali S Z. (2022). Submarine channels formation driven by turbidity currents interacting with an erodible bed. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 478(2263). https://doi.org/10.1098/rspa.2022.0137.

88. Dwivedi A, Karthik Reddy K S K, & Somala S N. (2022). Study of the seismic orientation of structure with bi-directional response analysis in the vicinity of branched fault earthquake rupture. Structures, 37, 613-623. https://doi.org/10.1016/j.istruc.2022.01.027.

89. Chaudhari V, Karthik Reddy K S K, & Somala S N. (2022). Offshore wind turbines subjected to supershear earthquake ruptures. Advances in Structural Engineering, 25(15), 3072-3085. https://doi.org/10.1177/13694332221115466.

90. Somala S N, Parla R, & Mangalathu S. (2022). Basin effects on tall bridges in Seattle from M9 Cascadia scenarios. Engineering Structures, 260, 114252. https://doi.org/10.1016/j.engstruct.2022.114252.

91. Mandal P & Somala S N. (2022). Functionally Graded Materials Pile Structure for Seismic Noise Cancellation. International Journal of Geomechanics, 22(10). https://doi.org/10.1061/(ASCE)GM.1943-5622.0002537.

92. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R X, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert S, Arai K, Arai K, Arai Y, Araki S, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Aston S M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Bailes M, Baiotti L, Baird J, Bajpai R, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Bassiri R, Basti A, Bawaj M, Bayley J C, Baylor A C, Bazzan M, Baccsy B, Bedakihale V M, Bejger M, & Belahcene I. (2022). Narrowband Searches for Continuous and Long-duration Transient Gravitational Waves from Known Pulsars in the LIGO-Virgo Third Observing Run. Astrophysical Journal, 932(2). https://doi.org/10.3847/1538-4357/ac6ad0.

93. Abbott R, Abe H, Acernese F, Ackley K, Adhicary S, Adhikari N, Adhikari R X, Adkins V K, Adya V B, Affeldt C, Agarwal D, Agathos M, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Alfaidi R A, Allana C, Allocca A, Altin P A, Amato A, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andras-Carcasona M, Andria T, Ansoldi S, Antelis J M, Antier S, Apostolatos T, Appavuravther E Z, Appert S, Apple S K, Arai K, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Aronson S M, Asada H, Ashton G, Aso Y, Arogeti M, Assiduo M, Assis de Souza Melo S, Aston S M, Astone P, Aubin F, AultONeal K, Babak S, Badaracco F, Badger C, Bae S, Bae Y, Bagnasco S, Bai Y, Baier J G, Baird J, Bajpai R, Baka T, Ball M, Ballardin G, Ballmer S W, Baltus G, Banagiri S, Banerjee B, Bankar D, Barayoga J C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, Bawaj M, Bayley J C, Bazzan M, Bacsy B, Bedakihale V M, Beirnaert F, Bejger M, Belahcene I, Bell A S, & Benedetto V. (2022). Model-based Cross-correlation Search for Gravitational Waves from the Low-mass X-Ray Binary Scorpius X-1 in LIGO O3 Data. Astrophysical Journal Letters, 941(2). https://doi.org/10.3847/2041-8213/aca1b0.

94. Parla R & Somala S N. (2022). Seismic Ground Motion Amplification in a 3D Sedimentary Basin: Source Mechanism and Intensity Measures. Journal of Earthquake and Tsunami, 16(4). https://doi.org/10.1142/S1793431122500087.

95. Abbott R, Abe H, Acernese F, Ackley K, Adhikari N, Adhikari R X, Adkins V K, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Alfaidi R A, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andras-Carcasona M, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Apostolatos T, Appavuravther E Z, Appert S, Apple S K, Arai K, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Arogeti M, Aronson S M, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Assis De Souza Melo S, Aston S M, Astone P, Aubin F, Aultoneal K, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baird J, Bajpai R, Baka T, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Banerjee B, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, Bawaj M, Bayley J C, & Bazzan M. (2022). All-sky search for continuous gravitational waves from isolated neutron stars using Advanced LIGO and Advanced Virgo O3 data. Physical Review D, 106(10). https://doi.org/10.1103/PhysRevD.106.102008.

96. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R X, Adya V B, Affeldt C, Agarwal D,

Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert S, Arai K, Arai K, Arai Y, Araki S, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Aston S.M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baiotti L, Baird J, Bajpai R, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Bassiri R, Basti A, Bawaj M, Bayley J C, Baylor A C, Bazzan M, Bacsy B, Bedakihale V M, Bejger M, Belahcene I, & Benedetto V. (2022). All-sky, all-frequency directional search for persistent gravitational waves from Advanced LIGO's and Advanced Virgo's first three observing runs. Physical Review D, 105(12) https://doi.org/10.1103/PhysRevD.105.122001.

97. Abbott R, Abe H, Acernese F, Ackley K, Adhikari N, Adhikari R X, Adkins V K, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Alfaidi R A, Allocca A, Altin P A, Amato A. Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andras-Carcasona M, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Apostolatos T, Appavuravther E Z, Appert S, Apple S K, Arai K, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Arogeti M, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, de Souza Melo S A, Aston S M, Astone P, Aubin F, AultONeal K, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Bailes M, Baird J, Bajpai R, Baka T, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Banerjee B, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, & Bawaj M. (2022). Searches for Gravitational Waves from Known Pulsars at Two Harmonics in the Second and Third LIGO-Virgo Observing Runs. Astrophysical Journal, 935(1). https://doi.org/10.3847/1538-4357/ac6acf.

98. Somala S N, Mangalathu S, Chanda S, Karthik Reddy K S K, & Parla R. (2022). Focal Mechanism Influence with Azimuth Using Near-Field Simulated Ground Motion: Application to a Multispan Continuous Concrete Single-Frame Box-Girder Bridge. Journal of Bridge Engineering, 27(6). https://doi.org/10.1061/(ASCE)BE.1943-5592.0001875.

99. Karthik Reddy K S K, Veggalam S, & Somala S N. (2022). Spatial variation of structural fragility due to supershear earthquakes. Structures, 44, 389-403. https://doi.org/10.1016/j.istruc.2022.08.025.

100. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R X, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Akutsu T, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert S, Arai K, Arai K, Arai Y, Araki S, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Aston S M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A.M, Bagnasco S, Bai Y, Baiotti L, Baird J, Bajpai R, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Bassiri R, Basti A, Bawaj M, Bayley JC, Baylor A C, Bazzan M, Bacsy B, Bedakihale V M, Bejger M, Belahcene I, Benedetto V, & Beniwal D. (2022). Search for continuous gravitational waves from 20 accreting millisecond x-ray pulsars in O3 LIGO data. Physical Review D, 105(2). https://doi.org/10.1103/PhysRevD.105.022002.

101. Abbott R, Abe H, Acernese F, Ackley K, Adhikari N, Adhikari R X, Adkins V K, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Alfaidi R A, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S.B, Anderson W G, Ando M, Andrade T, Andres N, Andras-Carcasona M, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Apostolatos T, Appavuravther E Z, Appert S, Apple S K, Arai K, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Arogeti M, Aronson S M, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Melo S A D S, Aston S M, Astone P, Aubin F, Aultoneal K, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baird J, Bajpai R, Baka T, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Banerjee B, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, Bawaj M, Bayley J C, & Bazzan M. (2022). Search for gravitational waves from Scorpius X-1 with a hidden Markov model in O3 LIGO data. Physical Review D, 106(6). https://doi.org/10.1103/PhysRevD.106.062002.

102. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R X, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert

S, Arai K, Arai K, Arai Y, Araki S, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Aston S M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baiotti L, Baird J, Bajpai R, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J.C, Barbieri C, Barish BC, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Bassiri R, Basti A, Bawaj M, Bayley J C, Baylor A.C, Bazzan M, Bacsy B, Bedakihale V M, Bejger M, Belahcene I, & Benedetto V. (2022). Constraints on dark photon dark matter using data from LIGO's and Virgo's third observing run. Physical Review D, 105(6). https://doi.org/10.1103/PhysRevD.105.063030.

103. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R.X, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert S, Arai K, Araya M C, Areeda J S, Arane M, Arnaud N, Aronson S M, Arun K G, Asali Y, Ashton G, Assiduo M, Aston S M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Baer A M, Bagnasco S, Bai Y, Baird J, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Bassiri R, Basti A, Bawaj M, Bayley J C, Baylor A.C, Bazzan M, Bacsy B, Bedakihale V M, Bejger M, Belahcene I, Benedetto V, Beniwal D, Bennett T F, Bentley J D, Benyaala M, Bergamin F, Berger B K, Bernuzzi S, Bersanetti D, Bertolini A, Betzwieser J, Beveridge D, & Bhandare R. (2022). Search of the early O3 LIGO data for continuous gravitational waves from the Cassiopeia A and Vela Jr supernova remnants. Physical Review D, 105(8). https://doi.org/10.1103/PhysRevD.105.082005.

104. Abbott R, Abe H, Acernese F, Ackley K, Adhikari N, Adhikari R X, Adkins V K, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Alfaidi R A, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andras-Carcasona M, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Apostolatos T, Appavuravther E Z, Appert S, Apple S K, Arai K, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Arogeti M, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, De Souza Melo S A, Aston S M, Astone P, Aubin F, Aultoneal K, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baird J, Bajpai R, Baka T, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Banerjee B, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, Bawaj M, & Bayley J C (2022). Search for continuous gravitational wave emission from the Milky Way center in O3 LIGO-Virgo data. Physical Review D, 106(4). https://doi.org/10.1103/PhysRevD.106.042003.

105. Parla R, Shanmugasundaram B, & Somala S N. (2022). Basin Effects on the Seismic Fragility of Steel Moment Resisting Frames Structures: Impedance Ratio, Depth, and Width of Basin. International Journal of Structural Stability and Dynamics, 22(9). https://doi.org/10.1142/S0219455422501085.

106. Chaudhari V & Somala S N. (2022). Fragility of offshore wind turbines variation with pulse-period and amplitude: Directivity and Fling step. Structures, 41, 66-76. https://doi.org/10.1016/j.istruc.2022.04.078.

107. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R X, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O.D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert S, Arai K, Arai K, Arai Y, Araki S, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Aston S M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baiotti L, Baird J, Bajpai R, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, Bawaj M, & Bayley J C (2022). Search for intermediate-mass black hole binaries in the third observing run of Advanced LIGO and Advanced Virgo. Astronomy and Astrophysics, 659(undefined). https://doi.org/10.1051/0004-6361/202141452.

108. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R X, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert S, Arai K, Arai K, Arai Y, Araki S, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Aston S M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baiotti L, Baird J, Bajpai R, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J C, Barbieri C, Barish B

C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Bassiri R, Basti A, Bawaj M, Bayley J C, Baylor A C, Bazzan M, Bacsy B, Bedakihale V M, Bejger M, Belahcene I, & Benedetto V. (2022). Search for Gravitational Waves Associated with Gamma-Ray Bursts Detected by Fermi and Swift during the LIGO-Virgo Run O3b. Astrophysical Journal, 928(2). https://doi.org/10.3847/1538-4357/ac532b.

109. Erteleva O O, Aptikaev F F, Karthik Reddy K S K, Chanda S, & Somala S N. (2022). Monte Cristo Range earthquake May 15, 2020: calculated intensity and macroseismic field. Geologiya i Geofizika Yuga Rossii, 12(1). https://doi.org/10.46698/VNC.2022.92.93.005.

110. Abbott R, Abbott T D, Acernese F, Ackley K, Adams C, Adhikari N, Adhikari R X, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Albanesi S, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Andrade T, Andres N, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Appert S, Arai K, Araya M C, Areeda J S, Arane M, Arnaud N, Aronson S M, Arun K G, Asali Y, Ashton G, Assiduo M, Aston S M, Astone P, Aubin F, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Baer A.M, Bagnasco S, Bai Y, Baird J, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Bankar D, Barayoga J C, Barbieri C, Barish BC, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Bassiri R, Basti A, Bawaj M, Bayley J C, Baylor A C, Bazzan M, Bacsy B, Bedakihale V M, Bejger M, Belahcene I, Benedetto V, Beniwal D, Bennett T.F, Bentley J D, Benyaala M, Bergamin F, Berger B K, Bernuzzi S, Berry C P L, Bersanetti D, Bertolini A, Betzwieser J, & Beveridge D. (2022). Search for Subsolar-Mass Binaries in the First Half of Advanced LIGO's and Advanced Virgo's Third Observing Run. Physical Review Letters, 129(6). https://doi.org/10.1103/PhysRevLett.129.061104.

111. Somala S N, Karthik Reddy K S K, & Mangalathu S. (2022). Diaphragm abutment Californian bridges subjected to UCERF2 rupture scenarios: Complete damage state evolution with improvements to seismic codes. Soil Dynamics and Earthquake Engineering, 155, 107204. https://doi.org/10.1016/j.soildyn.2022.107204.

112. Abbott R, Abe H, Acernese F, Ackley K, Adhikari N, Adhikari R X, Adkins V K, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Alfaidi R A, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andras-Carcasona M, Andria T, Angelova SV, Ansoldi S, Antelis J M, Antier S, Apostolatos T, Appavuravther E Z, Appert S, Apple S K, Arai K, Araya A, Araya M C, Areeda J S, Arane M, Aritomi N, Arnaud N, Arogeti M, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, Melo S A D S, Aston S M, Astone P, Aubin F, Aultoneal K, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baird J, Bajpai R, Baka T, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Banerjee B, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, Bawaj M, & Bayley J C. (2022). All-sky search for gravitational wave emission from scalar boson clouds around spinning black holes in LIGO O3 data. Physical Review D, 105(10). https://doi.org/10.1103/PhysRevD.105.102001.

113. Abbott R, Abe H, Acernese F, Ackley K, Adhikari N, Adhikari R X, Adkins V K, Adya V B, Affeldt C, Agarwal D, Agathos M, Agatsuma K, Aggarwal N, Aguiar O D, Aiello L, Ain A, Ajith P, Akutsu T, Albanesi S, Alfaidi R A, Allocca A, Altin P A, Amato A, Anand C, Anand S, Ananyeva A, Anderson S B, Anderson W G, Ando M, Andrade T, Andres N, Andras-Carcasona M, Andria T, Angelova S V, Ansoldi S, Antelis J M, Antier S, Apostolatos T, Appavuravther E Z, Appert S, Apple S K, Arai K, Araya A, Araya M C, Areeda JS, Arane M, Aritomi N, Arnaud N, Arogeti M, Aronson S M, Arun K G, Asada H, Asali Y, Ashton G, Aso Y, Assiduo M, de Souza Melo S A, Aston S M, Astone P, Aubin F, AultONeal K, Austin C, Babak S, Badaracco F, Bader M K M, Badger C, Bae S, Bae Y, Baer A M, Bagnasco S, Bai Y, Baird J, Bajpai R, Baka T, Ball M, Ballardin G, Ballmer S W, Balsamo A, Baltus G, Banagiri S, Banerjee B, Bankar D, Barayoga J C, Barbieri C, Barish B C, Barker D, Barneo P, Barone F, Barr B, Barsotti L, Barsuglia M, Barta D, Bartlett J, Barton M A, Bartos I, Basak S, Bassiri R, Basti A, Bawaj M, & Bayley J C. (2022). First joint observation by the underground gravitational-wave detector KAGRA with GEO 600. Progress of Theoretical and Experimental Physics, 2022(6). https://doi.org/10.1093/ptep/ptac073.

114. Bharat Kumar Anna V A, Venthuruthiyil S P, & Chunchu M. (2022). Vehicle trajectory data extraction from the horizontal curves of mountainous roads. Transportation Letters, undefined(undefined). https://doi.org/10.1080/19427867.2022.2125487.

115. Venthuruthiyil S P & Chunchu M. (2022). Anticipated Collision Time (ACT): A two-dimensional surrogate safety indicator for trajectory-based proactive safety assessment. Transportation Research Part C: Emerging Technologies, 139(undefined). https://doi.org/10.1016/j.trc.2022.103655.

116. Venthuruthiyil S P & Chunchu M. (2022). Interrupted and uninterrupted lane changes: a microscopic outlook of lane-changing dynamics. Transportmetrica A: Transport Science, 18(3). https://doi.org/10.1080/23249935.2021.1965240.

117. Ranjan R & Thatikonda S. (2022). Screening and Absolute Quantification of a β-lactamase Resistance Gene NDM-1 in Lake Sediment. Pollution, 8(3). https://doi.org/10.22059/POLL.2022.327427.1140 .

118. K Bhargavi, D Ray, P Chawdhury, M Selvaraj. (2022). Room-Temperature Toluene Decomposition by Catalytic Non-Thermal Plasma Reactor. IEEE Transactions on Plasma Science, 2022. https://doi.org/10.1109/TPS.2022.3153667.

119. Koyande N, Gangopadhyay M, Thatikonda S, & Rengan A K. (2022). The role of gut microbiota in the development of colorectal cancer: a review. International Journal of Colorectal Disease, 37(7). https://doi.org/10.1007/s00384-022-04192-w.

120. C Tirupathi & T Shashidhar. (2022). Analysis of spatio-temporal variation of hydroclimatic variables of the Krishna river basin under future scenarios. International Journal of River Basin Management, 1-44, 2022. https://doi.org/10.1080/15715124.2022.2079656.

121. J L Wilkinson, A B A Boxall, D W Kolpin, K M Y Leung, R W S Lai, Thatikonda S. (2022). Pharmaceutical pollution of the world's rivers, Proceedings of the National Academy of Sciences 119 (8), e2113947119. https://doi.org/10.1073/pnas.2113947119.

122. Kandukuri Bhargavi, Debjyoti Ray, Piu Chawdhury, Sairam Malladi, Thatikonda Shashidhar, Challapalli Subrahmanyam. (2022). Oxidation of Toluene by Ozone over Surface-Modified γ-Al2O3: Effect of Ag Addition. https://doi.org/10.3390/catal12040421.

123. Pebam M, Ps R, Gangopadhyay M, Thatikonda S, & Rengan A K. (2022). Terminalia chebula Polyphenol and Near-Infrared Dye-Loaded Poly (lactic acid) Nanoparticles for Imaging and Photothermal Therapy of Cancer Cells. ACS Applied Bio Materials, 5(11). https://doi.org/10.1021/acsabm.2c00724.

Funded Research Projects:

1. Ambika S; Application and LCA of Agriculture Waste-based Biochar in Water Treatment; 8 L. [1].

2. Amirtham Rajagopal; Microstructural evolution and damage in materials using a phase field approach; 35 L. [DST/CRG].

3. Amirtham Rajagopal; Non-Local Phase field approach to modelling delamination in high strength composite rocket motar casing; 33 L. [ASL-DRDO/CE/F050/2022-23/S249].

4. Amirtham Rajagopal; Nonlocal damage models for concrete under quasistatic and dynamic laods; 18.55 L. [DST/JSPS].

5. Amirtham Rajagopal; A thermodynamically consistent model for evolution of hydride precipitate in zirconium and its alloy; 22 L. [BRNS/CE/F050/2022-23/G484].

6. Amirtham Rajagopal; Nonlocal Approach for Modeling Delamination in Composites; 40 L. [DRDO/CE/F050/2022-23/G469].

7. Anil Agarwal; Substitution of Reinforced Concrete in Bridge Deck Construction with Lightweight High-Performance Composite Material; 55 L. [NHAI/CE/F036/2022-23/G 480 I].

8. Asif Qureshi; Reimagining the Good City from Ennore Creek, Chennai; 0.29 L. [Westminster/CE/F116/2022-23/S229].

9. B Munwar Basha; Development of Design Guidelines for Narrow Backfill Width Mechanically Stabilized Earth Walls built; 49.13 L. [NHAI/CE/F118/2022-23/G480F].

10. B Umashankar; Advanced numerical models to simulate different transportation infrastructure systems with focus on geosynthetic reinforced back-to-back walls and geosynthetic reinforced integral bridge structure; 28 L. [NHAI/CE/F036/2022-23/G 480 E].

11. B Umashankar; Laboratory and field investigations on geosynthetic reinforced unpaved and paved roads overlying soft subgradesLaboratory and field investigations on geosynthetic reinforced unpaved and paved roads overlying soft subgrades; 80 L. [CEFIPRA (Indo-French)].

12. B Umashankar; Use of slag and C&D wastes as bases/subabses of pavements or as fill materials in conjunction with geosynthetics; 76 L. [NHAI/CE/F036/2022-23/G480D].

13. B Umashankar; Use of slag and C&D wastes as bases/subabses of pavements or as fill materials in conjunction with geosynthetics; 84 L. [NHAI/CE/F036/2022-23/G 480 D].

14. Biswarup Bhattacharyya; Towards data-driven Digital Twin by Bayesian; 25 L. [SG/IITH/F299/2022-23/SG-141].

15. Debraj Bhattacharyya; Understanding the Fate and Effects of Pharmaceutically Active Compounds, Per- and Polyfluoroalkyl Su; 8 L. [AC2022-10].

16. Debraj Bhattacharyya; Improving the Nutrient and Micropollutant Removal Efficiency of Johkasou under Indian Conditions; 21.1 L. [IC2023-1].

17. Digvijay S Pawar; Crash data collection & Reconstruction in India; 45 L. [Toyota/Honda/CE/F175/2022-23/S248].

18. K B V N Phanindra; Characterizing Hydrogeology of Fractured Granite Aquifers using Experimental and Numerical Studies; 53.73 L. [SERB/CE/F070/2022-23/G474].

19. Maheswaran Rathinasamy; Understanding the impact of climate change on groundwater resources in Ganges River Basin; 54 L. [INDO CANADA DST Project-Sanctioned].

20. Maheswaran Rathinasamy; AMOTHEC-Anomalous Water Transport and precipitation extreme events; 0 L. [DST (CNA-SERB)/CE/F276/2022-23/G481].

21. Meenakshi; white cement, having properties of better workability and good compressive strength for decorative purpose; 8 L. [DCPL/CE/F310/2022-23/S265].

22. Mullapudi Ramya Sri; Grant in Aid Project: Self-healing characteristics of WMA mixtures; 32.78 L. [G417].

23. Pritha Bhattacharya; Emission reduction and energy economy by electric vehicle on Indian roads-driving cycle based study; 5.7 L. [EMPRI/CE/F212/2022-23/S261].

24. Pritha Bhattacharya; Microalgae-microbial fuel cell (mMFC): an integrated process for removal of xenobiotics in sewage and simultaneous electricity generation; 2 L.

25. Roshan Khan; Innovation of a 4-Dimensional High-Speed Train Simulator Facility for Investigations on Passenger Railcar Vibrations; 25 L. [SG/IITH/F274/2022-23/SG-112].

26. S Sireesh; Design Development of Fly ash Geopolymer Stabilized Marginal Aggregate Base Courses for Flexible Pavements; 91.8 L. [NHAI/CE/F036/2022-23/G 480 B].

27. S Sireesh; Laboratory and Field Investigation on PET Geogrid-Reinforced Base/Sub base Courses; 227.55 L. [STRATA-MoT/CE/F036/2022-23/G464].

28. S Sireesh; Performance of Geosynthetic-Interlayered Asphalt Layers and Overlays; 52.6 L. [NHAI/CE/F036/2022-23/G 480 A].

29. S Sireesh; Investigation of Geocomposites as a Replacement of GSB Layer; 66.8 L. [NHAI/CE/F036/2022-23/G 480 C].

30. Surendra Nadh Somala; India Science and Research Fellowship 2021-22; 2 L. [GOI/CE/F155/2022-23/G508].

31. Suvin P V; Development of a Novel Geometric Design Consistency Evaluation Module using Proactive Safety Assessment; 30 L. [SG142].

Awards & Recognitions

1. Asif Qureshi and collaborators received the international grant awarded by the British Academy, UK.

2. B Munwar Basha has been nominated by the Indian Geotechnical Society (IGS) to represent IGS on the International Technical Committee TC-302 on "Forensic Geotechnical Engineering" of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) for the term 2022-2025.

3. Soujanya Dabbiru, working under the guidance of B Munwar Basha has received the Springer Best Paper Award for the paper presented in IGC 2022.

4. B Umashankar has been nominated to represent the Indian Geotechnical Society (IGS) on the International Technical Committee TC-202 on "Transportation Geotechnics" of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) for the term 2022-2025.

5. B Umashankar has been the UGC nominee on governing body of Government Degree College, Siddipet, Medak, Telangana (a college affiliated to Osmania Univ.).

6. Baadiga Ramu, who worked under the guidance of Sireesh Saride and Umashankar B was appointed as an assistant professor at IIT Patna.

7. B Umashankar has been nominated as Chair, Groundwork, Deep Foundations Institute for the term 2022-2023.

8. Mahendrakuma Madhavan received the HUDCO Design Awards 2021-22.

9. Mahendrakumar Madhavan Elected as a Fellow of the Institution of Civil Engineers (ICE) London and the American Society of Civil Engineers (ASCE).

10. Mr Gaurav Chobe, who worked under the guidance of Mahendrakumar Madhavan & Prof Suriya Prakash received the Estus H and Vashti L Magoon Award for Excellence in Teaching from Purdue University's College of Engineering, for the 2022.

11. Meenakshi received the Faculty of Engineering and Information Technology (FEIT) Incoming Visiting Research Fellowship-2023.

12. Sireesh S received the IGS-Shri A G Dastidar Biennial Best Paper Award 2022.

13. Sireesh S was selected as a recipient of the prestigious

Australian Awards Fellowship 2023.

14. Y Sai Rama Krishna, PhD student of Seetha N, received the Research Excellence Award, April 2023, IIT Hyderabad.

15. Shashidhar T and collaborators were honored with "The Award for International Collaboration of the Year 2022," widely recognized as the 'Oscars of higher education' in the UK.

16. Shwetabh Yadav received the Teaching Excellence Award.

17. Surendra Nadh Somala received the Faculty Research Excellence Award 2022-23.

Research Highlights

1. Lightweight High-performance composites - Dr Anil Agarwal

- A prototype bridge with 9-m spam was built and tested.
- Total 12 portable lightweight segments.
- Bolted field joints.
- The bridge can be launched from one side of a trench.
- Can support up to 3.5 times its self-weight, i.e., Maruti Gypsy or a similar vehicle.
- Tested for 20,000 cycles of service level loads.
- Inaugurated by Sri Rajnath Singh Ji (Hon. Defense Minister) on Aug 13, 2020.

2. Developing Algal-Bacterial Hybrid Systems for Wastewater Treatment - Dr Debraj Bhattachayya

High-rate Wastewater treatment systems can be developed by utilizing the symbiotic association between microalgae and heterotrophic microorganisms. Such systems are capable of removing BOD, COD, suspended solids, nutrients, and even micropollutants from wastewater. The treated effluents can be used for non-potable purposes. These hybrid systems have less carbon footprint, and treatment can be achieved at a lesser cost using less energy input. Two prototypes have been successfully developed. One of the prototypes has also been implemented at full scale.

3. Mining Induced Seismicity - Dr Surendra Nadh Somala

Mining Induced Seismicity by Surendra Nadh Somala, in Collaboration with Dr Hiroshi Ogasawara in an ICDP seismological project in South Africa.
Drilling into seismogenic zones of M2-5.5 earthquakes (DSeis)' project (2015).
International Continental Scientific Drilling Program (ICDP).
Japan, South Africa, US, Germany, France, UK, India, Switzerland, Australia, Israel.

Department of Computer Science and Engineering

The Computer Science and Engineering (CSE) department has been growing steadily since its inception in 2008 and is one of the most sought-after destinations for incoming students as well as faculty. The department faculty comprises 26 faculty members with a good representation in the areas of theoretical computer science, artificial intelligence/machine learning, and computer systems areas. The CSE department has graduated around 60 PhDs, with many of the PhD graduates taking positions in top R&D labs and academic institutes - six of our PhD graduates have taken up faculty positions at other IITs. The department faculty and students consistently publish in top-tier conferences and journals. The undergraduate program has been consistently preferred by the top-ranked JEE performers - as evidenced by the improving opening and closing ranks. Our industry engagement has also been very strong with the MTech in Data Science (MDS) program, providing an opportunity for industry professionals to stay up-to-date with the latest R&D developments in the area of data science.

The CSE department also collaborates with various other industry and R&D labs, including Samsung, Intel, Microsoft, Google, AMD, DRDO, Honeywell, KLA, IBM, Adobe, Suzuki Motors, Fujitsu AI, and Weather News Inc., to name a few. The department faculty members routinely engage with other colleges and institutions by giving invited lectures and also serving in positions of advisory capacity on the Board of Studies and Board of Governors.

For more information, please visit: https://cse.iith.ac.in/

Faculty

Head of the Department

Subrahmanyam Kalyanasundaram
PhD - Georgia Tech, USA
Associate Professor
Profile page:
https://iith.ac.in/cse/subruk/

Professor

Bheemarjuna Reddy Tamma
PhD - IIT Madras
Profile page:
https://iith.ac.in/cse/tbr/

C Krishna Mohan
PhD - IIT Madras
Profile page:
https://iith.ac.in/cse/ckm/

M V Panduranga Rao
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/cse/mvp/

Sathya Peri
PhD - University of Texas at Dallas
Profile page:
https://iith.ac.in/cse/sathya_p/

Associate Professor

Antony Franklin
PhD - IIT Madras
Profile page:
https://iith.ac.in/cse/antony.franklin/

Aravind N R
PhD - Institute of Mathematical Sciences, Chennai
Profile page:
https://iith.ac.in/cse/aravind/

J Saketha Nath
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/cse/saketha/

Kotaro Kataoka
PhD - Media and Governance, Keio University
Profile page:
https://iith.ac.in/cse/kotaro/

Manish Singh
PhD - University of Michigan, USA
Profile
https://iith.ac.in/cse/msingh/

Maunendra Sankar Desarkar
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/cse/maunendra/

Rogers Mathew
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/cse/rogers/

Sobhan Babu
PhD - IIT Bombay
Profile page:
https://iith.ac.in/cse/sobhan/

Srijith P K
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/cse/srijith/

Vineeth N Balasubramanian
PhD - Arizona State University, USA
Profile page:
https://iith.ac.in/cse/vineethnb/

Ramakrishna Upadrasta
PhD - University of Paris and INRIA, Paris
Profile page:
https://iith.ac.in/cse/ramakrishna/

Assistant Professor

Fahad Panolan
PhD - IMS Chennai
Profile page:
https://iith.ac.in/cse/fahad/

Jyothi Vedurada
PhD - IIT Madras
Profile page:
https://iith.ac.in/cse/jyothiv/

Karteek Sreenivasaiah
PhD - IMSC, Chennai
Profile page:
https://iith.ac.in/cse/karteek/

Maria Francis
PhD – IISc Bangalore
Profile page:
https://iith.ac.in/cse/mariaf/

Nitin Saurabh
PhD - IMSc Chennai
Profile page:

https://iith.ac.in/cse/nitin/

Praveen Tammana
PhD - University of Edinburgh
Profile page:
https://iith.ac.in/cse/praveent/

Rajesh Kedia
PhD - IIT Delhi
Profile page:

https://iith.ac.in/cse/rkedia/

Rakesh Venkat
PhD - TIFR
Profile page:
https://iith.ac.in/cse/rakesh/

Rameshwar Pratap
PhD - Chennai Mathematical Institute
Profile page:

https://iith.ac.in/cse/rameshwar/

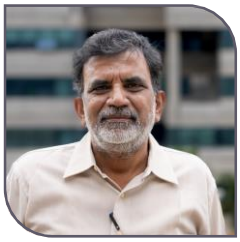
Shirshendu Das
PhD - IIT Guwahati
Profile page:
https://iith.ac.in/cse/shirshendu/

Adjunct Professor

Aditya Nori
General Manager, Healthcare
Profile page:
https://www.microsoft.com/en-us/research/people/adityan/

Kenzo FUJISUE
Member of the House of Councilors in the Diet (the national legislature of Japan)
Profile page:

Visiting Professor



C Siva Ram Murthy
Visiting Professor, IIT Hyderabad
Profile page:
https://iith.ac.in/cse/murthy/

Patents:

Filed:

1. Bheemarjuna Reddy Tamma; Method and System for Privacy-Preserving Continuous Internet Forensics; 202241035158.

Published:

1. Antony Franklin, Bheemarjuna Reddy Tamma; Method and System for Dynamic Selection of Functional Split for Cloud Radio Access Networks; 202041036210.
2. Antony Franklin, Bheemarjuna Reddy Tamma; System and Method for Performing Efficient Scheduling in Cloud Radio Access Network; 202141020062.

3. Vineeth N Balasubramanian; A Methodology for Transfer of Knowledge from Data-rich Domains for Thermal Image Processing; 202011032663.

4. Vineeth N Balasubramanian; System and Method for Instance-Specific Feature Al; India: 202241027805; USA: 18/197,075.

5. Vineeth N Balasubramanian; System and Method for Generating Derained Image us; India: 202241023945; USA: 18/138,060.

Publications:

1. Chintapalli V R, Adeppady M, Tamma B R, & Antony Franklin A. (2022). Restrain: A dynamic and cost-efficient resource management scheme for addressing performance interference in NFV-based systems. Journal of Network and Computer Applications. https://doi.org/10.1016/j.jnca.2021.103312.

2. Inukonda M S, Karpate A R, Tamma B R, Mittal S, & Tammana P. (2022). Nascent: A Non-Invasive Solution for Detecting Utilization of Servers in Bare-Metal Cloud. IEEE Access. https://doi.org/10.1109/ACCESS.2022.3145955.

3. Aveen Dayal, M Aishwarya, S Abhilash, C Krishna Mohan, Abhinav Kumar, Linga Reddy Cenkeramaddi. (2022). Adversarial Unsupervised Domain Adaptation for Hand Gesture Recognition using Thermal Images in IEEE Sensors Journal, Vol: 23, PP: 3493 - 3504, 2022. https://doi.org/10.1109/JSEN.2023.3235379.

4. Prudviraj Jeripothula, Chalavadi Vishnu, and C Krishna Mohan. (2022). M-FFN: Multi-Scale Feature Fusion Network for Image Captioning. Applied Intelligence (Springer). https://doi.org/10.1007/s10489-022-03463-x.

5. Anushka Joshi, Chalavadi Vishnu, Krishna Mohan. (2022). Early detection of earthquake magnitude based on stacked ensemble model. Journal of Asian Earth Sciences (Elsevier), pp. 100122, ISSN 2590-0560. https://doi.org/10.1016/j.jaesx.2022.100122.

6. Yenduri S, Perveen N, Chalavadi V, & C K M. (2022). Fine-grained action recognition using dynamic kernels. Pattern Recognition, 122(undefined). https://doi.org/10.1016/j.patcog.2021.108282.

7. Prudviraj Jeripothula, Chalavadi Vishnu, & C Krishna Mohan. (2022). AAP-MIT: Attentive Atrous Pyramid Network and Memory Incorporated Transformer for Multi-Sentence Video Description. IEEE Transactions on Image Processing. https://doi.org/10.1109/TIP.2022.3195643.

8. Subhrajit Nag, Dhruv Makwana, Sai Chandra Teja R, Sparsh Mittal, and C Krishna Mohan. (2022). WaferSegClassNet - A Light-weight Network for Classification and Segmentation of Semiconductor Wafer Defects. Computers in Industry journal (Elsevier), pp. 1-10. ISSN 0166-3615. https://doi.org/10.1016/j.compind.2022.103720.

9. Onkar Susladkar, Gayatri Deshmukh, Subhrajit Nag, Ananya Mantravadi, Dhruv Makwana, Sujitha Ravichandran, Sai Chandra Teja R, Gajanan H Chavhan, C Krishna Mohan, and Sparsh Mittal. (2022). ClarifyNet: A High-Pass and Low-Pass Filtering Based CNN for Single Image Dehazing. Journal of Systems Architecture (Elsevier). https://doi.org/10.1016/j.sysarc.2022.102736.

10. Perveen N, Mohan C K, & Chen Y W. (2022). Expression Modeling Using Dynamic Kernels for a Quantitative Assessment of a Facial Paralysis. Communications in Computer and Information Science, 1474 CCIS(undefined). https://doi.org/10.1007/978-3-030-94893-1_17.

11. Chalamala Srinivasa R, K Naveen Kumar, Singh Ajeet, Saibewar Aditya, and C Krishna Mohan. (2022). Federated learning to comply with data protection regulations. CSI Transactions on ICT (Springer Nature). https://doi.org/10.1007/s40012-022-00351-0.

12. Chalavadi Vishnu, Vineel Abhinav, Debaditya Roy, Sobhan Babu, and C Krishna Mohan. Improving Multi-agent Trajectory Prediction using Dynamic Traffic States on Interactive Driving Scenarios. Accepted in IEEE Robotics and Automation Letters, Early Access, pp. 1-8, Feb. 2023. https://doi.org/10.1109/LRA.2023.3258685.

13. Dhruv Makwana, Subhrajit Nag, Onkar Susladkar, Gayatri Deshmukh, Sai Chandra Teja R, Sparsh Mittal, C Krishna Mohan. (2022). ACLNet: An Attention and Clustering-based Cloud Segmentation Network. International Journal of Remote Sensing (Taylor and Francis). https://doi.org/10.1080/2150704X.2022.2097031.

14. Chalavadi V, Jeripothula P, Datla R, Ch S B, & C K M. (2022). mSODANet: A network for multi-scale object detection in aerial images using hierarchical dilated convolutions. Pattern Recognition, 126(undefined). https://doi.org/10.1016/j.patcog.2022.108548.

15. Jacob A, Panolan F, Raman V, & Sahlot V. (2022). Structural Parameterizations with Modulator Oblivion. Algorithmica, 84(8). https://doi.org/10.1007/s00453-022-00971-7.

16. Lokshtanov D, Mouawad A E, Panolan F, & Siebertz S. (2022). On the Parameterized Complexity of Reconfiguration of Connected Dominating Sets. Algorithmica, 84(2). https://doi.org/10.1007/s00453-021-00909-5.

17. Agrawal A, Kanesh L, Panolan F, Ramanujan M S, & Saurabh S. (2022). A Fixed-Parameter Tractable Algorithm for Elimination Distance to Bounded Degree Graphs. SIAM Journal on Discrete Mathematics, 36(2). https://doi.org/10.1137/21M1396824.

18. Banerjee S, Mathew R, & Panolan F. (2022). Target Set Selection Parameterized by Vertex Cover and More. Theory of Computing Systems, 66(5). https://doi.org/10.1007/s00224-022-10100-0.

19. Agrawal A, Misra P, Panolan F, & Saurabh S. (2022). Fast Exact Algorithms for Survivable Network Design with Uniform Requirements. Algorithmica, 84(9). https://doi.org/10.1007/s00453-022-00959-3.

20. Prashanth Podili, Sumanth Reddy Cherupall, Srinivas Boga, and Kotaro Kataoka. (2022). Inter-domain prefix and route validation using fast and scalable DAG based distributed ledger for secure BGP routing. Special Issue on Blockchains and Distributed Ledgers in Network and Service Management, Springer's Journal of Network and Systems Management, Vol.30, No.4, Pages.55, 2022. https://doi.org/10.1007/s10922-022-09668-2.

21. Adeeba Naaz, T V Pavan Kumar B, Maria Francis, and Kotaro Kataoka. (2022). Integrating Threshold Opening with Threshold Issuance of Anonymous Credentials over Blockchains for a Multi-certifier Communication Model. IEEE Access, Vol.10, pp.128697-128720, 2022. https://doi.org/10.1109/ACCESS.2022.3225439.

22. Pragati Shrivastava and Kotaro Kataoka. (2022). Topology Poisoning Attacks and Prevention in Hybrid Software-Defined Networks. IEEE Transactions on Network and Service Management, Vol.19, No.1, pp.510-523, 2022. https://doi.org/10.1109/TNSM.2021.3109099.

23. Yuka Kataoka, Achmad Husni Thamrin, Rodney Van Meter, Jun Murai, and Kotaro Kataoka. (2022). Investigating the effect of computer-mediated feedback via an LMS integration in a large-scale Japanese-speaking class. Education and Information Technologies, Vo.28, No.2, pp.1957-1986, 2022. https://doi.org/10.1007/s10639-022-11262-7.

24. Krishna V Palem, Duc Hung Pham, M V Panduranga Rao. (2022). Quantum learning of concentrated Boolean functions. Quantum Inf. Process. 21(7): 256. https://doi.org/10.1007/s11128-022-03607-5.

25. A Naaz, T V Pavan Kumar B, M Francis and K Kataoka. (2022). Integrating Threshold Opening with Threshold Issuance of Anonymous Credentials Over Blockchains for a Multi-Certifier Communication Model. in IEEE Access, vol. 10, pp. 128697-128720. https://10.1109/ACCESS.2022.3225439.

26. Ghosh S, Maji S, & Desarkar M.S. (2022). Unsupervised Domain Adaptation with Global and Local Graph Neural Networks Under Limited Supervision and Its Application to Disaster Response. IEEE Transactions on Computational Social Systems, vol. 10, no. 2, pp. 551-562, April 2023. https://doi.org/10.1109/TCSS.2022.3159109.

27. Madisetty S, & Desarkar M S. (2022). A reranking-based tweet retrieval approach for planned events. World Wide Web, 25(1). https://doi.org/10.1007/s11280-021-00962-8.

28. Aravind N R & Maniyar U. (2022). Planar projections of graphs. Discrete Applied Mathematics, 319(undefined). https://doi.org/10.1016/j.dam.2021.08.015.

29. Aravind N R, Kalyanasundaram S, & Kare A S. (2022). Vertex partitioning problems on graphs with bounded tree width. Discrete Applied Mathematics, 319(undefined). https://doi.org/10.1016/j.dam.2021.05.016.

30. Inukonda M S, Karpate A R, Tamma B R, Mittal S, & Tammana P. (2022). NASCENT: A Non-Invasive Solution for Detecting Utilization of Servers in Bare-Metal Cloud. IEEE Access, 10. https://doi.org/10.1109/ACCESS.2022.3145955.

31. Siddhu L, Kedia R, Pandey S, Rapp M, Pathania A, Henkel J, & Panda P R. (2022). CoMeT: An Integrated Interval Thermal Simulation Toolchain for 2D, 2.5D, and 3D Processor-Memory Systems. ACM Transactions on Architecture and Code Optimization, 19(3). https://doi.org/10.1145/3532185.

32. Ravipati D P, Kedia R, Van Santen V M, Henkel J, Panda P R, & Amrouch H. (2022). FN-CACTI: Advanced CACTI for FinFET and NC-FinFET Technologies. IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 30(3). https://doi.org/10.1109/TVLSI.2021.3123112 .

33. Grandoni F, Ostrovsky R, Rabani Y, Schulman L J, & Venkat R. (2022). A refined approximation for Euclidean k-means. Information Processing Letters, 176(undefined). https://doi.org/10.1016/j.ipl.2022.106251.

34. Shah N R, Misra A, Mine A, Venkat R, & Upadrasta R. (2022). BullsEye: Scalable and Accurate Approximation Framework for Cache Miss Calculation. ACM Transactions on Architecture and Code Optimization, 20(1). https://doi.org/10.1145/3558003.

35. Verma B D, Pratap R, & Thakur M. (2022). Variance reduction in feature hashing using MLE and control variate method. Machine Learning, 111(7). https://doi.org/10.1007/s10994-022-06166-z.

36. Verma B D, Pratap R, & Bera D. (2022). Efficient binary embedding of categorical data using BinSketch. Data Mining and Knowledge Discovery, 36(2). https://doi.org/10.1007/s10618-021-00815-y.

37. Mathew R, Mishra T K, Ray R, & Srivastava S. (2022). Modular and fractional L-intersecting families of vector spaces. Electronic Journal of Combinatorics, 29(1). https://doi.org/10.37236/10358.

38. Bhyravarapu S, Kalyanasundaram S, & Mathew R. (2022). Conflict-Free Coloring Bounds on Open Neighborhoods. Algorithmica, 84(8). https://doi.org/10.1007/s00453-022-00956-6.

39. Majumder A & Mathew R. (2022). Local boxicity and maximum degree. Discrete Mathematics, 345(12). https://doi.org/10.1016/j.disc.2022.113085.

40. Banerjee S, Mathew R, & Panolan F. (2022). Target Set Selection Parameterized by Vertex Cover and More. Theory of Computing Systems, 66(5). https://doi.org/10.1007/s00224-022-10100-0.

41. Bisht B, & Das S. (2022). BHT-NoC: Blaming Hardware Trojans in NoC Routers. IEEE Design and Test, 39(6). https://doi.org/10.1109/MDAT.2022.3202998.

42. Agarwalla B, Das S, & Sahu N. (2022). Process variation aware DRAM-Cache resizing. Journal of Systems Architecture, 123(undefined). https://doi.org/10.1016/j.sysarc.2021.102364.

43. Kumar S, Sinha P, & Das S. (2022). WinDRAM: Weak rows as in-DRAM cache. Concurrency and Computation: Practice and Experience, 34(28). https://doi.org/10.1002/cpe.7350.

44. Bhavanam S R, Channappayya S S, Srijith P K, & Desai S. (2022). Cosmic Ray rejection with attention augmented deep learning. Astronomy and Computing, 40(undefined). https://doi.org/10.1016/j.ascom.2022.100625.

45. Gunapati G, Jain A, Srijith P K, & Desai S. (2022). Variational inference as an alternative to MCMC for parameter estimation and model selection. Publications of the Astronomical Society of Australia, 39(undefined). https://doi.org/10.1017/pasa.2021.64.

46. Gupta R, Srijith P K, & Desai S. (2022). Galaxy morphology classification using neural ordinary differential equations. Astronomy and Computing, 38(undefined). https://doi.org/10.1016/j.ascom.2021.100543.

47. Bhave A, Kulkarni S, Desai S, & Srijith P K. (2022). Two dimensional clustering of Gamma-Ray Bursts using durations and hardness. Astrophysics and Space Science, 367(4). https://doi.org/10.1007/s10509-022-04068-z.

48. Bhyravarapu S, Kalyanasundaram S, & Mathew R. (2022). Conflict-Free Coloring Bounds on Open Neighborhoods. Algorithmica, 84(8). https://doi.org/10.1007/s00453-022-00956-6.

49. Aravind N R, Kalyanasundaram S, & Kare A S. (2022). Vertex partitioning problems on graphs with bounded tree width. Discrete Applied Mathematics, 319(undefined). https://doi.org/10.1016/j.dam.2021.05.016.

50. Bhyravarapu S & Kalyanasundaram S. (2022). A tight bound for conflict-free coloring in terms of distance to cluster. Discrete Mathematics, 345(11). https://doi.org/10.1016/j.disc.2022.113058.

Funded Research Projects:

1. C Krishna Mohan; Design and development of a framework to evaluate the engagement level of the participants using limited supervision with computer vision, AI; 24.26 L. [I'm Beside you/CSE/F016/2022-23/S220].

2. C Krishna Mohan; Earthquake Early Warning System (EEWS) Using Deep Learning Approaches; 35 L. [MOES/CSE/F016/2022-23/G493].

3. C Krishna Mohan; Earthquake Early Warning System (EEWS) Using Deep Learning Approaches; 35 L. [MOES/CSE/F016/2022-23/G493].

4. C Krishna Mohan; Smart Cities for Emerging Countries Based on Sensing, Network, and Big Data Analysis of Multimodal Regional Transport System (M2Smart) Funded by JICA / JST SATREPS; 3000 L. [JICA/CSE/F016/2022-23/S220].

5. C Krishna Mohan; Computer-Aided Diagnosis of Liver Cancer using Weakly-Supervised Deep Learning incorporated with Computational Anatomic Models, Funded by JSPS (KAKEN), Japan; 100.04 L. [JSPS/CSE/F016/2022-23/S220].

6. C Krishna Mohan; Design and development of machine learning algorithms for traffic analytics, Funded by DST-SERB Core Research Grant; 36.05 L. [DST-SERB/CSE/F016/2022-23/S220].

7. C Krishna Mohan; Design and development of machine learning algorithms for road hazard detection, Funded by Hyundai Mobis, India; 21.24 L. [Hyundai Mobis/CSE/F016/2022-23/S220].

8. C Krishna Mohan; Computer vision, optics and the Algorithms involved in the Hangar Design; 17.7 L. [INNOMINDS/CSE/F016/2022-23/S220].

9. C Krishna Mohan; LiDAR and camera sensors data based deep learning algorithm for autonomous driving system; 23 L. [SERB/CSE/F016/2022-23/S220].

10. Kotaro Kataoka; ColdChain; 16.1 L. [Denso/CSE/F005/2020-21/S128].

11. Kotaro Kataoka; Fundamental Researches on the Interoperability of Blockchain Platform; 18.87 L. [Denso/CSE/F005/2021-22/S182].

12. M V Panduranga Rao; Assistive Software for auditing the security of quantum communication equipment; 14.73 L. [QSIPL/CSE//F010/2022-23/S260].

39. Majumder A & Mathew R. (2022). Local boxicity and maximum degree. Discrete Mathematics, 345(12). https://doi.org/10.1016/j.disc.2022.113085.

40. Banerjee S, Mathew R, & Panolan F. (2022). Target Set Selection Parameterized by Vertex Cover and More. Theory of Computing Systems, 66(5). https://doi.org/10.1007/s00224-022-10100-0.

41. Bisht B, & Das S. (2022). BHT-NoC: Blaming Hardware Trojans in NoC Routers. IEEE Design and Test, 39(6). https://doi.org/10.1109/MDAT.2022.3202998.

42. Agarwalla B, Das S, & Sahu N. (2022). Process variation aware DRAM-Cache resizing. Journal of Systems Architecture, 123(undefined). https://doi.org/10.1016/j.sysarc.2021.102364.

43. Kumar S, Sinha P, & Das S. (2022). WinDRAM: Weak rows as in-DRAM cache. Concurrency and Computation: Practice and Experience, 34(28). https://doi.org/10.1002/cpe.7350.

44. Bhavanam S R, Channappayya S S, Srijith P K, & Desai S. (2022). Cosmic Ray rejection with attention augmented deep learning. Astronomy and Computing, 40(undefined). https://doi.org/10.1016/j.ascom.2022.100625.

45. Gunapati G, Jain A, Srijith P K, & Desai S. (2022). Variational inference as an alternative to MCMC for parameter estimation and model selection. Publications of the Astronomical Society of Australia, 39(undefined). https://doi.org/10.1017/pasa.2021.64.

46. Gupta R, Srijith P K, & Desai S. (2022). Galaxy morphology classification using neural ordinary differential equations. Astronomy and Computing, 38(undefined). https://doi.org/10.1016/j.ascom.2021.100543.

47. Bhave A, Kulkarni S, Desai S, & Srijith P K. (2022). Two dimensional clustering of Gamma-Ray Bursts using durations and hardness. Astrophysics and Space Science, 367(4). https://doi.org/10.1007/s10509-022-04068-z.

48. Bhyravarapu S, Kalyanasundaram S, & Mathew R. (2022). Conflict-Free Coloring Bounds on Open Neighborhoods. Algorithmica, 84(8). https://doi.org/10.1007/s00453-022-00956-6.

49. Aravind N R, Kalyanasundaram S, & Kare A S. (2022). Vertex partitioning problems on graphs with bounded tree width. Discrete Applied Mathematics, 319(undefined). https://doi.org/10.1016/j.dam.2021.05.016.

50. Bhyravarapu S & Kalyanasundaram S. (2022). A tight bound for conflict-free coloring in terms of distance to cluster. Discrete Mathematics, 345(11). https://doi.org/10.1016/j.disc.2022.113058.

51. Balasubramanian V N (2022),Toward explainable deep learning. Communications of the ACM, 65(11) https://doi.org/10.1145/3550491.

52. Joseph KJ, Rajasegaran J, Khan S, Khan FS, & Balasubramanian VN (2022), Incremental Object Detection via Meta-Learning. IEEE Transactions on Pattern Analysis and Machine Intelligence, 44(12) https://doi.org/10.1109/TPAMI.2021.3124133.

53. Shwetha Vittal, A Antony Franklin: HARNESS: High Availability Supportive Self Reliant Network Slicing in 5G Networks. IEEE Trans. Netw. Serv. Manag. 19(3): 1951-1964 (2022).

54. Shashwat Kumar, Lalit Bhagat, A Antony Franklin, Jiong Jin: Multi-neural network based tiled 360°video caching with Mobile Edge Computing, J Netw. Comput. Appl. 201: 103342 (2022).

55. Venkatarami Reddy Chintapalli, Madhura Adeppady, Bheemarjuna Reddy Tamma, A. Antony Franklin: RESTRAIN: A dynamic and cost-efficient resource management scheme for addressing performance interference in NFV-based systems, J. Netw. Comput. Appl. 201: 103312 (2022).

Funded Research Projects:

1. C Krishna Mohan; Design and development of a framework to evaluate the engagement level of the participants using limited supervision with computer vision, AI; 24.26 L. [I'm Beside you/CSE/F016/2022-23/S220].

2. C Krishna Mohan; Earthquake Early Warning System (EEWS) Using Deep Learning Approaches; 35 L. [MOES/CSE/F016/2022-23/G493].

3. C Krishna Mohan; Earthquake Early Warning System (EEWS) Using Deep Learning Approaches; 35 L. [MOES/CSE/F016/2022-23/G493].

4. C Krishna Mohan; Smart Cities for Emerging Countries Based on Sensing, Network, and Big Data Analysis of Multimodal Regional Transport System (M2Smart) Funded by JICA / JST SATREPS; 3000 L. [JICA/CSE/F016/2022-23/S220].

5. C Krishna Mohan; Computer-Aided Diagnosis of Liver Cancer using Weakly-Supervised Deep Learning incorporated with Computational Anatomic Models, Funded by JSPS (KAKEN), Japan; 100.04 L. [JSPS/CSE/F016/2022-23/S220].

6. C Krishna Mohan; Design and development of machine learning algorithms for traffic analytics, Funded by DST-SERB Core Research Grant; 36.05 L. [DST-SERB/CSE/F016/2022-23/S220].

7. C Krishna Mohan; Design and development of machine learning algorithms for road hazard detection, Funded by Hyundai Mobis, India; 21.24 L. [Hyundai Mobis/CSE/F016/2022-23/S220].

8. C Krishna Mohan; Computer vision, optics and the Algorithms involved in the Hangar Design.; 17.7 L. [INNOMINDS/CSE/F016/2022-23/S220].

9. C Krishna Mohan; LiDAR and camera sensors data based deep learning algorithm for an autonomous driving system; 23 L. [SERB/CSE/F016/2022-23/S220].

10. Kotaro Kataoka; ColdChain; 16.1 L. [Denso/CSE/F005/2020-21/S128].

11. Kotaro Kataoka; Fundamental Researches on the Interoperability of Blockchain Platform; 18.87 L. [Denso/CSE/F005/2021-22/S182].

12. M V Panduranga Rao; Assistive Software for auditing the security of quantum communication equipment; 14.73 L. [QSIPL/CSE//F010/2022-23/S260].

13. Maunendra Sankar Desarkar; Non-Toxic Multi-lingual Personalized Auto-suggest Generation; 17.7 L. [Microsoft/CSE/F158/2022-23/S236].

14. Maunendra Sankar Desarkar; HateSpread: Analyzing the Spread of Hatred in Online Social Discussions; 6.6 L. [SERB/CSE/F158/2021-22/G442].

15. Maunendra Sankar Desarkar; Generating Individual Row Description from Tables; 10 L. [TREDENCE/CSE/F158/2022-23/S225].

16. N R Aravind; Geometric Obnoxious Facility Location Optimization; 10.05 L. [SERB/CSE/F104/2022-23/G509].

17. Praveen Aravind Babu Tammana; Debugging Performance Issues in Microservices Applications (Academic award with no instructions) (USD 3000); 2.37 L. [IBM/CSE/F242/2022-23/S237].

18. Rajesh Kedia; Efficient Management of Shared Resources for Edge Systems Executing Concurrent DNNs; 20.27 L. [SERB/CSE/F278/2022-23/G499].

19. Rameshwar Pratap Yadav; A new metric to compare matrices and sublinear search; 30 L. [SG/IITH/F308/2022-23/SG-144].

20. Sathya Peri; An Efficient Non-Blocking Framework for Large-Scale GraphAnalytics; 28.09 L. [SERB/CSE/F137/2022-23/G542].

21. Sathya Peri; An Efficient Framework for Simulating Blood Flow in a Stenosed Channel (PR No: PR41173); 0 L. [DBT/CHE/F045/2022-23/G486].

22. Sathya Peri; Efficient Smart Contract Framework for Tezos Blockchain Ecosystem; 89.43 L. [CEFIPRA/IFCPAR/CSE/F137/2022-23/G539].

23. Sathya Peri; Parallelization of Smart Contract Execution in Tezos Blockchain (USD 9,225); 0.09 L. [TEZOS/CSE/F137/2022-23/S198].

24. Shirshendu Das; Efficient utilization and Refresh over head Minimization of eDRAM based Last Level Cache; 9.76 L. [SERB/CSE/F330/2022-23/G541].

25 Srijith P K; Continual learning for vision and language; 53.19 L. [SRIPL/CSE/F184/2022-23/S246].

26. Srijith P K; Bayesian Causal learning; 20 L. [JICA].

27. Srijith P K; Deep learning for Telemetry data; 5.17 L. [INTEL/CSE/F184/2022-23/S250].

28. Subrahmanyam Kalyanasundaram; Conflict-Free Coloring of Graphs and Related Problems; 22.81 L. [SERB/CSE/F081/2022-23/G524].

29. Vineeth N Balasubramanian; Learning in the Presence of Strategic Agents; 550; [SERB-CRG/AI/F293/2022-23/G532].

30. Vineeth N Balasubramanian; Deep Learning R&D; 7.2655; [SONY/CSE/F121/2022-23/C1042].

31. Vineeth N Balasubramanian; Research on the viability of deep learning-based techniques on BBP images and Data; 207.26; [KLA/CSE/F121/2020-21/S143].

32. Vineeth N Balasubramanian; Development of Real-time Video Perception capabilities Capabilities for an Autonomous Robot; 26720; [RCI DRDO/EE/F100/2022-23/S231].

33. Vineeth N Balasubramanian; Algorithmic Recourse for Actionable Explanations in AI Models; 17.7267; [Microsoft/CSE/F121/2022-23/S241].

34. Antony Franklin; Minimization of HD Maps data transmission through edge caching and spatial aware update transmission; 2417.7; [NMICPS TiHAN/CSE/F157/2022-23/S235].

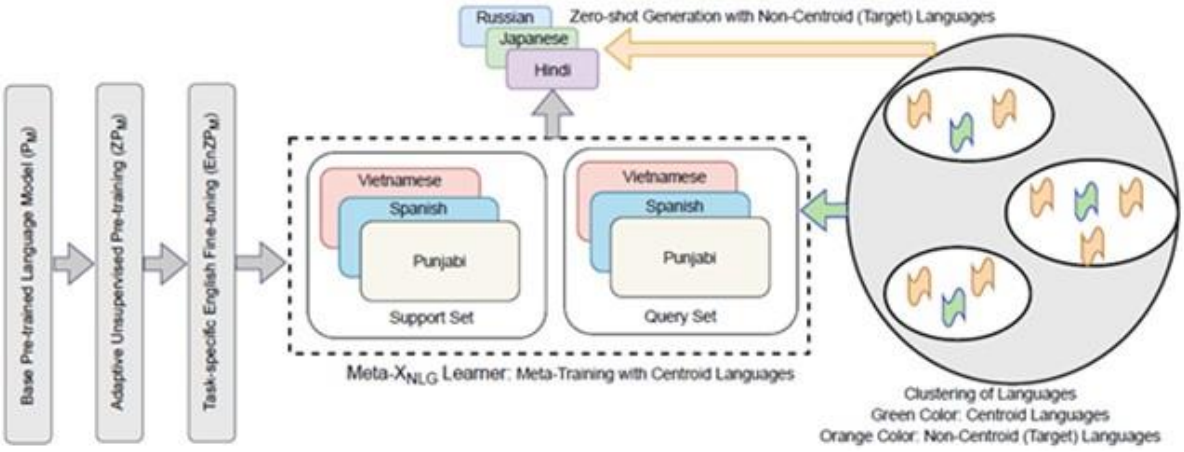
35. Antony Franklin; Enabling Multi-Hop in C-V2X Network; 28024; [SUZUKI/CSE/F157/2022-23/S267].

Awards & Recognitions:

1. C Krishna Mohan has received Fulbright-Nehru Fellowship Award 2023.
2. C Krishna Mohan has been selected as co-opted members of the SERB-PAC committee in Biomedical and Health Science(BHS).
3. Jyothi Vedurada has been inducted as the Program Committee Member: ACM PPoPP 2023, VSTTE 2022, ISEC 2022.
4. Jyothi Vedurada has been inducted as the Program Vice-Chair: IEEE HiPC 2022.
5. Anish Hirwe (PhD 2020), who worked under the guidance of Kotaro Kataoka, has been appointed as an Assistant Professor at Department of Computer Science & Engineering IIT Palakkad.
6. Praveen Aravind Babu Tammana has received the IBM Academic Award under Global University Program (GUP).
7. Rajesh Kedia has been Elevated to Senior Member of IEEE in November 2022.
8. Rakesh Venkat has received the Teaching Excellence Award (2023) - (Professional Service): Served on Program Committee of FSTTCS 2022 (International Conference).
9. Srijith P K received Sony research award.
10. Subrahmanyam Kalyanasundaram has been elected as Senior Member of IEEE (April 2023).
11. Arghya Pal (PhD 2020), who worked under the guidance of Vineeth N Balasubramanian, received a tenure-track Assistant Professorship offer from Monash University (Australia Campus).
12. Vineeth N Balasubramanian, Fulbright-Nehru Academic and Professional Excellence Fellowship, 2022-23.
13. Vineeth N Balasubramanian, Best Paper Award Honorable Mention, Continual Learning in Computer Vision (CLVISION) workshop, CVPR 2022 (CORE A-ranked conference).
14. Vineeth N Balasubramanian, NASSCOM AI Gamechangers Award (DL Algorithms and Architecture category), Winner and Runner-up, 2022.
15. Vineeth N Balasubramanian, Microsoft Academic Partnership Grant Award, 2022.
16. Antony Franklin, Best paper award in COMSNETS 2022 Conference for the paper "NUMASFP: NUMA-aware Dynamic Service Function Chain Placement in Multi-core Servers" jointly with Venkatarami Reddy Chintapalli, Sai Balaram Korrapati, Bheemarjuna Reddy Tamma.

Research Highlights

1. **Meta-XNLG: A Meta-Learning Approach Based on Language Clustering for Zero-Shot Cross-Lingual Transfer and Generation – Dr Maunendra Sankar Desarkar:**



Architecture and functioning of the Meta-XNLG model

Sample generation from the Meta-XNLG model for the zero-shot languages (model did not see task-specific training data for these languages)

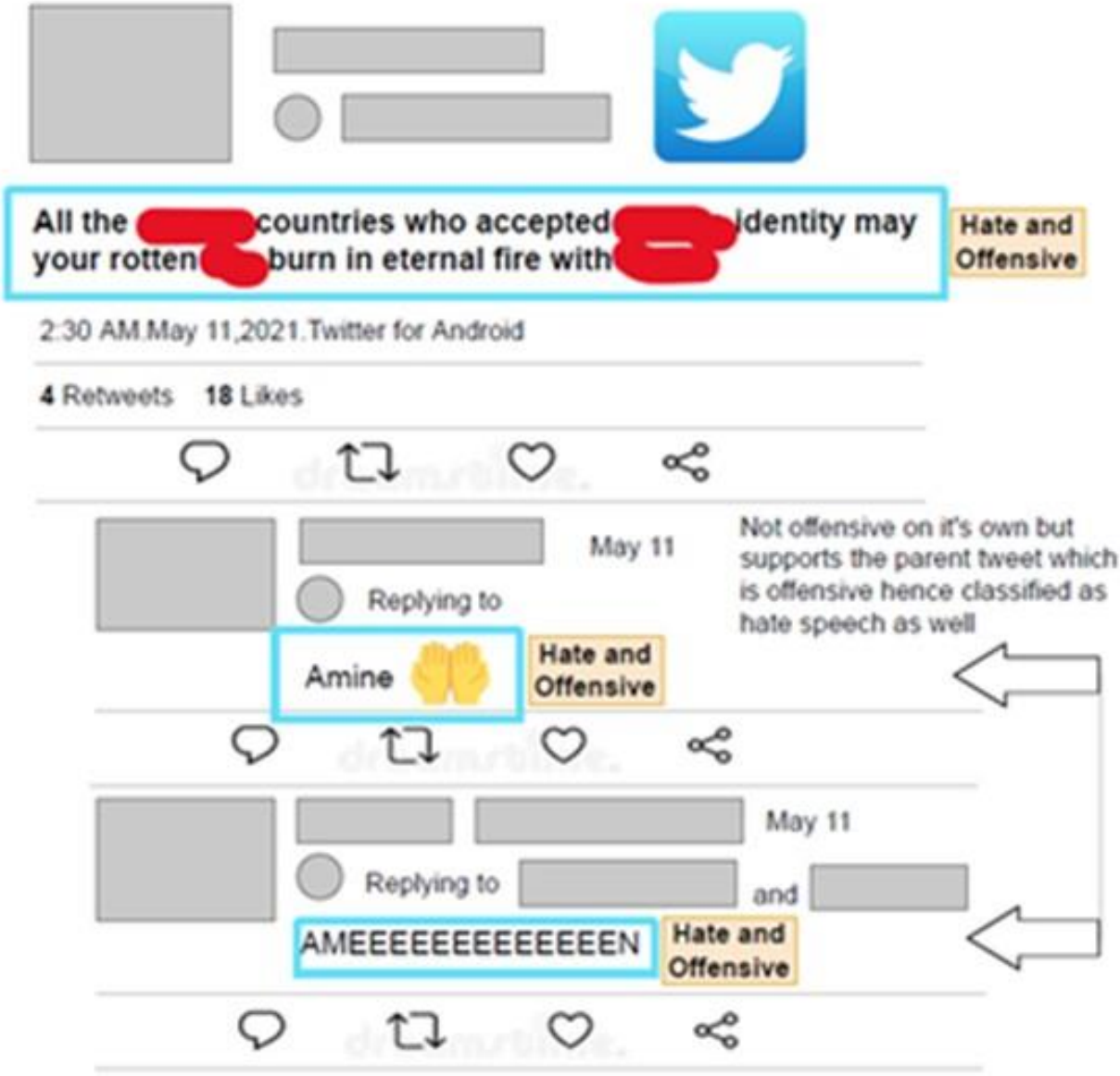
In this paper, we propose a novel meta-learning framework (called Meta-XNLG) to learn shareable structures from typologically diverse languages and use it for cross-lingual transfer of learning for Natural Language Generation (NLG) tasks. In this setup,

- We automatically group the available languages into multiple clusters based on their typological structures.
- Then, we train a common model for NLG tasks using supervised examples from only the centroid languages in the clusters.
- The learned model is then directly applied to the other languages from the same cluster for the tasks without the requirement of any task-specific training data for these languages. These languages can also be termed as zero-shot languages (as the model saw zero/no task-specific training data from these languages).

Thereby, one single model caters to all the languages under consideration and utilizes the task-specific training data from only the centroid languages. Some examples of generations from this model for the zero-shot languages are shown for reference. This work can be used for text generation in languages for which not much training data is available and can be very helpful for multilingual countries like India.

Paper: Kaushal Kumar Maurya, Maunendra Sankar Desarkar, Meta-XNLG, A Meta-Learning Approach Based on Language Clustering for Zero-Shot Cross-Lingual Transfer and Generation. ACL (Findings) 2022:269-284.

2. Hostility Detection in Online Hindi-English Code-Mixed Conversations – Dr Maunendra Sankar Desarkar:



Hostility Detection in Online Hindi-English Code-Mixed Conversations

The social media is seeing a huge increase in hateful and offensive comments. Comments spreading or provoking hatred are unwanted. Moreover, the comments/posts that directly do not contain anything hateful but support hateful comments/posts are equally unwanted. This work proposes a technique to detect such unwanted comments (original, derivatives, supportive) in social channels – through context identification and weighted context augmentation for the task.
Paper: Aditi Bagora, Kamal Shrestha, Kaushal Maurya, Maunendra Sankar Desarkar, Hostility Detection in Online Hindi-English Code-Mixed Conversations. ACM Web Science 2022: 390-400.

3. Towards Fair Evaluation of Dialogue State Tracking by Flexible Incorporation of Turn-level Performances - Dr Maunendra Sankar Desarkar:

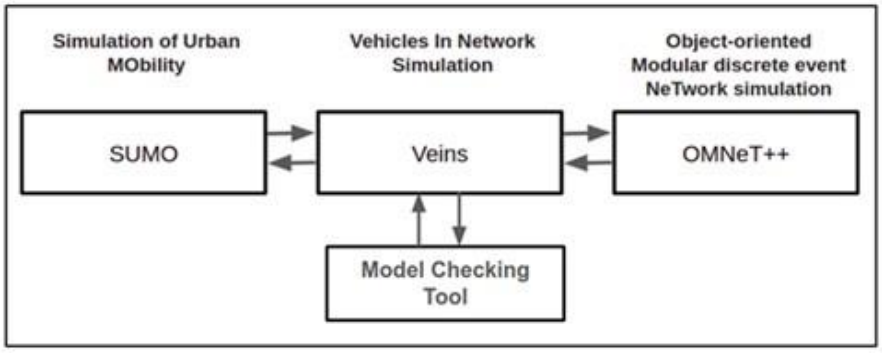
Dialog State Tracking is an important subtask for any goal-oriented dialog system or conversational AI system. At any stage of a dialog, its Dialog State is a collection of belief states or slot-value pairs that are live and under discussion at that point. Dialog Systems are often evaluated using Joint Goal Accuracy (JGA), which requires an exact match of the computed dialog state with the ground truth dialog state. However, as the dialog state is cumulative in nature, one error in slot-value prediction at the beginning of the dialog often falls through and hurts the performance of the model, although the model might have performed well in the subsequent turns. This metric is thus very strict and often underestimates the performance of DST models. We propose a new metric, Flexible Goal Accuracy (FGA) that partially penalizes a misprediction that is locally correct, i.e. the source of the misprediction is some earlier turn. The penalty can be adjusted using a hyperparameter, thereby allowing further flexibility to determine the penalty based on the requirement of the domain under consideration (e.g. medical vs. tourism vs. e-commerce, etc.).

Turn		Conversation Details	Exact match	Turn match
0	U_0	Hi, I am traveling to Cambridge and could use some help for sure. I am so excited to see some local tourist attractions.	✓	✓
	B_0	{ }		
	B'_0	{ }		
1	S_1	We have 79 attractions to choose from, anything specific that you would like to tell us to help narrow it down?	✓	✓
	U_1	I'm looking for a hotel called cityroomz.		
	B_1	{**hotel**: {**name**: cityroomz}}		
	B'_1	{**hotel**: {**name**: cityroomz}}		
2	S_2	Cityroomz is a 0-star hotel in the center of town. Its address is Sleeperz Hotel, Station Road.	✗	✗
	U_2	Can you please book a room for 4 people for 2 nights starting on wednesday?		
	B_2	{**hotel**: {**area**: centre, **day**: wednesday, **people**: 4, **stay**: 2, **name**: cityroomz, **stars**: 0}}		
	B'_2	{**hotel**: {**day**: wednesday, **people**: 4, **stay**: 2, **name**: cityroomz}}		
3	S_3	Booking was successful.Reference number is : WGUYAGN2 anything else i can help?	✗	✓
	U_3	Thanks. I am also looking for places to go in town. Perhaps an attraction in the city centre.		
	B_3	{**attraction**: {**area**: centre}, **hotel**: {**area**: centre, **day**: wednesday, **people**: 4, **stay**: 2, **name**: cityroomz, **stars**: 0}}		
	B'_3	{**attraction**: {**area**: centre}, **hotel**: {**day**: wednesday, **people**: 4, **stay**: 2, **name**: cityroomz}}		

Failure in Exact Match in spite of turn level match, due to errors made in the past

Paper: Suvodip Dey, Ramamohan Kummara, Maunendra Sankar Desarkar, Towards Fair Evaluation of Dialogue State Tracking by Flexible Incorporation of Turn-level Performances. ACL (2) 2022: 318-324

4. Traffic Intersections as Agents: A model checking approach for analysing communicating agents – Dr Subrahmanyam Kalyanasundaram and Prof M V Panduranga Rao:



Traffic Intersections as Agents: A model checking approach for analysing communicating agents

The analysis of traffic policies, for instance, the duration of green and red phases at intersections, can be quite challenging. While the introduction of communication systems can potentially lead to better solutions, it is important to analyse and formulate policies in the presence of potential communication failures and delays. Given the stochastic nature of traffic, posing the problem as a model-checking problem in probabilistic epistemic temporal logic seems promising. In this work, we propose an approach that uses epistemic modalities to model the effect of communication between multiple intersections and temporal modalities to model the progression of traffic volumes over time. We validate our approach in a non-stochastic setting using the tool Model Checker for Multi-Agent Systems (MCMAS). We develop a Statistical Model Checking module and use it in conjunction with a toolchain that integrates a traffic simulator (SUMO) and a network simulator (OMNeT++/Veins) to study the impact of communications on traffic policies.

Paper: "Traffic Intersections as Agents, A model checking approach for analysing communicating agents." B. Thamilselvam, Y. Ramesh, S. Kalyanasundaram, and M. V. Panduranga Rao.

Proceedings of the 38th ACM/SIGAPP Symposium On Applied Computing (SAC 2023), Tallinn, Estonia, March 2023.

Department of Design

The Department of Design offers a vibrant environment for learning, practicing, researching, and exploring several facets of design. The department envisions creatively engaging in the space between technologies and people. This involves facilitating innovation in key emergent areas such as Participatory and collaborative Design, Communication and interaction Design, Professional Ethics and sustainability, Product Systems and services, Design and Education, Wellness, Crowd Sourced Design, etc. "Design" calls for thinking "from scratch," thinking "Out of the box," and thinking in line with the needs of contemporary society and devising creative solutions. "Design" is essentially aimed at enhancing the user experience. Improvement of any process/service/equipment by incorporation of ingenious means is what defines "Good Design." The Department of Design is committed to the growth of design education. To fulfill this vision, a joint PhD program with Swinburne University, Australia, and a Design Minor program has been initiated.

The design department admitted the third Batch of Bachelor of Design (BDes) and the ninth Batch of Master of Design (MDes) students this year. Dr Saurav Khuttiya Deori joined the department as an Assistant Professor, which makes the total number of regular faculty in the department 10. The department also completed two cohorts of certificate programs on "Visual design and user experience" through the Centre for Continuing Education (CCE) and in collaboration with TalentSprint.

The faculty have published their research and academic works in internationally recognized conferences, journals, design competitions, and workshops. The members of the department also participated in large numbers in the "International Conference on Research into Design (ICoRD 23)" Held in IISc Bangalore, which is one of the premiere design research conferences. One of the papers authored by our faculty and students, Dr Shiva Ji and Avinash PK, also received the "Best Paper" Award. We will also be hosting this conference in January 2025.

The department also organized talks, seminars, and guest lectures from eminent academicians, researchers, innovators, and authors. Some of the important talks include "Industry 4.0, Overview and Examples from a Smart Factory" by Prof Amaresh Chakrabarti, Chairman and Professor, CPDM, IISc Bangalore, "The Biennale Model" by Bose Krishnamachari, and "The free software movement and GNU," an Extra Mural Lecture by Richard Stallman. The department also collaborated with the Suzuki Innovation Centre on campus to organize a talk from the grass-root innovator Mr Naik Qayoom from Srinagar, Kashmir.

For more information, please visit: https://design.iith.ac.in/

Faculty

Head of the Department

Prasad S Onkar
PhD - IISc Bangalore
Associate Professor
Profile page:
https://iith.ac.in/des/psonkar/

Professor

Deepak John Mathew
PhD - Center for Advanced Studies in Education, M S University of Baroda
Professor
Profile page:
https://iith.ac.in/des/djm/

Assistant Professor

Ankita Roy
Profile page:
https://iith.ac.in/des/aroy/

Delwyn Jude Remedios
Profile page:
https://iith.ac.in/des/delwyn/

Neelakantan P K
PhD - IIT Bombay
Profile page:
https://iith.ac.in/des/neel/

Saurav Khuttiya Deori
PhD - IIT Guwahati
Profile page:
https://iith.ac.in/des/seema/

Seema Krishnakumar
Profile page:
https://iith.ac.in/des/seema/

Shahid Mohammad
PhD - IIT Guwahati
Profile page:
https://iith.ac.in/des/mohammad.shahid/

Shiva Ji
PhD - IIT Guwahati
Profile page:
https://iith.ac.in/des/shivaji/

Srikar A V R
Profile page:
https://iith.ac.in/des/srikaravr/

Adjunct Faculty

Ajith Abraham George
Principal Consultant,
Intellithink Industrial IoT
Profile page:
https://www.linkedin.com/in/ajith-abraham-george-a09bbb178/

Ambarish Kulkarni
Director - Vehicle Engineering Team, Manufacturing Futures Research Institute, Swinburne
Profile page:
https://bit.ly/421C3MA

Chakravarthy B K
Professor, IIT Bombay
Profile page:
http://www.idc.iitb.ac.in/people/faculty/chakravarthy-b-k

Internal Adjunct Faculty

Dr Shuhita Bhattacharjee Assistant Professor Department of Liberal Arts IIT Hyderabad
Profile page:
https://iith.ac.in/la/shuhita/

Patents:

Registered Applications:

1. Akansha Singh, B Vivekananda Chary, P Neelakantan Keshavan. (2022). Spindle Based Seating Furniture.

Books:

1. Ankita Roy; A Tribute to Bundela Painting. ISBN: 978-8193208564.

Publications:

1. Rao M N, & Mathew D J. (2022). Design Briefs: Review, Reframing Briefs, and Analysis of a Study. International Journal of Design Education, 17(1). https://doi.org/10.18848/2325-128X/CGP/v17i01/1-20.

2. Bhandari Upasana, & Mathew Deepak John. (2022). Implementing 21st Century Pedagogical Requirements in a Lesson Plan Design and Development of a Lesson Plan for fifth grade in an Indian School. https://doi.org/10.1145/3502434.3502457.

3. Rautray P, Mathew D J, Eisenbart B, & Kuys J. (2022). Understanding Working Scenarios of Urban Air Mobility. Proceedings of the Design Society, 2(undefined). https://doi.org/10.1017/pds.2022.58.

4. Solanki C & Mathew Deepak John. (2022). Factors Affecting Engagement in Digital Educational Games India HCI 2021. https://doi.org/10.1145/3506469.3506491.

5. Solanki Chaitanya & Mathew Deepak John. (2022). An exploratory study using the first-person role-playing game 'Tattva Bhoomi' to improve learning in middle school children: A quasi-experimental study. Innovations Journal. https://journal-innovations.com/assets/uploads/doc/6a645 - 238-244.16111.pdf.

6. Bhandari U & Mathew D J. (2022). A Critical Review of National Education Policy 2020: Role of Twenty-First-Century Skills and Scope of Design Education in Indian Schools. International Journal of Design Education, 17(1). https://doi.org/10.18848/2325-128X/CGP/v17i01/21-35.

7. Remedios D J, Mathew D J, & Schleser M. (2022). Rotating Cylindrical PIN VR Display—An Ergonomic Approach for VR Scripts. Lecture Notes in Networks and Systems, 391(undefined). https://doi.org/10.1007/978-3-030-94277-9_27.

8. Saha Indranil & Mathew D J. (2022). Digital innovation in the fashion industry: a review and prospects with a special focus on the 3D printing technology. Metszet Journal (Volume 7, Issue 11, November-2022). https://doi.org/10.27896/METSZET7.11/32.

9. Bhandari Upasana & Mathew Deepak John. (2022). A Critical Review of National Education Policy 2020: Role of 21st Century Skills and Scope of Design Education in Indian Schools. International Journal of Design Education. https://doi.org/10.18848/2325-128X/CGP/v17i01/21-35.

10. Rangarajan V, Onkar P S, De Kruiff A, & Barron D. (2022). A descriptive phenomenological approach to perception of affective quality in design inspiration. Design Studies, 78(undefined). https://doi.org/10.1016/j.destud.2021.101072.

11. Raju S K K & Onkar P S. (2022). Lattice_Karak: Lattice structure generator for tissue engineering, lightweight and heat exchanger applications [Formula presented]. Software Impacts, 14(undefined). https://doi.org/10.1016/j.simpa.2022.100425.

12. Rangarajan V, Onkar P S, De Kruiff A, & Barron D. (2022). The role of perception of affective quality in graphic design inspiration. Design Journal, 25(5). https://doi.org/10.1080/14606925.2022.2082126.

13. Pawar T, Sharma A, & Ji S. (2022). Heritage Representation of Kashi Vishweshwar Temple at Kalabgoor, Telangana with Augmented Reality Application Using Photogrammetry. Lecture Notes in Electrical Engineering, 924(undefined). https://doi.org/10.1007/978-981-19-4136-83.

14. Chakraborty S & Ji S. (2022). A Sustainable Approach for the Urban Sprawl of Kolkata (Circa 1690-2020). Lecture Notes in Networks and Systems, 391(undefined). https://doi.org/10.1007/978-3-030-94277-9_100.

15. Chakraborty S, & Ji S. (2022). Evolution of Bagbazar Street Through Visibility Graph Analysis (1746–2020). Lecture Notes in Electrical Engineering, 924(undefined). https://doi.org/10.1007/978-981-19-4136-8_5.

16. Chakraborty S, & Ji S (2022), A Sustainable Approach for the Urban Sprawl of Kolkata (Circa 1690â€"2020). Lecture Notes in Networks and Systems, 391(undefined) https://doi.org/10.1007/978-3-030-94277-9_100.

17. Pawar T, Sharma A, & & Ji S (2022), Heritage Representation of Kashi Vishweshwar Temple at Kalabgoor, Telangana with Augmented Reality Application Using Photogrammetry. Lecture Notes in Electrical Engineering, 924(undefined) https://doi.org/10.1007/978-981-19-4136-8_3.

Funded Research Projects:

1. Deepak John Mathew; Integrating AI, AR and VR in learning models and their impact; 21.1 L. [DSIR/DES/F132/2021-22/G452].

2. Mohammad Shahid; Cheriyal Craft; 11.67 L. [IGNCA/DES/F240/2023-24/S269].

3. Saurav Khuttiya Deori; A study on early Architectural ornamentation in the context of Assam to develop a visual framework; 30 L. [SG/IITH/F319/2022-23/SG-147].

4. Shiva Ji; Creating Digital Immersive Heritage Experience, Risk Assessment and Vernacular Architecture Analysis of Five Historically Significant Temple Marvels of Kashi; 89 L. [DST/SHRI/DES/F205/2022-23/G483].

5. Srikar A V R; Fully Standalone Types Photovoltaic fed Zero carbon battery charging station for institute's EVs (without grid connectivity); 29.52 L. [IITH/DES/F257/2022-23/G470].

6. Srikar A V R; Redefining User Experience of Smart Glasses for the Visually Impaired through Generative Design; 2 L. [DRISHTI CPS/CF/SL/PG/2023/000002].

7. Shiva Ji; Creating Digital Immersive Heritage Experience ,Risk Assessment and Vernacular Architecture Analysis of Five Historically Significant Temple Marvels of Kashi; 895; [DST/SHRI/DES/F205/2022-23/G483].

Awards & Recognitions:

1. Ankita Roy received the National Tourism Award for the Book – "The Magic of Mandu – Suhur-e-Shaadiabad" for "Excellence in Publishing in English" by Ministry of Tourism, GoI, Incredible India – Given by Vice President of India Shri Jagadeep Dhankhar and Shri G Kishan Reddy (Minister of Tourism & Culture).

2. Ankita Roy received the TYPODAY 2022 Best Poster Design Award at Typo Day 2022.

3. Ankita Roy received the Prestigious National award for excellence in Publishing.

4. Mitti, an independent Sand Animation Film directed by Delwyn Jude Remedios, has been
   - The Runner Up at Cineaste International Film Festival of India, Delhi 2022,
   - The Finalist at 60 Seconds Short Film Fest, United States, 2023
   - The Official Selection at TAAFI - Toronto Animation Arts Festival International, 2023
   - The Official Selection at Lift-Off Filmmaker Sessions @ Oinewood Studios, United Kingdom 2022.

5. Save Our Species, an Independent Stop-motion animation film directed by Delwyn Jude Remedios, has been
   - The Official Selection at Changing Climate Changing Lives Film Festival, Thailand 2022
   - The Official Selection at Happy Valley Animation Festival, United States 2022
   - The Official Selection at Toxics Link, Delhi 2022
   - The Official Selection at Reto por el Mundo / Erronka Munduan / Challenge for the World, Spain 2023

6. VR the World, a digital 2-D film directed by Pravin J, under the guidance of Delwyn Jude Remedios has been
   - The Semi Finalist at International Cultural Artifact Film Festival (ICA) - 2022
   - Semi Finalist at International Cultural Artifact Film Festival (ICA) - 2022

7. Cheppalanivundi, a digital 3-D film directed by Pulugam Sai Kumar, under the guidance of Delwyn Jude Remedios has been
   - The Official Selection at ONE EARTH film festival 2022
   - The Official Selection at the Student World Impact Film Festival 2022
   - The Official Selection at First-Time Filmmaker Sessions 2022

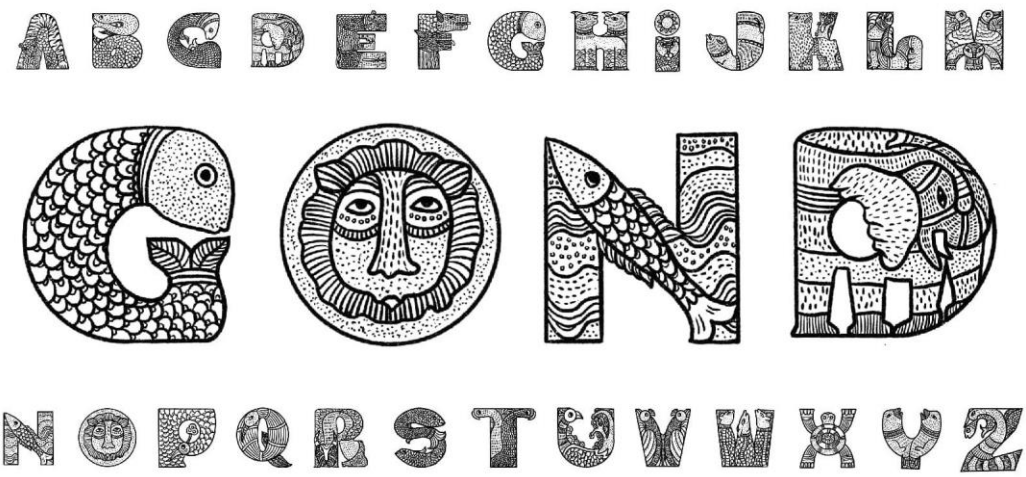
8. Neelakantan P K and his student Akansha were the First runner up at ADI Battle of Projects, for their project "Spindle".

9. Shiva Ji won the Best Paper Award for the paper "Climate change impacts on the built heritage of Hyderabad" at the International Conference on Research into Design 2023 organized by the Indian Institute of Science Bangalore.

10. Shiva Ji won the Best Paper Award for the paper "The transition of food grain purchasing systems in urban gated communities towards a circular economy in India" at the International Conference on Research into Design 2023 organized by the Indian Institute of Science Bangalore, 09-11 Jan 2023.

Highlights

1. **Representation of Gond Art in the form of Type design by Harsh Raj Gond (M.Des 21-23), working under the guidance of Mohammad Shahid.**
   Harsh Raj Gond (M.Des 21-23) is one among the winners of the Typoday 2022, organized by IDC, IIT Bombay. The Poster is a representation of Gond Art in the form of Type design.



2. **Cheriyal Craft Project in collaboration with Indira Gandhi National Centre for Arts (IGNCA) & Aatmanirbhar Bharat Centre for Design (ABCD), New Delhi by Dr Mohammad, Shahid Nandini Louganee & Pragya, MDes.**

3. **Vāyu and Cāṟu developed by Shovan Kanti Kar and V Vishnu Srinivasa Prasad respectively (MDes 2021-23) under the guidance of Prof Srikar AVR.**

Department of Electrical Engineering

Welcome to the Electrical Engineering Department Annual Report for the year 2022-2023. This report provides a comprehensive overview of the department's achievements, activities, and advancements during the past year. Our commitment to excellence in electrical engineering education and research remains unwavering, and we are proud to present the highlights of our journey in 2022-2023.

The Electrical Engineering Department has been a cornerstone of engineering education since its establishment. We offer a comprehensive range of undergraduate and graduate programs in Electrical Engineering, specializing in areas such as Microelectronics VLSI, Power Electronics and Power Systems, Systems and Control, Communications, Signal Processing and Learning. Our department fosters an innovative and collaborative learning environment to nurture the next generation of electrical engineers.

This year, the EE department reached 560 students (BTech + MTech + PhD). Our department is home to 33 dedicated faculty members, each possessing a strong academic background and expertise in diverse electrical engineering domains, and 13 support staff, who play a crucial role in maintaining a conducive learning environment for our students. We strive to foster innovation, critical thinking and a collaborative spirit among our students. This leads to the highest average citation (0.7) in the past three years and the second (2.72) (after IIT Bombay, 2.95) in the last ten-year published paper in the electrical engineering department across all the IITs. Dr. Arthi Gopalakrishnan, an alumna of IIT Hyderabad who worked under Dr. Sushmee Badhulika, received the best thesis award in the area of carbon nanomaterials" from the INYAS-INSA committee on National Science Day (28th February 2022). Lakshmi Prasad Natarajan (EE) has been selected for the INSA (Indian National Science Academy) Young Scientist Award. This is one of the best recognitions for a young researcher in India.

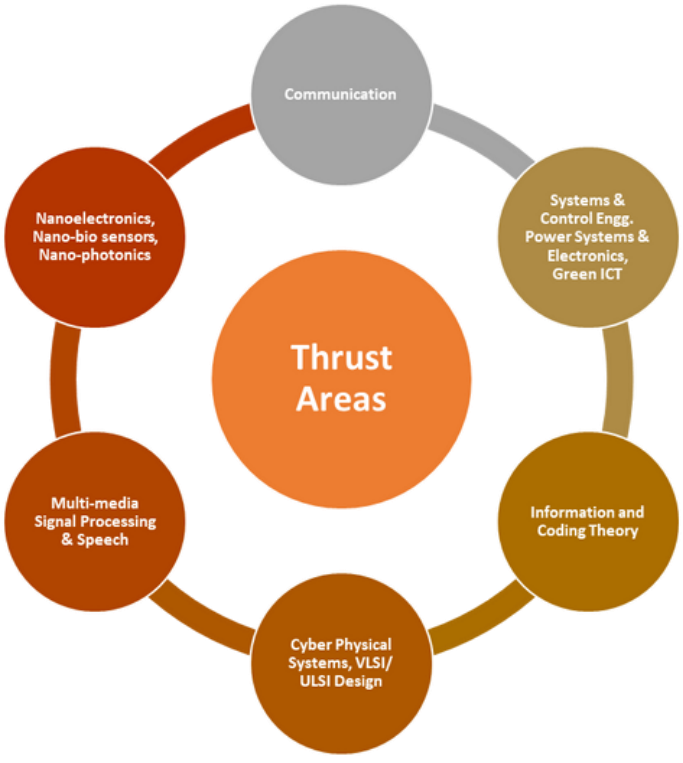
Project Funding

The department secured significant funding from various sources to support research initiatives, develop advanced technologies, and foster academic growth. The support and funding around 9133.15924 lakhs received through various private/public agencies have been instrumental in advancing the research and educational endeavours of the Electrical Engineering department during 2022-2023. These financial resources have enabled the department to make significant strides in cutting-edge research and innovation, enriching the learning experience of our students and strengthening our impact in the field of electrical engineering.

Placement

This year, the department achieved an outstanding placement record (B.tech: 90.20%, M.tech: 97.14%, PhD: 100%). The high placement rate achieved by our Electrical Engineering students showcases the department's dedication to nurturing skilled and industry-ready professionals. We are proud of our students' accomplishments and express gratitude to the faculty, staff, and industry partners for their support in making these achievements possible. We remain committed to empowering our students with the knowledge and skills needed to excel in their chosen careers and contribute significantly to the field of Electrical.

For more information, please visit: https://ee.iith.ac.in/



Faculty

Head of the Department

Shiv Govind Singh
PhD - IIT Bombay
Professor
Profile page:
https://iith.ac.in/ee/sgsingh/

Professor

Amit Acharyya
PhD - University of Southampton, UK
Profile page:
https://iith.ac.in/ee/amit_acharyya/

Ashudeb Dutta
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/ee/asudeb_dutta/

K Siva Kumar
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/ksiva/

Kiran Kumar Kuchi
PhD - University of Texas at Arlington, USA
Profile page:
https://iith.ac.in/ee/kkuchi/

Rajalakshmi P
PhD - IIT Madras
Profile page:
https://iith.ac.in/ee/raji/

Siva Rama Krishna V
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/svanjari/

Soumya Jana
PhD - UIUC, USA
Profile page:
https://iith.ac.in/ee/jana/

Sumohana S Channappayya
PhD - The University of Texas at Austin, USA
Profile page:
https://iith.ac.in/ee/sumohana/

Sushmee Badhulikha
PhD - University of California, USA
Profile page:
https://iith.ac.in/ee/sbadh/

Zafar Ali Khan Mohammed
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/zafar/

Associate Professor

Abhinav Kumar
PhD - IIT Delhi
Profile page:
https://iith.ac.in/ee/abhinavkumar/

G V V Sharma
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ee/gadepall/

Gajendranath Chowdary Ch
PhD - IIT Delhi
Profile page:
https://iith.ac.in/ee/gajendranath/

Kaushik Nayak
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ee/knayak/

Ketan Detroja
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ee/ketan/

Naresh Kumar Emani
PhD - Purdue University, West Lafayette Campus, USA
Profile page:
https://iith.ac.in/ee/naresh/

Pradeep Kumar Yemula
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ee/ypradeep/

Ravikumar Bhimasingu
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/ravikumar/

Sri Rama Murty Kodukula
PhD - IIT Madras
Profile page:
https://iith.ac.in/ee/ksrm/

Sundaram Vanka
PhD - University of Notre Dame, Notre Dame, Indiana, USA
Profile page:
https://iith.ac.in/ee/sundar.vanka/

Vaskar Sarkar
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ee/vaskar/

Assistant Professor

Abhishek Kumar
PhD - IIT Madras
Profile page:
https://iith.ac.in/ee/akumar/

Aditya T Siripuram
PhD - Stanford University
Profile page:
https://iith.ac.in/ee/staditya/

Jose Titus
PhD - IIT Madras
Profile page:
https://iith.ac.in/ee/jtitus/

Lakshmi Prasad Natarajan
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/lakshminatarajan/

Oves Badami
PhD - Universita Degli Studi di Udine, Udine, Italy
Profile page:
https://iith.ac.in/ee/oves.badami/

Rupesh Ganpatrao Wandhare
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ee/rupesh/

Seshadri Sravan Kumar V
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/seshadri/

Shashank Vatedka
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/shashankvatedka/

Shishir Kumar
PhD - Trinity College, Dublin
Profile page:

https://iith.ac.in/ee/shishirk/

Shubhadeep Bhattacharjee
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/ee/shubhadeep/

Adjunct Faculty

Amit Kumar Mishra
(SERB-VAJRA)
Profile page:
https://ieeexplore.ieee.org/author/37290432700

Adjunct Professor

Krishna Kanth Avalur
Director R&D – AMS Semiconductors India, Hyderabad
Profile page:
https://www.linkedin.com/in/kkanth/

Nixon Patel
Founder CEO, Qulabs.ai
Adjunct Professor
Profile page:
https://www.linkedin.com/in/nixonpatel/

Sai Dhiraj Amuru
Principal Research Engineer Wi Sing Networks
Adjunct Faculty
Profile page:
https://people.iith.ac.in/asaidhiraj/

Emeritus Faculty

Dr Uday B Desai
Emeritus Professor
Profile page:
https://iith.ac.in/ee/ubdesai/

Patents:

Filed:

1. Abhinav Kumar; A method for adaptive multi-user clustering in Non-Orthogonal Multiple Access systems with IMperfect; 202241018280.
2. Abhinav Kumar, Sundaram vanka; Configurable Wireless Networks; 202241035398.
3. Kiran Kumar Kuchi; Methods for Signaling Channel State Information Feedback between User Equipment and Base Station; 202241023541.
4. Kiran Kumar Kuchi; A Spatially Separable Attention Mechanism for Massive MIMO CSI Feedback; 202241044961.
5. Kiran Kumar Kuchi; Methods of signaling channel state information feedback with varying feedback dimensions; 202241060837.
6. Shiv Govind Singh; Thermally Evaporated Organic Photovoltaic Cell and a Method of Fabrication Therefor; 202241060162.
7. Sumohana S Channappayya; Multi-Spectral System Design for Robust Detection and Tracking of Objects; 202241050692.

Published:

1. Kiran Kumar Kuchi; Method and system for generating a transmit waveform for reference sequences; US 17/284,050.
2. Kiran Kumar Kuchi; Method and system for generating a waveform in a communication network; US 17/601785.
3. Shishir Kumar; Miniaturized Microscope Device and Method Thereof; 202041030727.
4. Shiv Govind Singh; Thermally Evaporated Organic Photovoltaic Cell and a Method of Fabrication Therefor; 202241060162.
5. Shiv Govind Singh; Chemi resistive bio sensor for quantitative detection of retinopathy of premeturity associated biomarks and the process thereof; 202241039688.
6. Shiv Govind Singh; Metallic transition metal dichalcogenide based chemiresistive bio sensor; 202241026382.
7. Rajalakshmi P; Techniques for real time aquarate geo referencing objects using lidar; 202141020099.
8. Rajalakshmi P; A system for determination of flight performance of bioinspired aerial vehicle in simulated space conditions; 202241043483.
9. Rajalakshmi P; Energy efficient biomimetic Nano Aerial Vehicle and method for generating energy; 202141057570.
10. Rajalakshmi P; Techniques for Improved Maneuverability of Bioinspired Quad Wing Unmanned Aerial Vehicle; 202141017174.
11. Zafar Ali Khan Mohammed; A Universal Generalized Flip Decoder and a Method of Decoding Thereof; 202241074335.
12. Shishir Kumar; MINIATURIZED MICROSCOPE DEVICE AND METHOD THEREOF.; 202041030727.

Granted:

1. Kiran Kumar Kuchi; Method and system for designing a waveform for data communication; 201747032497.
2. Kiran Kumar Kuchi; Method for estimating channel states of plurality of user equipments (ues); 201641025741.
3. Kiran Kumar Kuchi; Methods and transmitters for pre-coding a waveform with low peak-toaverage- power; 201641013222.
4. Kiran Kumar Kuchi; Method and apparatus for reducing phase discontinuities in a tone phase shift keying; 201641005999.
5. Kiran Kumar Kuchi; Method and system for transmitting and receiving a waveform with low paper; 201641000865.
6. Kiran Kumar Kuchi; Method and system for pilot transmission with low peak to average power ratio (papr); 3316/CHE/2015.
7. Sushmee Badhulika; ZnSnO3/In2O3 Core-Shell Nanofibers, Method of Preparing them and Their Uses; 202141056630.

Publications:

1. Bhange P, Joshi D K, Pandu S K, Mankari K, Acharyya S G, Sridhar K, & Acharyya A. (2022). Real-Time Fatigue Crack Growth Rate Estimation Methodology for Structural Health Monitoring of Ships. IEEE Sensors Journal, 22(20). https://doi.org/10.1109/JSEN.2022.3204146.
2. Vatti C S, Rakesh M B, Ravi Teja Reddy P, & Acharyya A. (2022). A Hierarchical Fault-Tolerant and Cost Effective Framework for RRAM Based Neural Computing Systems. IEEE Transactions on Circuits and Systems II: Express Briefs, 69(3). https://doi.org/10.1109/TCSII.2022.3144193.
3. Wiles B M, Roberts P R, Allavatam V, Acharyya A, Vemishetty N, ElRefai M, Wilson D G, Maharatna K, Chen H, & Morgan J M. (2022). Personalized subcutaneous implantable cardioverter-defibrillator sensing vectors generated by mathematical rotation increase device eligibility whilst preserving device performance. Europace: European pacing, arrhythmias, and cardiac electrophysiology: journal of the working groups on cardiac pacing, arrhythmias, and cardiac cellular electrophysiology of the European Society of Cardiology, 24(8). https://doi.org/10.1093/europace/euab310.
4. Pal C, Pankaj S, Akram W, Biswas D, Mattela G, & Acharyya A. (2022). Fragmented Huffman-Based Compression Methodology for CNN Targeting Resource-Constrained Edge Devices. Circuits, Systems, and Signal Processing, 41(7). https://doi.org/10.1007/s00034-022-01968-x.
5. Jha P K, Rajendran M K, Lenka P K, Acharyya A, & Dutta A. (2022). A Fully Analog Autonomous QRS Complex Detection and Low-Complexity Asystole, Extreme Bradycardia, and Tachycardia Classification System. IEEE Transactions on Instrumentation and Measurement, 71(undefined). https://doi.org/10.1109/TIM.2022.3216392.
6. Bhardwaj S, Raghuraman S, Yerrapragada J.B, Jagirdar A, Maharatna K, & Acharyya A. (2022). Low-Complex and Low-Power n-dimensional Gram–Schmidt Orthogonalization Architecture Design Methodology. Circuits, Systems, and Signal Processing, 41(3). https://doi.org/10.1007/s00034-021-01852-0 .

7. Gudur V Y, Maheshwari S, Acharyya A, & Shafik R. (2022). An FPGA Based Energy-Efficient Read Mapper with Parallel Filtering and In-Situ Verification. IEEE/ACM Transactions on Computational Biology and Bioinformatics, 19(5). https://doi.org/10.1109/TCBB.2021.3106311.

8. Kishen S, Tapar J, & Emani N K. (2022). Tunable directional emission from electrically driven nano-strip metal-insulator-metal tunnel junctions. Nanoscale Advances, 4(17). https://doi.org/10.1039/d2na00149g.

9. Tapar J, Kishen S, & Emani N K. (2022). Generalized Kerker effect in PT-symmetric nanoantenna array. Journal of Optics (United Kingdom), 24(3). https://doi.org/10.1088/2040-8986/ac486f .

10. Reddy B P, Iqbal A, Rahman S, Meraj M, & Keerthipati S. (2022). Dynamic Modeling and Control of Pole-Phase Modulation-Based Multiphase Induction Motor Drives. IEEE Journal of Emerging and Selected Topics in Power Electronics, 10(3). https://doi.org/10.1109/JESTPE.2021.3062216.

11. Natarajan L P, & Joy S K. (2022). Permute and Add Network Codes via Group Algebras. IEEE Transactions on Communications, 70(5). https://doi.org/10.1109/TCOMM.2022.3158369.

12. Uday T, Kumar A, & Natarajan L. (2022). Joint NOMA for Improved SER of Cell-Edge Users in Multi-Cell Indoor VLC. IEEE Wireless Communications Letters, 11(1). https://doi.org/10.1109/LWC.2021.3117923.

13. Akumalla V & Ali Khan M Z. (2022). Optimal quantized bits for estimation over a capacity and power-limited, lossy channel. Electronics Letters, 58(22), 843-845. https://doi.org/10.1049/ell2.12558.

14. Pullaiah Y, Bajaj M, Badami O, & Nayak K. (2022). TCAD Analysis of O-Terminated Diamond m-i-p+ Diode Characteristics Dependencies on Surface States CNL and Metal-Induced Gap States. IEEE Transactions on Electron Devices, 69(1). https://doi.org/10.1109/TED.2021.3129726.

15. Gauhar G A, Chenchety A, Yenugula H, Georgiev V, Asenov A, & Badami O. (2022). Study of gate current in advanced MOS architectures. Solid-State Electronics, 194. https://doi.org/10.1016/j.sse.2022.108345.

16. Kumar G S & Bhimasingu R. (2022). Optimal Sector-Based Sequential Model Predictive Control for Current Source Rectifier. IEEE Journal of Emerging and Selected Topics in Power Electronics, 10(5). https://doi.org/10.1109/JESTPE.2022.3186242.

17. Yihan Zhang and Shashank Vatedka. (2022). List Decoding Random Euclidean Codes and Infinite Constellations. IEEE Transactions on Information Theory, vol 68, no 12, December 2022. https://doi.org/10.1109/TIT.2022.3189542.

18. Yihan Zhang, Shashank Vatedka, Sidharth Jaggi, and Anand Sarwate. (2022). Quadratically Constrained Myopic Adversarial Channels. IEEE Transactions on Information Theory, vol 68, no 8, August 2022. https://doi.org/10.48550/arXiv.1801.05951.

19. Astrid Weston, Eli G Castanon, Vladimir Enaldiev, Fabio Ferreira, Shubhadeep Bhattacharjee, Shuigang Xu, Hector Corte-Leon, Zefei Wu, Nicholas Clark, Alex Summerfield, Teruo Hashimoto, Yunze Gao, Wendong Wang, Matthew Hamer, Harriet Read, Laura Fumagalli, Andrey V Kretinin, Sarah J Haigh, Olga Kazakova, A K Geim, Vladimir I Fal'ko & Roman Gorbachev. (2022). Interfacial ferroelectricity in marginally twisted 2D semiconductors. Nature Nanotechnology, 17(4). https://doi.org/10.1038/s41565-022-01072-w.

20. Berdyugin A I, Xin N, Gao H, Slizovskiy S, Dong Z, Bhattacharjee S, Kumaravadivel P, Xu S, Ponomarenko L A, Holwill M, Bandurin D A, Kim M, Cao Y, Greenaway M T, Novoselov K S, Grigorieva I V, Watanabe K, Taniguchi T, Fal'ko V I, Levitov L S, Kumar R K, & Geim A K. (2022). Out-of-equilibrium criticalities in graphene superlattices. Science, 375(6579). https://doi.org/10.1126/science.abi8627.

21. Bhavanam S R, Channappayya S S, Srijith P K, & Desai S. (2022). Cosmic Ray rejection with attention augmented deep learning. Astronomy and Computing, 40(undefined). https://doi.org/10.1016/j.ascom.2022.100625.

22. Shahid M, Abhishek B, & Channappayya S S. (2022). A Cross-Platform HD Dataset and a Two-Step Framework for Robust Aerial Image Matching. IEEE Access, 10(undefined). https://doi.org/10.1109/ACCESS.2022.3184328.

23. Chandrakanth V, Murthy V S N, & Channappayya S S. (2022). UAV-based autonomous detection and tracking of beyond visual range (BVR) non-stationary targets using deep learning. Journal of Real-Time Image Processing, 19(2). https://doi.org/10.1007/s11554-021-01185-w.

24. Durai L & Badhulika S. (2022). Stripping voltammetry and chemometrics assisted ultra-selective, simultaneous detection of trace amounts of heavy metal ions in aqua and blood serum samples. Sensors and Actuators Reports, 4(undefined). https://doi.org/10.1016/j.snr.2022.100097.

25. Gunasekaran S S, Veeralingam S, & Badhulika S. (2022). "One for two" strategy of fully integrated textile-based supercapacitor powering an ultra-sensitive pressure sensor for wearable applications. Journal of Energy Storage, 48(undefined). https://doi.org/10.1016/j.est.2022.103994.

26. Muduli S P, Veeralingam S, & Badhulika S. (2022). Multilayered Piezoelectric Nanogenerator Based on Lead-Free Poly (vinylidene fluoride)- (0.67BiFeO3-0.33BaTiO3) Electrospun Nanofiber Mats for Fast Charging of Supercapacitors. ACS Applied Energy Materials, 5(3). https://doi.org/10.1021/acsaem.1c03648.

27. Veeralingam S & Badhulika S. (2022). Low-density, stretchable, adhesive PVDF-polypyrrole reinforced gelatin-based organohydrogel for UV photodetection, tactile, and strain sensing applications. Materials Research Bulletin, 150(undefined). https://doi.org/10.1016/j.materresbull.2022.111779.

28. Reddy B K S, Veeralingam S, Borse P H, & Badhulika S. (2022). Synchronous enhancement of responsivity, response time and spectral range in solution-processed CdS photodetector upon modification with PEDOT: PSS. Journal of Alloys and Compounds, 919(undefined). https://doi.org/10.1016/j.jallcom.2022.165775.

29. Karnan M, Durai L, Hari Prakash K, & Badhulika S. (2022). Facile synthesis of ZnTiO3 nanoflakes as an efficient electrode material for high energy density supercapacitor applications. Journal of Energy Storage, 56(undefined).

https://doi.org/10.1016/j.est.2022.106114.

30. Karnan M, Hari Prakash K, & Badhulika S. (2022). Revealing the super capacitive performance of N-doped hierarchical porous activated carbon in aqueous, ionic liquid, and redox additive electrolytes. Journal of Energy Storage, 53(undefined). https://doi.org/10.1016/j.est.2022.105189.

31. Gunasekaran S S & Badhulika S. (2022). Effect of pH and activation on macroporous carbon derived from cocoa-pods for high-performance aqueous supercapacitor application. Materials Chemistry and Physics, 276(undefined). https://doi.org/10.1016/j.matchemphys.2021.125399.

32. Sha R, Basak A, Maity P C, & Badhulika S. (2022). ZnO nano-structured based devices for chemical and optical sensing applications. Sensors and Actuators Reports, 4(undefined). https://doi.org/10.1016/j.snr.2022.100098.

33. Bharti D K, Veeralingam S, & Badhulika S. (2022). An ultra-high performance, lead-free Bi2WO6: P (VDF-TrFE)-based triboelectric nanogenerator for self-powered sensors and smart electronic applications. Materials Horizons, 9(2). https://doi.org/10.1039/d1mh01606g.

34. Veeralingam S & Badhulika S. (2022). Ultrasonic irradiation assisted the growth of organic polypyrrole nanospheres reinforced 3D-hierarchical macroporous Ni-foam-based high-performance broadband photodetector. Materials Research Bulletin, 147(undefined). https://doi.org/10.1016/j.materresbull.2021.111640.

35. Durai L, & Badhulika S. (2022). Spinel structured MgAl2O4 nanoparticles as a low-cost and stable SERS substrate for rapid simultaneous detection of neurological drugs in biofluids. Ceramics International, 48(13). https://doi.org/10.1016/j.ceramint.2022.03.140.

36. Veeralingam S & Badhulika S. (2022). Enhanced carrier separation assisted high-performance piezo-phototronic self-powered photodetector based on core-shell ZnSnO3 @In2O3 heterojunction. Nano Energy, 98(undefined). https://doi.org/10.1016/j.nanoen.2022.107354.

37. Durai L, Gopalakrishnan A, & Badhulika S. (2022). Solid-state synthesis of β-NaAlO2 nanoflakes as an anode material for high-performance sodium-ion batteries. Materials Chemistry Frontiers, 6(19). https://doi.org/10.1039/d2qm00329e.

38. Kumaar Swamy Reddy B, Veeralingam S, Borse P H, & Badhulika S. (2022). A flexible, rapid response, hybrid inorganic–organic SnSe2–PEDOT: PSS bulk heterojunction based high-performance broadband photodetector. Materials Chemistry Frontiers, 6(3). https://doi.org/10.1039/d1qm01232k.

39. Durai L & Badhulika S. (2022). Current Challenges and Developments in Perovskite-Based Electrochemical Biosensors for Effective Theragnostics of Neurological Disorders. ACS Omega, 7(44). https://doi.org/10.1021/acsomega.2c05591.

40. Veeralingam S & Badhulika S. (2022). Lead-Free Transparent Flexible Piezoelectric Nanogenerator for Self-Powered Wearable Electronic Sensors and Energy Harvesting through Rainwater. ACS Applied Energy Materials, 5(10). https://doi.org/10.1021/acsaem.2c02521.

41. Veeralingam S, Bharti D K, & Badhulika S. (2022). Lead-free PDMS/ PPy based low-cost wearable piezoelectric nanogenerator for self-powered pulse pressure sensor application. Materials Research Bulletin, 151(undefined). https://doi.org/10.1016/j.materresbull.2022.111815.

42. Durai L, Gopalakrishnan A, & Badhulika S. (2022). A low-cost and facile electrochemical sensor for the trace-level recognition of flutamide in biofluids using large-area bimetallic NiCo2O4 micro flowers. New Journal of Chemistry, 46(7). https://doi.org/10.1039/d1nj05246b.

43. Veeralingam S, Praveen S, Vemula M, & Badhulika S. (2022). One-step synthesis of carbon-doped PPy nanoparticles interspersed in 3D porous melamine foam as a high-performance piezoresistive pressure, strain, and breath sensor. Materials Chemistry Frontiers, 6(5). https://doi.org/10.1039/d1qm01427g.

44. Badhulika S & Panda S. (2022). Editorial for a showcase issue for India. Sensors and Actuators Reports, 4(undefined). https://doi.org/10.1016/j.snr.2022.100115.

45. Nanda O P & Badhulika S. (2022). Biomass derived Nitrogen, Sulphur, and Phosphorus self-doped micro-meso porous carbon for high-energy symmetric supercapacitor – With a detailed study of the effect of different current collectors. Journal of Energy Storage, 56(undefined). https://doi.org/10.1016/j.est.2022.106042.

46. Reddy B K S, Veeralingam S, Borse P H, & Badhulika S. (2022). High responsivity self-powered flexible broadband photodetector based on hybrid Selenium-PEDOT: PSS junction. Organic Electronics, 108(undefined). https://doi.org/10.1016/j.orgel.2022.106586 .

47. Muduli S P, Veeralingam S, & Badhulika S. (2022). Free-standing, non-toxic and reusable 0.67BiFeO3–0.33BaTiO3 based polymeric piezo-catalyst for organic dye wastewater treatment. Journal of Water Process Engineering, 48(undefined). https://doi.org/10.1016/j.jwpe.2022.102934.

48. Thomas M, Veeralingam S, & Badhulika S. (2022). MoSe2/PVA-based wearable multi-functional platform for pulse rate monitoring, skin hydration sensor, and human gesture recognition utilizing electrophysiological signals. Journal of Applied Physics, 132(22). https://doi.org/10.1063/5.0123238.

49. Gunasekaran S S & Badhulika S. (2022). Almond peel-derived iron-induced activated carbon for high energy and long-life supercapacitor in organic electrolyte. Energy Storage, undefined(undefined). https://doi.org/10.1002/est2.404.

50. Gilbert Prince A, Durai L, & Badhulika S. (2022). Ni3C MXene nanosheets as an efficient binder-less electrocatalyst for oxygen evolution reaction. FlatChem, 36(undefined). https://doi.org/10.1016/j.flatc.2022.100439.

51. Durai L & Badhulika S. (2022). A Wearable PVA Film Supported TiO2 Nanoparticles Decorated NaNbO3 Nanoflakes-Based SERS Sensor for Simultaneous Detection of Metabolites and Biomolecules in Human Sweat Samples. Advanced Materials Interfaces, 9(13) https://doi.org/10.1002/admi.202200146.

52. Veeralingam S & Badhulika S. (2022). Paper-based flexible,

VIS-NIR photodetector with actively variable spectrum and enhanced responsivity using surface engineered transitional metal buffer layer. FlatChem, 33(undefined). https://doi.org/10.1016/j.flatc.2022.100370.

53. Durai L, Gunasekaran S S, & Badhulika S. (2022). A non-noble, low-cost, multicomponent electrocatalyst based on nickel oxide decorated AC nanosheets and PPy nanowires for the direct methanol oxidation reaction. International Journal of . Hydrogen Energy, 47(5). https://doi.org/10.1016/j.ijhydene.2021.10.249.

54. Reddy B K S, Veeralingam S, Borse P H, & Badhulika S. (2022). Nanotechnology PAPER 1D NiO–3D Fe2O3 mixed dimensional heterostructure for fast response flexible broadband photodetector. Nanotechnology, 33(23). https://doi.org/10.1088/1361-6528/ac5838.

55. Veeralingam S & Badhulika S. (2022). Enzyme immobilized multi-walled carbon nanotubes on paper-based biosensor fabricated via mask-less hydrophilic and hydrophobic microchannels for cholesterol detection. Journal of Industrial and Engineering Chemistry, 113(undefined). https://doi.org/10.1016/j.jiec.2022.06.015.

56. Veeralingam S, Gunasekaran S S, & Badhulika S. (2022). Bifunctional NiFe LDH as a piezoelectric nanogenerator and asymmetric pseudo-supercapacitor. Materials Chemistry Frontiers, 6(16). https://doi.org/10.1039/d2qm00275b.

57. Sha R, Vishnu N, & Badhulika S. (2022). Single Step Synthesis of 2-D Marcasite FeS2 Micro-Flowers Based Electrochemical Sensor for Simultaneous Detection of Four DNA Bases. IEEE Transactions on Nanotechnology, 21(undefined). https://doi.org/10.1109/TNANO.2022.3190223.

58. Durai L, & Badhulika S. (2022). Hydrothermal Synthesis of Non- noble Hybrid Cu2S Decorated Nickel Foam and Its Enhanced Electrocatalytic Activity for Direct Aluminum Fuel Cell Application. ACS Applied Energy Materials, 5(8). https://doi.org/10.1021/acsaem.2c00579.

59. Reddy M K K & Sarkar V. (2022). Designing a Generic Multi-Modality Processing Adapter for the Practical Implementation of the Photovoltaic Regulated Power Point Tracking under the Partial Shading. Electric Power Systems Research, 208(undefined). https://doi.org/10.1016/j.epsr.2022.107806.

60. Sarkar L, Sushma MV, Yalagala BP, Rengan AK, Singh SG, & Vanjari SRK(2022), ZnO nanoparticles embedded silk fibroin - A piezoelectric composite for nanogenerator applications. Nanotechnology, 33(26) https://doi.org/10.1088/1361-6528/ac5d9f.

61. Moganti GLK, Siva Praneeth VN, & Vanjari SRK(2022), A Hybrid Bipolar Active Charge Balancing Technique with Adaptive Electrode Tissue Interface (ETI) Impedance Variations for Facial Paralysis Patients. Sensors, 22(5) https://doi.org/10.3390/s22051756.

62. Ramesh A, Gavaskar DS, Nagaraju P, Duvvuri S, Vanjari S.R.K., & Subrahmanyam C.(2022) . Mn-doped ZnO microspheres prepared by solution combustion synthesis for room temperature NH<inf>3</inf> sensing. Applied Surface Science Advances, 12(undefined) https://doi.org/10.1016/j.apsadv.2022.100349.

63. Bonam S., Joseph J., Kumar C.H., Panigrahi A.K., Vanjari S.R.K., & Singh S.G.(2022) . Fabrication of On-Silicon Aperture Coupled Patch Antenna Through Micromachining and Cu-Cu Thermocompression Bonding. IEEE Transactions on Semiconductor Manufacturing, 35(4) https://doi.org/10.1109/TSM.2022.3201300.

64. Yalagala B.P., Sankaranarayanan S.A., Rengan A.K., & Vanjari SRK (2022), Biocompatible, Flexible, and High-Performance Nanowelded Silver Nanowires on Silk Fibroin for Transparent Conducting Electrodes toward Biomemristor Application. ACS Sustainable Chemistry and Engineering, 10(14) https://doi.org/10.1021/acssuschemeng.1c08227.

65. Sarkar L., Yelagala B.P., Singh S.G., & Vanjari SRK (2022), Electrodeposition as a facile way for the preparation of piezoelectric ultrathin silk filmâ€"based flexible nanogenerators. International Journal of Energy Research, 46(3) https://doi.org/10.1002/er.7393.

66. Ramesh A., Gavaskar D.S., Nagaraju P., Duvvuri S., Vanjari SRK, & Subrahmanyam C(2022), Mn-doped ZnO microspheres prepared by solution combustion synthesis for room temperature NH<inf>3</inf> sensing. Applied Surface Science Advances, 12(undefined) https://doi.org/10.1016/j.apsadv.2022.100349.

67. Sarkar L, Yelagala BP, Singh SG, & Vanjari SRK (2022), Electrodeposition as a facile way for the preparation of piezoelectric ultrathin silk filmâ€"based flexible nanogenerators. International Journal of Energy Research, 46(3) https://doi.org/10.1002/er.7393.

68. Yalagala BP, Sankaranarayanan SA, Rengan AK, & Vanjari SRK (2022), Biocompatible, Flexible, and High-Performance Nanowelded Silver Nanowires on Silk Fibroin for Transparent Conducting Electrodes toward Biomemristor Application. ACS Sustainable Chemistry and Engineering, 10(14) https://doi.org/10.1021/acssuschemeng.1c08227.

69. Moganti GLK, Siva Praneeth VN, & Vanjari SRK (2022), A Hybrid Bipolar Active Charge Balancing Technique with Adaptive Electrode Tissue Interface (ETI) Impedance Variations for Facial Paralysis Patients. Sensors, 22(5) https://doi.org/10.3390/s22051756.

70. Gangwar R, Ray D, Rao KT, Khatun S, Subrahmanyam C, Rengan AK, & Vanjari SRK (2022), Plasma Functionalized Carbon Interfaces for Biosensor Application: Toward the Real-Time Detection of Escherichia coli O157: H7. ACS Omega, 7(24) https://doi.org/10.1021/acsomega.2c01802.

71. Bonam S, Joseph J, Kumar CH, Panigrahi AK, Vanjari SRK, & Singh SG (2022), Fabrication of On-Silicon Aperture Coupled Patch Antenna Through Micromachining and Cu-Cu Thermocompression Bonding. IEEE Transactions on Semiconductor Manufacturing, 35(4) https://doi.org/10.1109/TSM.2022.3201300.

72. Sarkar L, Sushma MV, Yalagala BP, Rengan AK, Singh SG, & Vanjari SRK (2022), ZnO nanoparticles embedded silk fibroin - A piezoelectric composite for nanogenerator applications. Nanotechnology, 33(26) https://doi.org/10.1088/1361-6528/ac5d9f.

73. Gangwar R, Ray D, Rao KT, Khatun S, Subrahmanyam C, Rengan AK, & Vanjari SRK (2022),asma Functionalized Carbon Interfaces for Biosensor Application: Toward the Real-Time

Detection of Escherichia coli O157: H7. ACS Omega, 7(24) https://doi.org/10.1021/acsomega.2c01802.

Funded Research Projects:

1. Aditya T Siripuram; Development of Real-time audio and speech processing modules for robot audition; 230.4 L. [RCI DRDO/EE/F001/2022-23/S232].

2. Amit Acharyya; Power Optimization of Auxiliary Systems SO no: sezu-2-20220714-054 Dt:14.07.2022 (Payment milestone:35% after releasing SO); 13.8 L. [MOBIS/EE/F091/2022-23/S234].

3. Amit Acharyya; Collaboration Service for Machine Learning based Models; 27.6 L. [S211].

4. Amit Acharyya; Spintronics-based Digital logic Architecture Design for AI Applications; 60 L. [SERB/EE/F091/2022-23/G546].

5. Emani Naresh Kumar; Assistive Software for auditing the security of quantum communication equipment; 14.73 L. [QSIPL/CSE//F010/2022-23/S260].

6. Emani Naresh Kumar; Engineering Light Emission in Nanophotonic Structures Using Two-Pulse Excitation; 51.7 L. [SERB/EE/F195/2022-23/G534].

7. G V V Sharma; 5G-Adv ORAN Massive MIMO Base Station; 7499 L. [IIITB-COMET/EE/F072/2022-23/G473].

8. Jose Titus; Six-phase induction motar drives with extended speed range using silicon carbide based current source inverter and silicon IGBT based voltage source inverter for electric traction applications; 32.98 L. [SERB/EE/F283/2022-23/G506].

9. Mohammed Zafar Ali Khan; IIT-H-Terragraph-60 GHz Trial; 0.49 L. [FCL/EE/F013/2022-23/S244].

10. Oves Mohamed Hussein Badami; Development of simulation framework and modeling of bipolar valence change RRAM:Focus on the electron transport and ambient temperature; 28.96 L. [DST-SERB/EE/F241/2022-23/G498].

11. Rupesh Ganpatrao Wandhare; Design of power converter for 3-phase grid integration of Hydrogen fed PME Fuel cell using high frequency link multistage converter; 51.69 L. [G433].

1.

12. Rupesh Ganpatrao Wandhare; Hybrid Bridge Isolated DC-DC Converter with Zero Voltage Switching for a Wide Range of Operations and Suitable for Auxiliary Supply in EV; 37.54 L. [G460].

13. Shashank Vatedka; Classical and quantum error correcting codes and mathematics over finite fields for smart telecomm; 0 L. [DST/MA/F247-F228/2022-23/G485].

14. Shashank Vatedka; Distributed estimation and learning with limited communication; 30.51 L. [SERB/EE/F228/2022-23/G522].

15. Shubhadeep Bhattacharjee; Tunable Synaptic plasticity in Mos transistor for low-power spiking neural networks; 33.1 L. [SERB/EE/F279/2022-23/G497].

16. Shubhadeep Bhattacharjee; BEOL compatible MoS2 synaptic transistors; 8 L. [ASCENT (Only consumables and travel grant)].

17. Shubhadeep Bhattacharjee; Heterogenous Integration of Neuromorphic Devices with 2D Semiconductors; 25 L. [EE/F279/2022-23/SG117].

18. Sri Rama Murty Kodukula; Recent Advances in Speech Recognition; 0.33 L. [QUALCOMM/EE/F001/2022-23/S221].

19. Sri Rama Murty Kodukula; Development of Real-time audio and speech processing modules for robot audition; 230.4 L. [RCI DRDO/EE/F001/2022-23/S232].

20. Sri Rama Murty Kodukula; Speech technologies in Indian languages under the project titled National Language Translation Mission(NLTM): BHASHINI; 86 L. [MEITY/EE/F001/2022-23/G459].

21. Sumohana S Channappayya; Development of Real-time Video perception capabilities Capabilities for an Autonomous Robot; 267.38 L. [RCI DRDO/EE/F100/2022-23/S231].

22. Sumohana S Channappayya; Network Design for Autonomous Navigation; 24.8 L. [TiHAN-IITH/EE/F261/2022-23/G489].

23. Sundaram Vanka; Network Design for Autonomous Navigation; 24.8 L. [TiHAN-IITH/EE/F261/2022-23/G489].

24. Sushmee Badhulika; 3D printed 2D-MoS2 Triboelectric Nanogenerator for Self-Powering Sensor to detect Pre-diabetes in human breath; 1.12 L. [TATASTEEL/EE/F135/2022-23/S224].

25. Siva Rama Krishna Vanjari; Fabrication of high temperature piezo pressure sensor for Aeronautical application; 34L; [ARDB/EE/F029/2022-23/G505].

26. Shishir Kumar; Game-changing low-cost, accurate and user-friendly patch-clamp microfluidic chip-based system for measurement of ion-channel activity in live biological cells; 358280; [IITH/BT/F145/SOCH2].

Awards and Recognitions:

Aditya T Siripuram received Excellence in teaching at IIT Hyderabad.

2. Amit Acharyya & his students Nikhitha Avula and Tarun Gupta won Design & Verification Conference India 2022 Hackathon "AI on FPGA".

3. Murali K Rajendran (PhD 2020), who worked under Ashudeb Dutta and Gajendranath Chowdhary has been appointed as an Assistant Professor at National Institute of Technology, Tiruchirappalli.

4. Nagaveni PhD (2021), who worked under Ashudeb Dutta has been appointed as an Assistant Professor at IIT Dharwad.

5. Jose Titus received the "International Travel Grant" from the Science & Engineering Research Board, Govt. of India under the SERB-ITS scheme (2022) for attending the IEEE Industrial Electronics Conference in Belgium, Brussels in October 2022.

6. Kalloor Joseph, Francis(PhD) who worked under Sumohana Channapayya and Rajya Laxmi received the Dutch personal grant VENI and as Assistant professor position at the University of Twente.

7. Pavan Kumar Reddy Manne (PhD 2021) who worked under Kiran Kumar Kuchi received IEEE GraTE'7 Best PhD Thesis Award 2022.

8. Lakshmi Prasad Natarajan received the INSA Young Scientist Award 2022.

9. Ravikumar Bhimasingu's paper titled "State of Charge Estimation of Li-ion Batteries through Efficient Gated Recurrent Neural Networks using Engineered features" received "Best Paper Award" under "Power and Energy Systems Track" at IEEE INDICON 2022 (IEEE 19th India Council International Conference, held during Nov 24-26, 2022 at Cochin, Kerala).

10. Shashank Vatedka has been elevated to Senior Member, IEEE.

11. Shashank Vatedka received the Best paper award (communications track) at the 2023 National Conference on Communications, IIT Guwahati, India (coauthored with PhD student Ritesh Kumar).

12. Kancharla Parimala (PhD 2022), who worked under Sumohana Channapayya appointed as an Assistant Professor at School of Computing and Electrical Engineering, IIT Mandi.

13. Sundaram Vanka has been the nominated Member, National Working Group-15 corresponding to ITU-T Study Group -15 regarding "Networks, Technologies and Infrastructures for Transport, Access & Home since 2022.

14. Sushmee Badhulika received 1st prize in Tata Steel Materials Next contest, 2022.

15. Sri Rama Murty Kodukula guided BTech EE students won second position worldwide in IEEE Signal Processing Cup, SPCUP, at ICASSP – 2022.

16. Vaskar Sarkar received the Best paper award in POWERCON 2022 for the paper "Accurate regulation of the power output of a two-stage photovoltaic system with minimal local energy storage".

Research Highlights:

Electrical Engineering Department, IITH is committed to pushing the boundaries of knowledge through research and innovation. In 2022, numerous things can be included; a few are the following.

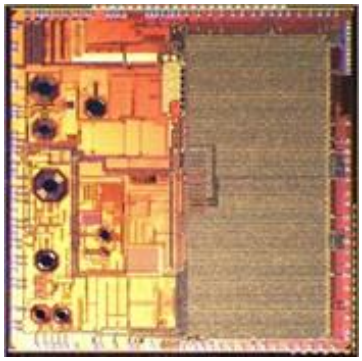
1. Developed and integrated the indigenous 5Gi standard – Prof Kiran Kuchi:

Prof Kiran Kuchi Developed and integrated the indigenous 5Gi standard, harmonizing it with the global 5G standard while protecting Indian intellectual property rights (IPR). Further, he introduced the world's first indigenous 5G modem System-on-Chip (SoC) called NB-IoT, enabling connectivity to terrestrial 5G base stations and satellites. This product has achieved commercial success. Additionally, Pioneered a novel 5G MIMO technology, successfully developed and introduced to the market.

Transceiver	3GPP TS36.211 Rel14 compliant
Bands Supported	1, 2, 3, 5, 8, 12, 13, 17, 18, 19, 20, 26, 28, 66, & L Band
Location	GPS, GLONASS, Galileo, NavIC Constellations
MCU	ARM Cortex M4
DSP	Yes, Separate
Interfaces	Digital GPIO, PWM, I2C, UART, Quad SPI
Fab	40nm TSMC
Dimensions	7mm x 7mm x 1mm

5G SoC Specifications

Extreme massive MIMO Lab Prototype



Magnified view of the 5G SoC Die

2. White Paper has been published on the prestigious Bharat 6G Alliance website – Prof Kiran Kuchi:

Prof. Kiran Kuchi and his R&D team authored a White Paper titled: "MEETING IMT2030 PERFORMANCE TARGETS: THE POTENTIAL OF OTFDM WAVEFORM AND STRUCTURAL MIMO TECHNOLOGIES." The White Paper has been published on the prestigious Bharat 6G Alliance website at: https://bharat6galliance.com/img/pdf/Whitepaper_on_The_Potential.pdf. The paper delves into several candidate technologies crucial for the development of 6G systems. Two key technologies, Orthogonal Time Frequency Division Multiplexing (OTFDM) waveform and Structural MIMO (S-MIMO), are examined in-depth.

White Paper has been published on the prestigious Bharat 6G Alliance website

3. IOT-enabled aquaculture monitoring system - Prof Shiv Govind Singh

The team led by Prof Shiv Govind Singh has focused on an IOT-enabled aquaculture monitoring system to assist fish farmers. Dr Singh interacted with nearby villagers and came to know that fish farming is their one of the major sources of income. Even after getting all the benefits of Government schemes, the profit margins are very less due to fish mortality, ignorance in fish farming, no control of water quality and other related parameters. His team took the challenge to support them technically by intimating water quality through a web application. Prof. Singh led another very important discovery in the domain of gas sensors. His team made a very significant contribution in this domain to overcome the very important problem in gas sensors. His team's discovery paved the way for room temperature, high selective, high sensitive mixed gas concentration and fast response perdition using an analytical model.

IoT-enabled aquaculture monitoring hardware—team meeting with framers at ground zero

4. Development of a speech interface to the command control system – Prof K Sri Rama Murty:

Dr K Sri Rama Murty led the development of a speech interface to the command control system, sponsored by DRDL - DRDO. Missile launch vehicles typically travel on rugged terrain. In such situations, it is extremely difficult to use a keyboard and mouse to interface with surveillance software and issue commands, including missile launches. The SIP lab at IITH has successfully developed and deployed a voice interface to interact with the surveillance/missile launching software. This software was received well by the users of DRDL and the Army and is being deployed on their vehicles. The major challenge in this project is the low SNR of the collected speech signals. A typical missile launching vehicle contains a couple of electric power generators, RADAR equipment, heavy-duty air conditioning units, and computing hardware, all packed into a small space, leading to high noise levels. The proposed speech interface is specifically designed to combat such high noise levels in missile launch vehicles.

5. 1. Designed fast, efficient and accurate image-matching algorithms for RGB and thermal aerial imagery - Prof Sumohana S Channappayya

Prof Sumohana S Channappayya and his team designed fast, efficient and accurate image-matching algorithms for RGB and thermal aerial imagery. Specifically, the algorithms are designed to run on a low-cost and low-resource hardware platform and deliver real-time performance. The intended applications are surveillance and reconnaissance.

Department of Entrepreneurship and Management

The Department of Entrepreneurship and Management is one of the recently established departments at IIT Hyderabad. The department's faculty strength increased by 3 in this year. We are joined by three new Assistant Professors: Dr Ranapratap Maradana, Dr Jayshree Patnaik, and Dr Rajesh Ittamalla. Dr B Ravi from IIT Bombay joined the department as an Adjunct Faculty during the year. The Department kickstarted the MTech in Techno Entrepreneurship Programme in July 2022 with 10 Students enrolled in the program in a Self-Sponsored Mode. The first batch of students enrolled in the MTech Dual Degree in Techno Entrepreneurship program passed out in July 2022. The department also offers a Minor in Entrepreneurship for the BTech Students.

For more information, please visit: https://em.iith.ac.in/

Faculty

Head of the Department

M P Ganesh
PhD - IIT Bombay
Associate Professor Profile page:
https://iith.ac.in/la/mpganesh/

Assistant Professor

Jayshree Patnaik
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/em/jpatnaik/

Lohithaksha Maniraj Maiyar
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/em/l.maiyar/

Nakul Parameswar
PhD - IIT Delhi
Profile page:
https://iith.ac.in/em/nakul/

Rajesh Ittamalla
PhD - University of Hyderabad
Profile page:
https://iith.ac.in/em/rajeshittamalla/

RanaPratap Maradana
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/em/ranapratap/

Adjunct Professor

Prof Bhallamudi Ravi
Institute Chair Professor,
ME Department, IIT Bombay
Profile page:
https://www.me.iitb.ac.in/?q=faculty/Prof.%20B.%20Ravi

Publications:

1. Patnaik J, & Bhowmick B. (2022). Determining appropriateness for management of appropriate technology: an empirical study using factor analysis. Technology Analysis and Strategic Management, 34(2). https://doi.org/10.1080/09537325.2021.1890013.

2. Banerjee S, Patnaik J, Bhowmick B, & Dan P K. (2022). Role of Academic Initiatives for Technology Management at the Base of the Pyramid: Empirical Evidence from India. International Journal of Innovation and Technology Management, undefined(undefined). https://doi.org/10.1142/S0219877022500158.

3. Patnaik J & Tarei PK. (2022). Analyzing appropriateness in appropriate technology for achieving sustainability: A multi-sectorial examination in a developing economy. Journal of Cleaner Production, 349(undefined). https://doi.org/10.1016/j.jclepro.2022.131204.

4. Ghadge A, Mogale D G, Bourlakis M, Maiyar L M, & Moradlou H. (2022). The link between Industry 4.0 and green supply chain management: Evidence from the automotive industry. Computers & Industrial Engineering, 169, 108303. https://doi.org/10.1016/j.cie.2022.108303.

5. Bindra S, Sharma D, Parameswar N, Dhir S, & Paul J. (2022). Bandwagon effect revisited: A systematic review to develop future research agenda. Journal of Business Research, 143. https://doi.org/10.1016/j.jbusres.2022.01.085.

6. Parameswar N, Dhir S, Khoa T T, Galati A, & Ahmed Z U. (2022). Dynamics of the termination of global alliances: probing the past, analyzing the present, and defining the frontiers for future research. International Marketing Review, 39(5). https://doi.org/10.1108/IMR-01-2021-0046 .

7. Anand A, Buhagiar K, Kozachenko E, & Parameswar N. (2022). Exploring the role of knowledge management in contexts of crisis: a synthesis and way forward. International Journal of Organizational Analysis, https://doi.org/10.1108/IJOA-02-2022-3156.

8. Parameswar N, & Dhir S. (2022). Delhivery: Fulfilling E-commerce Delivery. Asian Journal of Management Cases, 19(2). https://doi.org/10.1177/09728201221080684.

9. Hasan Z, Parameswar N, & Ongsakul V. (2022). Multilevel analysis of factors influencing innovation through m-TISM approach. Journal for International Business and Entrepreneurship Development, 14(1). https://doi.org/10.1504/JIBED.2022.124246.

10. Praveen S V, & Ittamalla R. (2022). The General public's attitude toward governments implementing digital contact tracing to curb COVID-19 is a study based on natural language processing. International Journal of Pervasive Computing and Communications, 18(5). https://doi.org/10.1108/IJPCC-09-2020-0121.

11. Sv P, Lorenz J M, Ittamalla R, Dhama K, Chakraborty C, Kumar D V S, & Mohan T. (2022). Twitter-Based Sentiment Analysis and Topic Modeling of Social Media Posts Using Natural Language Processing to Understand People's Perspectives Regarding COVID-19 Booster Vaccine Shots in India: Crucial to Expanding Vaccination Coverage. Vaccines, 10(11). https://doi.org/10.3390/vaccines10111929.

12. Sv P, Ittamalla R, & Balakrishnan J. (2022). Analyzing general public's perception on posttraumatic stress disorder and COVID-19: a machine learning study. Journal of Loss and Trauma, 27(7). https://doi.org/10.1080/15325024.2021.1982558.

13. Sv P, & Ittamalla R. (2022). What concerns the general public the most about monkeypox virus? – A text analytics study based on Natural Language Processing (NLP). Travel Medicine and Infectious Disease, 49(undefined). https://doi.org/10.1016/j.tmaid.2022.102404.

14. Praveen S V, Ittamalla R, & Subramanian D. (2022). Challenges in successful implementation of Digital contact tracing to curb COVID-19 from global citizen's perspective: a text analysis study. International Journal of Pervasive Computing and Communications, 18(5). https://doi.org/10.1108/IJPCC-09-2020-0147.

15. Praveen S V, Ittamalla R, & Subramanian D. (2022). How optimistic do citizens feel about digital contact tracing? – Perspectives from developing countries. International Journal of Pervasive Computing and Communications, 18(5). https://doi.org/10.1108/IJPCC-10-2020-0166.

16. Ittamalla R, & Srinivas Kumar D V. (2022). An empirical investigation of the impact of service experience on emotions, satisfaction, and loyalty for theme park visitors. International Journal of Business Excellence, 26(4). https://doi.org/10.1504/IJBEX.2022.122749.

17. Ajoy K Sarangi, Rudra P Pradhan, Tamal Nath1, and Hiranmoy Roy. (2022). How Does Innovation Affect Economic Growth? Evidence from G20 Countries. Sage Publications. https://doi.org/10.1177/0019466221106356.

Funded Research Projects:

1. Nakul Parameswar; Competitiveness of Indian Technological Start Ups-An Exploratory Study; 6.6 L. [ICSSR/E&M/F269/2022-23/G468].

2. Rajesh Ittamalla; Start-up Branding: Determinants,

Dynamics, and Management Strategies; 13 L. [SG/IITH/F318/2022-23/SG-149].

3. Rajesh Ittamalla; Creating Agritourism Experiences: Customers Perspectives, Service Providers' Perspectives, and Entrepreneurial Perspective; 12 L. [ICSSR/DEM/F318/2023-24/G561].

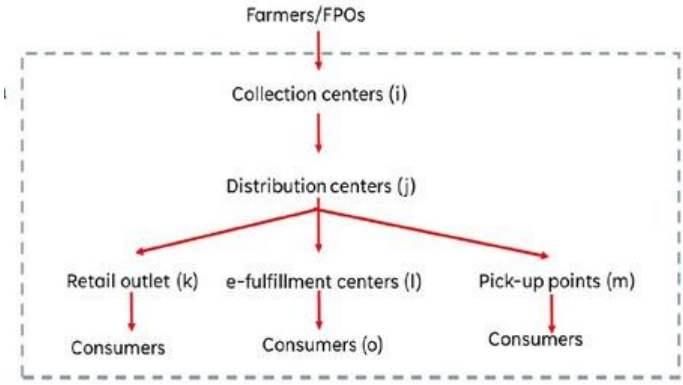
Awards & Recognitions:

1. Lohithaksha Maniraj Maiyar received top reviewer recognition from Cogent Engineering journal, Taylor and Francis for reviewing papers for the journal in past 4 years as on 12 September 2022.
2. Lohithaksha Maniraj Maiyar received 3rd best prize for jointly co-authored conference presentation of PhD student Ms Indira Roy on "Omnichannel distribution network design for fresh-food procurement considering freshness keeping Effort and food quality loss" at the International Conference on Data Analytics in Public Procurement and Supply Chain 2022 (ICDPAS2022)" jointly organized by NITIE, Mumbai and AJNIFM, Faridabad. It involved a cash prize of Rs 50,000 to the team of co-authors.
3. Ms Indira Roy, Ph. D Scholar working with Dr. Lohithaksha M Maiyar was selected for the prestigious Prime Minister's Research Fellowship programme in the lateral entry mode during the year.

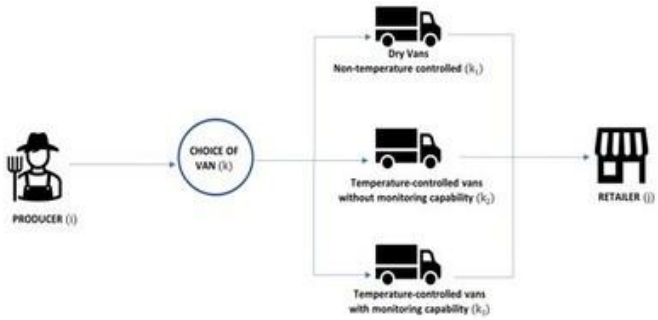
Research Highlights

1. **Research being undertaken in the areas of – Frugal Innovation, Sustainable Food Supply Chain, Startup Branding and New Venture Marketing, Venture Capital Investment and Innovation, Financial Inclusion, Women in Entrepreneurship and Competitiveness of Tech Start-ups.**

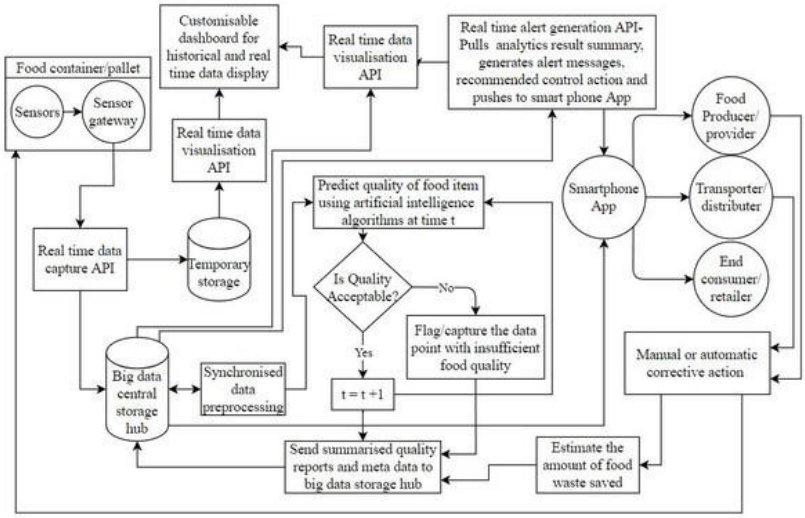
2. **Omni-Channel Distribution Network Design for Fresh Food Procurement Considering Freshness-Keeping Effort and Food Quality Loss co-authored by Indira Roy and Lohithaksha M Maiyar (DOI: https://doi.org/10.1007/978-981-99-1019-9_5):**



3. **A Decision Support Model for Cost-Effective Choice of Temperature-Controlled Transport of Fresh Food co-authored by Lohithaksha M Maiyar, Indira Roy, Ramakrishnan Ramanathan and Usha Ramanathan (DOI: https://doi.org/10.3390/su15086821):**



4. **Fighting food waste: How can Artificial Intelligence and Analytics help? Co-authored by Lohithaksha M Maiyar, Ramakrishnan Ramanathan, Shanta Lakshmi Belavadi Nagaraja Swamy and Usha Ramnathan (DOI: https://doi.org/10.1142/9781786349989_0008):**



Highlights

The Department undertook many activities during the year to promote and nurture an entrepreneurial mind set and innovative thinking among the students of IIT Hyderabad. A few notable programmes undertaken during the year are:

1. **The Department of Entrepreneurship and Management under the aegis of the Institute Innovation Council (IIC_IITH) organized a Fireside Chat with BoG Chairman Dr BVR Mohan Reddy for the Book Launch Event of "Engineered in India: From Dreams to Billion $ Cyient" for IITH Innovation Day on 7th January 2023.**

2. **The Department of Entrepreneurship and Management under the aegis of the Institute Innovation Council (IIC_IITH) along with iTIC IIT Hyderabad and Zinnov conducted a Webinar on "Evolution of Technology Startup Landscape in India' - A Debriefing Session" on 21st March 2023.**

3. **E-cell and the Department of Entrepreneurship and Management, in association with IIT Hyderabad Alumni Association, under the aegis of the Institute Innovation Council, organized the "Business Plan Development Challenge LEAD Pitch" competition to foster leadership and creativity among Japanese and Indian students on 16th March 2023.**

4. **E-Cell and the Department of Entrepreneurship and Management, under the aegis of the Institute Innovation Council (IIC_IITH), organized an interactive session "Students' Grilling Professors on Entrepreneurship" for students on 27th March 2023. Prof B Ravi, Adjunct Faculty, spearheaded the event along with Dr MP Ganesh, Head of Department, Dr Nakul Parameswar, and Dr Jayshree Patnaik from the Department.**

The flagship Entrepreneurship Talk Series organized by the Department of Entrepreneurship and Management gained further traction in the year 2022-2023, wherein 12 talks were undertaken as part of the series (details of these talks are mentioned below):

1. Mr Shiladitya Mallik; Co-founder and Chief Business Officer, SmartWinnr; Idea, Productization, Market Positioning And Need For Future Plans.
2. Mr Pankaj Dubey; Founder, DSPIN; Consulting Startup Ideation, Funding, Risk-Taking, Opportunity, Critical Thinking, Building Teams, Raising Capital, And Learning From Failures.
3. Mr Saurabh Jain; Founder & CEO, Fun2doLabs; The Entrepreneurial Perspectives And Real-Life Challenges That The Youth Should Solve.
4. Mr Samyak Jain; Founder & CEO, Myways.ai; Instilling Entrepreneurial Mindset Among Students Right from College.
5. Ms Deepshikha Kumar; Founder & CEO, Speakin Asia; Idea Execution, Importance of Internship.
6. Mr Ajay Jain; Founder & Managing Partner, Silverneedle Ventures; Problem-Solution Fit and Product-Market Fit.
7. Mr Manish Advani; Founder & CEO of MIMO Potentio; Entrepreneurship Skills & Motivation.
8. Ms Namratha Vedire; Director, Platform & Operations at 'Engage'; Process Of Innovation Development and Commercialization.
9. Mr Venus Desai; Co-Founder & CEO, NuGen Systems; Converting Innovation into Startup.
10. Ms. Shweta Suresh Thakare; Co-Founder of GramHeet; Impact Of Social Enterprise and Challenges.
11. Mr Suresh Susurla; CEO and MD of Startoon Labs Pvt Limited; Prototype/Process Design and Development.
12. Mr Srinivas Raghavan; N CTO of StartupXSeed; Product-Market Fit, And Reasons for Failure.

Department of Liberal Arts

The Department of Liberal Arts at IIT Hyderabad is one of the leading centers in the nation today for the study of Humanities and Social Sciences along with various dimensions of the creative and performing arts. While the department is founded on the traditional model of intellectual inquiry, it seamlessly amalgamates this with contemporary scholarly discourses of a globalized and technologized world. The department has grown especially over the last few years and currently boasts a team of twenty exceptionally gifted and dedicated full-time faculty members. Liberal Arts at IIT Hyderabad is also proud to have associated with it many eminent academics and professional practitioners as Adjunct Faculty. The latest names to be added to this group include renowned Western classical musician Mr Timothy Marthand and noted Educationist and Economist Prof Jandhyala B G Tilak. Where student achievements are concerned, the department is proud to have graduated two batches of Master's students this year with degrees in Development Studies and Health, Gender, and Society. More important, our former Master's students from Development Studies, Ms Keertana Kannabiran Tella—who published a book entitled Abortion Rights, Reproductive Justice and the State: International Perspectives (by Routledge)—and Shweta Thakare—who successfully initiated GramHeet or an AgriTech startup (with her husband Pankaj Mahalle)—have done us extremely proud. In fact, Ms Thakare was also featured in the "Forbes Asia 100 to Watch List"! Likewise, several doctoral scholars who have graduated from our department have joined many premier institutes as faculty and have kept the flag flying for the Department of Liberal Arts. The most recent additions to this group include Dr Sudarshan R Kottai, who has joined the Department of Humanities and Social Sciences at IIT Palakkad as an Assistant Professor, and Dr Sanjiv Kumar, who has joined the Department of Economics Sciences at IIT Kanpur as Assistant Professor. In addition, some of our doctoral scholars, such as Meghna Amin, have received the prestigious Fullbright-Nehru Scholarship.

In terms of faculty achievements, we have had several moments of glory over the last one year. While faculty publications include books brought out by reputed presses such as Routledge, Lexington Press, and Orient Blackswan, faculty journal publications have been equally stellar. Some of the most noted journals in the fields of Humanities and Social Sciences such as Engaging Science, Technology, and Society; Journal of South Asian Development; Mental Health, Religion and Culture; Feminism & Psychology; Economic Analysis and Policy; Text and Performance Quarterly; The Journal of International Trade & Economic Development; Environment & Development Economics; Economic Analysis and Policy; International Journal of Business Excellence; Menopause; ANQ: A Quarterly Journal of Short Articles, Notes and Reviews; Eneuro; Integrative & Communicative Biology; Anthropology & Medicine; and Lit: Literature Interpretation Theory, to name a few, have featured scholarly articles by the faculty of Liberal Arts. In addition, the department currently has several ongoing research projects with Liberal Arts faculty members functioning as Principal Investigators. Some of the most important names amongst these projects have been funded by the Economic and Social Research Council (ESRC), United Kingdom, Sree Padmavathi Venkateswara Foundation (SreePVF), the International Rice Research Institute, and SPARC, among others.

With such academic signposts as a backdrop in addition to several ongoing national and international collaborations with universities such as George Mason University, Swinburne, and Monash, and many other names in the pipeline, the department looks forward to not just a national but also a global presence in the near future. The present times demand a robust knowledge economy that bridges the gap between academic deliberations and societal transformation. The Department of Liberal Arts at IIT Hyderabad, by fostering the carpe diem spirit, aspires toward just that.

For more information, please visit: https://la.iith.ac.in/

Faculty

Head of the Department

Shubha Ranganathan
PhD - IIT Bombay
Associate Professor
Profile page:
https://iith.ac.in/la/shubha/

Professor

Badri Narayan Rath
PhD - Institute for Social and Economic Change, Bengaluru
Profile page:
https://iith.ac.in/la/badri/

Associate Professor

Amrita Deb
PhD - BHU, Varanasi
Profile page:
https://iith.ac.in/la/amrita/

Ganesh M P
PhD - IIT Bombay
Profile page:
https://iith.ac.in/la/mpganesh/

Haripriya Narasimhan
PhD - Syracuse University - NY, USA
Profile page:
https://iith.ac.in/la/haripriya/

Indira Jalli
PhD - University of Hyderabad
Profile page:
https://iith.ac.in/la/indiraj/

Mahati Chittem
PhD - University of Sheffield, UK
Profile page:
https://iith.ac.in/la/mahati/

Prabheesh K P
PhD - IIT Madras
Profile page:
https://iith.ac.in/la/prabheesh/

Prakash Chandra Mondal
PhD - IIT Delhi
Profile page:
https://iith.ac.in/la/prakashmondal/

Srirupa Chatterjee
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/la/srirupa/

Assistant Professor

Aalok Dinkar Khandekar
PhD - Rensselaer Polytechnic Institute
Profile page:
https://iith.ac.in/la/aalok/

Aardra Surendran
PhD - Jawaharlal Nehru University, New Delhi
Profile page:
https://iith.ac.in/la/aardra/

Amrita Datta
PhD - The Hague, The International Institute of Social Sciences (Erasmus University Rotterdam)
Profile page:
https://iith.ac.in/la/amritadatta/

Chandan Bose
PhD - University of Canterbury, New Zealand
Profile page:
https://iith.ac.in/la/chandanbose/

Gaurav Dhamija
PhD - Shiv Nadar University
Profile page:
https://iith.ac.in/la/gauravdhamija/

Neeraj Kumar
PhD - IIT Gandhinagar
Profile page:
https://iith.ac.in/la/neeraj.kumar/

Anindita Majumdar
PhD - IIT Delhi
Profile page:
https://iith.ac.in/la/anindita/

Dinabandhu Sethi
PhD - University of Hyderabad
Profile page:
https://iith.ac.in/la/dinabandhu/

Nandini Ramesh Sankar
PhD - Cornell University, USA
Profile page:
https://iith.ac.in/la/nandini/

Shuhita Bhattacharjee
PhD - University of Lowa
Profile page:
https://iith.ac.in/la/shuhita/

Adjunct Professor

S Irudaya Rajan
Professor, CDS, Thiruvananthapuram, Kerala ***Profile page:***
https://www.mei.edu/profile/s-irudaya-rajan

Adjunct Faculty

Anjal Prakash
Research Director and Adjunct Professor, Indian School of Business
Profile page:
https://www.isb.edu/en/Indo-Pacific/AnjalPrakash.html

Nanda Kishore Kannuri
Additional Professor, Indian Institute of Public Health, Hyderabad
Profile page:
https://phfi.org/member/nanda-kishore-kannuri-2/

Mridula Anand
Associate Director, Indian School of Business
Profile page:
https://www.linkedin.com/in/mridulaanand1/?originalSubdomain=in

Timothy Marthand
School of the Arts Singapore (SOTA)
Profile page:
https://www.linkedin.com/in/timothy-marthand-39264732/?originalSubdomain=in

Books:

1. Amrita Datta; Single-authored book: Migration and Development in India: The Bihar Experience. Routledge, Taylor, and Francis. (2022). https://www.routledge.com/Migration-and-Development-in-India-The-Bihar-Experience/Datta/p/book/9781032291833.

2. Chandan Bose and Mira Mohsini (editors). Encountering Craft: Methodological Approaches from Anthropology, Art History, and Design. https://www.routledge.com.

3 Shuhita Bhattacharjee; Monograph; Postsecular Theory: Texts and Contexts; Shuhita Bhattacharjee (Author), Sumit Chakrabarti (Ed.); Orient Blackswan, 2022. https://orientblackswan.com.

4. Srirupa Chatterjee and Swathi Krishna S (editors). Gendered Violence in Public Spaces: Women's Narratives of Travel in Neoliberal India. https://rowman.com.

Book Chapters:

1. Amrita Deb; Published a chapter in a Textbook for postgraduate psychology students. Deb, A. (2022) Block 3, Unit 9: Resilience research and applications. In MPCE-046, Applied Positive Psychology, Indira Gandhi National Open University.

2. Chandan Bose; Covid-19 Stories: Imaginations of the Local. (2022). Book chapter in edited volume Pandemic of Perspectives: Creative Re-imaginings, edited by Rimple Mehta, Sandali Thakur, and Debaroti Chakraborty, Routledge, London.

3. Shuhita Bhattacharjee; Book Chapter: 'Rosy Ki Khwaheeshein': Scripted Romance and Acquaintance Rape in Alankrita Shrivastava's Oeuvre of Female Desire," In Women Filmmakers in Contemporary Hindi Cinema: Looking through their Gaze. Edited by Aysha Iqbal Viswamohan. Palgrave Macmillan https://link.springer.com/book/9783031102318.

Publications:

1. Khandekar A. (2022). Aalok Khandekar. Interactions, 29(1). https://doi.org/10.1145/3505282.

2. Angela Okune, Grant Jun Otsuki, Tim Schutz, Clément Dreano, Noela Invernizzi, Duygu Kasdogan, Ali Kenner, Aalok Khandekar, Sujatha Raman, Federico Vasen, Amanda Windle, and Emily York. "Open Research Data: Experimenting towards a Publishing Infrastructure." Engaging Science, Technology, and Society 8(1): 1-13. https://doi.org/10.17351/ests2022.1885.

3. Khandekar, Aalok, Noela Invernizzi, Duygu Kasdogan, Ali Kenner, Angela Okune, Grant Jun Otsuki, Sujatha Raman, Amanda Windle, and Emily York. (2022). Building Community with ESTS. Engaging Science, Technology, and Society 8(1): 1-8. https://doi.org/10.17351/ests2022.1671.

4. Khandekar, Aalok, Clement Dreano, Noela Invernizzi, Duygu Kasdogan, Ali Kenner, Angela Okune, Grant Jun Otsuki, Sujatha Raman, Tim Schutz, Federico Vasen, Amanda Windle, and Emily York. (2022). Pursuing Transnational STS at ESOCITE/4S Joint Conference. Engaging Science, Technology, and Society 8(3): 1–7. https://doi.org/10.17351/ests2022.2011.

5. Latif, A. M, & Datta, A. (2023). Protecting the rights of women migrant domestic workers: structural violence and competing interests in The Philippines and Sri Lanka: by Sophie Henderson, London, Routledge, Taylor and Francis Group, pp. 206, US $120, ISBN 9781032015583 (hardback). South Asian Diaspora. 2023. https://doi.org/10.1080/19438192.2023.2188358.

6. Hakkim A & Deb A. (2022). Religious meaning-making and prosocial action among disaster response volunteers. Mental Health, Religion, and Culture, 25(7). https://doi.org/10.1080/13674676.2022.2116634.

7. S A & Deb A. (2022). Strength-Based Approach in Indian Clinical Practice: Reflections from a Five-year Ethnographic Study. Journal of Evidence-Based Social Work (United States), 19(6). https://doi.org/10.1080/26408066.2022.2091968.

8. Soni S & Deb A. (2022). From symptomology to resilience: Case illustrations of recovery from OCD using CBT. Journal of Human Behavior in the Social Environment, 32(8). https://doi.org/10.1080/10911359.2021.1983740.

9. Majumdar A & Qureshi A. (2022). Thinking about infertility from a mixed-methods perspective: the need to look at toxicity in rural India. Sexual and Reproductive Health Matters, 29(2). https://doi.org/10.1080/26410397.2021.1999565.

10. Majumdar A. (2022). Conceptualizing aged reproduction: genetic connectedness, son preference and assisted reproduction in North India. Reproductive Biomedicine and Society Online, 14(undefined). https://doi.org/10.1016/j.rbms.2021.11.005.

11. Majumdar A. (2022). Outliers and Rogue Doctors: Manufacturing "Anxiety" Around Older Mothers in India. Medical Anthropology: Cross-Cultural Studies in Health and Illness, 41(6-7) https://doi.org/10.1080/01459740.2022.2099275.

12. Anika Konig & Majumdar A. (2022). Paperwork: Following the trail of (identity) papers in transnational commercial surrogacy. International Journal of Comparative Sociology, 63(5-6).

https://doi.org/10.1177/00207152221102843.

13. Akram V, Rath B N, & Panda B. (2022). Convergence Analysis of Social Sector Expenditure and its Components: Evidence from the Indian States. Applied Economics, undefined(undefined). https://doi.org/10.1080/00036846.2022.2118962.

14. Jangam B P & Rath B N. (2022). Global value chain linkages and domestic value-added content: Empirical evidence. Studies in Economics and Finance, 39(4). https://doi.org/10.1108/SEF-09-2020-0383.

15. Narayan P K, Rath B N, & Syarifuddin F. (2022). Understanding the role of trade agreements in Indonesia's FDI. Journal of Asian Economics, 82(undefined). https://doi.org/10.1016/j.asieco.2022.101532.

16. Ansari M A, Villanthenkodath M A, Akram V, & Rath B N. (2022). The nexus between ecological footprint, economic growth, and energy poverty in sub-Saharan Africa: a technological threshold approach. Environment, Development, and Sustainability, undefined(undefined). https://doi.org/10.1007/s10668-022-02377-5.

17. Behera C & Rath B N. (2022). The connectedness between Twitter uncertainty index and stock return volatility in the G7 countries. Applied Economics Letters, 29(20). https://doi.org/10.1080/13504851.2021.1963656.

18. Rath B N & Bhattacharya P. (2022). Does Innovation Outcomes Influence the Performance of Indian Manufacturing Firms? Buletin Ekonomi Moneter dan Perbankan, 25(undefined). https://doi.org/10.21098/bemp.v25i0.1824.

19. Akram V & Rath B N. (2022). Does government revenue converge across Indian states? Evidence from club convergence. Applied Economics Letters, 29(10). https://doi.org/10.1080/13504851.2021.1897734.

20. Akram V & Rath B N. (2022). Public Health Expenditure Convergence Across Indian States: New Evidence from Lm and Rals-Lm Tests. Singapore Economic Review, undefined(undefined). https://doi.org/10.1142/S0217590822500631.

21. Sahoo P K, Le V, & Rath B N. (2022). The Determinants of Firm Competitiveness: Evidence from the Indian Manufacturing Sector. International Journal of the Economics of Business, 29(2). https://doi.org/10.1080/13571516.2021.1959251.

22. Sahoo P K, Rath B N, & Le V. (2022). Nexus between export, productivity, and competitiveness in the Indian manufacturing sector. Journal of Asian Economics, 79(undefined). https://doi.org/10.1016/j.asieco.2022.101454.

23. Bose C. (2022). Old tales through new images and new tales through old images: ethnography of a Jambavantaru katha (narrative) performance in Telangana. Text and Performance Quarterly, 42(4). https://doi.org/10.1080/10462937.2022.2102674.

24. Bose C. (2022). How Does Law Prescribe Circulation of Children? Understanding Different Kinds of Movement Within the Adoption Law in India. Journal of Family Issues, 43(7). https://doi.org/10.1177/0192513X211030058.

25. Swenden W, Sengupta P, Sarvananthan M, Surendran A, & Ruwanpura K N. (2022). State Capacity, Ideology and the Management of COVID-19 in South Asia: India and Sri Lanka in Perspective. Journal of South Asian Development, 17(3). https://doi.org/10.1177/09731741221124279.

26. Nayak S & Surendran A. (2022). Caste biases in school textbooks: a case study from Odisha, India. Journal of Curriculum Studies, 54(3). https://doi.org/10.1080/00220272.2021.1947389.

27. Surendran A. (2022). Contested capital: Rural middle classes in India, By Maryam Aslany. Cambridge University Press. 2020. Pp xxiii+ 299. $120.00 (hb). ISBN: 978-1-108-83633-3. Journal of Agrarian Change. (DoI??).

28. Sahoo P K & Sethi D. (2022). Market efficiency of the cryptocurrencies: Some new evidence based on price–volume relationship. International Journal of Finance and Economics, undefined(undefined). https://doi.org/10.1002/ijfe.2744.

29. Mohanty A, Sethi D, & Mohanty A R. (2022). Does petroleum tax revenue drive the sales tax effort of Indian states? A stochastic frontier approach. International Journal of Finance and Economics, 27(1). https://doi.org/10.1002/ijfe.2212.

30. Dhamija G, Ojha M, & Roychowdhury P. (2022). Hunger and Health: Reexamining the Impact of Household Food Insecurity on Child Malnutrition in India. Journal of Development Studies, 58(6). https://doi.org/10.1080/00220388.2022.2029419.

31. Dhamija G & Sen G. (2022). Lasting impact on health from natural disasters, potential mechanisms, and mitigating effects. Environment and Development Economics, undefined(undefined). https://doi.org/10.1017/S1355770X2200016X.

32. Dhamija G & Sen G. (2022). Impact of early life shocks on educational pursuits-Does a fade out co-exist with persistence? PLoS ONE, 17(10 October). https://doi.org/10.1371/journal.pone.0275871.

33. Roychowdhury P & Dhamija G. (2022). Don't cross the line: Bounding the causal effect of hypergamy violation on domestic violence in India. Journal of the Royal Statistical Society. Series A: Statistics in Society, 185(4). https://doi.org/10.1111/rssa.12858.

34. Kumar N, Sidarta A, Smith C, & Ostry D J. (2022). Ventrolateral Prefrontal Cortex Contributes to Human Motor Learning. eNeuro, 9(5). https://doi.org/10.1523/ENEURO.0269-22.2022.

35. Rangaswamy N & Narasimhan H. (2022). The Power of Data Science Ontogeny: Thick Data Studies on the Indian IT Skill Tutoring Microcosm. Transforming Communication, undefined(undefined). https://doi.org/10.1007/978-3-030-96180-0_4.

36. Shareef A O & Prabheesh K P. (2022). Does International Monetary Policy influence the Bank Risk? Evidence from India. Buletin Ekonomi Moneter dan Perbankan, 25(2). https://doi.org/10.21098/bemp.v25i2.1867.

37. Padhan R & Prabheesh K P. (2022). A Survey of Literature on Measurement of Financial Integration: Need, Challenges, and Classification. Emerging Markets Finance and Trade, 58(3). https://doi.org/10.1080/1540496X.2021.1911802.

38. Prabheesh K P & Kumar S. (2022). How Do the Financial Markets Respond to India's Asset Purchase Program? Evidence from the COVID-19 Crisis. Emerging Markets Finance and Trade, undefined(undefined). https://doi.org/10.1080/1540496X.2022.2148463.

39. Kumar S, Prabheesh K P, & Bashar O. (2022). Examining the effectiveness of macroprudential policy in India. Economic Analysis and Policy, 75(undefined). https://doi.org/10.1016/j.eap.2022.04.011.

40. Garg B & Prabheesh K P. (2022). Is Indonesia's Current Account Balance Optimal? Evidence from an Intertemporal Approach. Buletin Ekonomi Moneter dan Perbankan, 25(undefined). https://doi.org/10.21098/bemp.v25i0.1843.

41. Prabheesh K P, Taghizadeh-Hesary F, & Padhan R. (2022). Does Infrastructure investment lead to economic growth? Evidence from central Asian countries. Unlocking Private Investment in Sustainable Infrastructure in Asia, undefined(undefined). https://doi.org/10.4324/9781003228790-8.

42. George P N, Ganesh M P, Chawak S, & Chittem M. (2022). Factors Associated with Choosing the Kerala Model of Palliative Care versus Standard Care among Indian Cancer Patients. Indian Journal of Medical and Paediatric Oncology, undefined(undefined). https://doi.org/10.1055/s-0042-1742613.

43. Chittem M, Kelada L, Muppavaram N, Lingappa L, & Wakefield C E. (2022). Unmet and under-met needs among Indian parents of children with neurological disorders. Journal of Pediatric Nursing, 63(undefined). https://doi.org/10.1016/j.pedn.2021.11.015.

44. Chawak S, Chittem M, Dhillon H, Huilgol N, & Butow P. (2022). Treatment-related communication experiences and expectations among Indian cancer patients receiving radiation therapy and their family members: A qualitative study. Patient Education and Counseling, 105(9). https://doi.org/10.1016/j.pec.2022.05.003.

45. Chittem M, Eliott J, & Olver I. (2022). Demonstrating the importance of cultural considerations at end of life utilizing the perspective of Indian patients with cancer. Supportive Care in Cancer, 30(3). https://doi.org/10.1007/s00520-021-06656-1.

46. George P, Chittem M, Dwivedi R, Pal C, Guntupalli Y, Pati S, & Chakravarthi R. (2022). The empathy factor: The role of empathy in knowledge, attitude, and practice of organ donation in India - A crossectional, observational study. Indian Journal of Transplantation, 16(3). https://doi.org/10.4103/ijot.ijot_64_21.

47. Chittem M, Sridharan S G, Pongener M, Maya S, & Epton T. (2022). Experiences of barriers to self-monitoring and medication management among Indian patients with type 2 diabetes, their primary family members, and physicians. Chronic Illness, 18(3) https://doi.org/10.1177/17423953211032251.

48. Shunmugasundaram C, Dhillon H M, Butow P N, Sundaresan P, Chittem M, Akula N, Veeraiah S, Huilgol N, & Rutherford C. (2022). Body Image Scale: Evaluation of the Psychometric Properties in Three Indian Head and Neck Cancer Language Groups. Frontiers in Psychology, 13(undefined). https://doi.org/10.3389/fpsyg.2022.779850.

49. George P N, Ganesh M P, Chawak S, & Chittem M. (2022). Factors Associated with Choosing the Kerala Model of Palliative Care versus Standard Care among Indian Cancer Patients. Indian Journal of Medical and Paediatric Oncology, 43. https://doi.org/10.1055/s-0042-1742613 .

50. Lathia T, Selvan C, Namjoshi S, Chawak S, Kelada L, & Chittem M. (2022). Indian physicians' attitudes and practice regarding menopause and its management: a focus group discussion. Menopause, 29(11). https://doi.org/10.1097/GME.0000000000002059.

51. Nandini Ramesh Sankar. (2022). "Potatosoap": Moly in James Joyce's Ulysses. ORCID Icon. https://doi.org/10.1080/0895769X.2022.2059752.

52. Tarbuck A & Sankar N R. (2022). Book reviews: Greg Thomas, Border Blurs: Concrete Poetry in England and

Scotland. (2022). Zoe Skoulding, Poetry & Listening: The Noise of Lyric (2020). Journal of British and Irish Innovative Poetry 14(1). doi: https://doi.org/10.16995/bip.9753.

53. Mondal P. (2022). Meaning Relations, Syntax, and Understanding. Axiomathes, 32(3). https://doi.org/10.1007/s10516-021-09534-x.

54. Mondal P. (2022). Disunity with unity in cognition within the context of language–biology relations. Journal of Theoretical and Philosophical Psychology, 42(1). https://doi.org/10.1037/teo0000156.

55. Mondal P. (2022). The Puzzling Chasm Between Cognitive Representations and Formal Structures of Linguistic Meanings. Cognitive Science, 46(9). https://doi.org/10.1111/cogs.13200.

56. Mondal P. (2022). A Critical Perspective on the (Neuro) Biological Foundations of Language and Linguistic Cognition. Integrative Psychological and Behavioral Science, undefined(undefined) https://doi.org/10.1007/s12124-022-09741-0.

57. Mondal P. (2022). Predicate Concepts and their Normal Form. Computacion y Sistemas, 26(1). https://doi.org/10.13053/CyS-26-1-4161.

58. Mondal P. (2022). A Unifying Perspective on Perception and Cognition Through Linguistic Representations of Emotion. Frontiers in Psychology, 13(undefined). https://doi.org/10.3389/fpsyg.2022.768170.

59. Shuhita Bhattacharjee. (2022). "Dark Humour and the Female Performance of Subversion in South- Asian Diaspora Cinema: Chadha's Rich Deceiver, It's A Wonderful Afterlife, and What Do You Call an Indian Woman Who's Funny?" South Asian Studies. 2022. https://doi.org/10.1080/02666030.2022.2035085.

60. Chatterjee S & Rastogi S. (2022). Television culture and the beauty bias problem: an analysis of India's postmillennial television serials. Media Asia, 49(3). https://doi.org/10.1080/01296612.2021.2010939.

61. Chatterjee, Srirupa, and Shreya Rastogi. (2022). Colorism and Female Identity: Discourses from Twentieth Century Indian Literature and Culture. Papers on Language and Literature. 58.3, 2022. https://www.siue.edu/pll/forthcoming_essays.shtml.

62. Anand A V, & Chatterjee S. (2022). Overcoming Daddy: The Daughter's Rite of Passage in Joyce Carol Oates' Late Novels. Critique - Studies in Contemporary Fiction, 63(3). https://doi.org/10.1080/00111619.2021.2018988.

63. Krishna S & Chatterjee S. (2022). Between Maternity and Autonomy: Radical Mothering in Mona Simpson's Anywhere but Here. Critique - Studies in Contemporary Fiction, 63(2) https://doi.org/10.1080/00111619.2021.1959291.

Funded Research Projects:

1. Aardra Surendran; Labour Migration networks in the Construction industry in Bangalore; 6 L. [ICSSR/LA/F265/2022-23/S257].

2. Amrita Datta; Odisha Migration Study(OMS); 158 L. [OMS/LA/F221/2022-23/S252].

3. Anindita Majumdar; Kings college Social Science & Public Policy global fellowship 2023; 0.07 L. [KINGS COLLEGE/LA/F187/2022-23/S259].

4. Chandan Bose; Intimacy and Risk: Understanding violence taking place through queer dating applications in contemporary India; 15 L. [ICSSR/LA/F211/2022-23/G544].

5. Gaurav Dhamija; Odisha Migration Study(OMS); 1.96 L. [OMS/LA/F221/2022-23/S252].

6. Haripriya Narasimhan; Odisha Migration Study(OMS); 1.96 L. [OMS/LA/F221/2022-23/S252].

7. K P Prabheesh; Covid-19 uncertainty and monetary policy; 1.71 L. [APAEA/LA/F007/2022-23/S264].

8. M P Ganesh; Odisha Migration Study(OMS); 1.96 L. [OMS/LA/F221/2022-23/S252].

9. M P Ganesh; Competitiveness of Indian Technological Start Ups-An Exploratory Study; 6.6 L. [ICSSR/E&M/F269/2022-23/G468].

10. Mahati Chittem; Study of calcium channel expression and calcium dynamics in cells derived from Indian breast cancer patients; 53 L. [ICMR/BT/F145/2022-23/G536].

11. Prakash Chandra Mondal; Semantic Processes in Bilingual Children and Factors Affecting Them; 21 L. [DST-CSRI/LA/KK/2021-22/PDF-54].

12. Shuhita Bhattacharjee; Risk and Intimacy: Understanding Violence taking place through Queer Dating Applications in Contemporary India; 15 L. [FNo 02/155/2022-23/ICSSR/RP/MJ/GEN].

Awards & Recognitions:

1. Bhushan Praveen Jangam, PhD (2018), who worked under the guidance of Badri Narayan Rath, has been appointed as an Assistant Professor in the School of Management and Entrepreneurship at IIT Jodhpur.

2. Chandan Bose received the Major Research Project

Grant of Rupees Fifteen Lakhs from the Indian Council of Social Science Research (ICSSR).

3. Rakesh Pradhan, integrated PhD (2021), who worked under the guidance of Prabheesh K P, was offered a faculty position (AP, grade II) at the Dept of Management Studies, IIT Roorkee.

4. Vineet Gairola, PhD Scholar, working under the guidance of Shubha Ranganathan, received the Emerging Scholar Award 2023 during the Thirteenth International Conference on Religion & Spirituality in Society by Religion in Society Research Network USA.

5. Shuhita Bhattacharjee received the Major Research Project Grant of Rupees Fifteen Lakhs from the Indian Council of Social Science Research (ICSSR).

6. Shweta Thakare (MA - Development Studies-2021) being featured in 'Forbes Asia 100 to Watch List' for her Startup GramHeet.

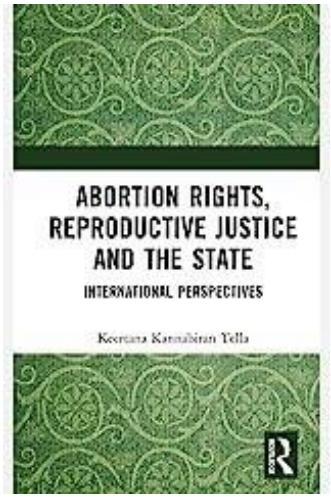
7. Srirupa Chatterjee has been selected as Editorial Board Member of Humanities & Social Sciences Communications (Springer Nature).

8. Swathi Krishna S, PhD (2018), who worked under the guidance of Srirupa Chatterjee, has been appointed as an Assistant Professor in the School of Humanities, Social Sciences, & Management at IIT Bhubaneswar.

Research Highlights

Student Achievements:

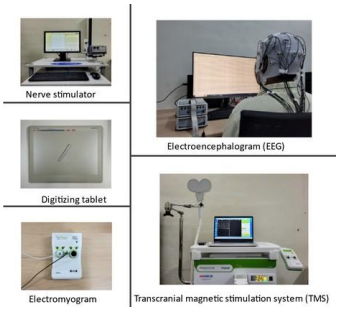
Abortion Rights, Reproductive Justice, and the State: International Perspectives by Keertana Kannabiran Tella. "This book looks at the trajectories of reproduction and abortion rights in diverse socio-cultural contexts in various countries, and the regional concerns which animate these discourses." (https://www.routledge.com)



Research Facilities:

Cognitive Science Lab

This lab focuses on the "Nature of plasticity in somatosensory cortex and its role in motor learning and memory consolidation" and the "Role of motor and sensory areas in short and long-term motor learning consolidation," among others. ((https://la.iith.ac.in/research.html#headmenu)



Linguistics Lab

This lab focuses on "Formulating Meaning Relations for the Computational Implementation of Natural Language Understanding" and "Unifying Principles of Cognition and Emotion for Neural Network Implementation," among others. (https://la.iith.ac.in/research.html#headmenu)

2-channel electroglottograph (EG2-PCX)

Development Studies Lab and Economics Lab

Development Studies group works on “Labour Supply Chains in the Construction Industry: Circular Migrants, Contracting, and Covid,” “Labour Migration Networks in the Construction Industry in Bengaluru,” and “State, Society, and Sport: A Social History of Women’s Athletics in Kerala” among many others. (https://la.iith.ac.in/research.html).

The Economics group focuses on “Economic Growth and Development, Industrial Economics, Econometrics,” “Development Economics, Health Economics, Gender Economics, Applied Microeconomics,” “Monetary Economics, Public Economics, Time Series Analysis” and “Macro & Monetary Economics, International Finance, Econometrics” (https://la.iith.ac.in/faculty.html)

- Development studies lab

Consumer Pyramids Household Survey (CPHS)

- Economics Lab

Department of Materials Science & Metallurgical Engineering

Namaskar!

We are in the second year of staying in our permanent abode. This year, the Materials Science and Metallurgical Engineering (MSME) department has increased its strength of Faculty to twenty-one and Staff to thirteen. We are joined by three new Assistant Professors: Dr Piyush Jagtap, Dr Anuj Goyal, and Dr Suresh Perumal; one Adjunct Professor, Dr Tata Narasinga Rao (Director ARCI); two Distinguished Professors, Prof Nobuhiro Tsuji from Kyoto University, Japan and Prof Christopher Berndt from Swinburne University, Australia and one Technical Superintendent: Mr Mohammad Abdul Junaid.

Under MSME's efforts on upskilling, Professional Development Workshops on various scientifically helpful topics were conducted on a regular basis by Dr Shourya Dutta Gupta and Colleagues to all IIT Hyderabad students. On a similar note, finally, the MSME could initiate the IIM Hyderabad Student Chapter at IIT Hyderabad and hold several exciting talks by calling noted speakers.

Encouraged by the government's initiative on India Semiconductor Mission, the MSME started with the country's first Semiconductor Materials and Devices MTech program. This niche program shall address the required skilled manpower for the semiconductor industries of India.

Several faculty members brought many research projects from various public/private agencies worth around INR 4.57 crores. More exciting scientific outcomes are mentioned alongside each faculty's profile in this annual report.
This year was special for our students for in-campus job placements. For the first time, the MSME PhD scholars are placed directly into R&D labs through the office of career services of IIT Hyderabad while doing their PhD. Also, for the first time, full placements of the MTech students happened through the office of career services of IIT Hyderabad.

For more information, please visit: https://msme.iith.ac.in/

Materials Science and Metallurgical Engineering Department Building

Faculty

Head of the Department

Suhash Ranjan Dey
PhD - University Paul-Verlaine - Metz, France
Professor
Profile page:https://iith.ac.in/msme/suhash/

Professor

Bharat Bhooshan Panigrahi
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/msme/bharat/

Janaki Ram G D
PhD - IIT Madras
Profile page:
https://iith.ac.in/msme/jram/

Murty B S
PhD - IISc Banglore
Profile page:
https://iith.ac.in/msme/bsm /

Pinaki Prasad Bhattacharjee
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/msme/pinakib

Ranjith Ramadurai
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/msme/ranjith/

Associate Professor

Atul Suresh Deshpande
PhD - Max-Planck Institute of Colloids and Interfaces - Potsdam, Germany
Profile page:
https://iith.ac.in/msme/atuldesh pande/

Mudrika Khandelwal
PhD - University of Cambridge, UK
Profile page:
https://iith.ac.in/msme/mudrika /

Saswata Bhattacharya PhD - IISc Bangalore ***Profile page:***
https://iith.ac.in/msme/saswata

Assistant Professor

Anuj Goyal
PhD - University of Florida
Profile page:
https://iith.ac.in/msme/anujgoyal/

Ashok Kamaraj
PhD - AcSIR, CSIR-NML
Profile page:
https://iith.ac.in/msme/ashokk/

Chandrasekhar Murapaka
PhD - Nanyang Technological University (NTU), Singapore
Profile page:
https://iith.ac.in/msme/mchandrasekhar/

Deepu J Babu
PhD - TU Darmstadt, Germany
Profile page:
https://iith.ac.in/msme/deepu.babu/

Mayur Vaidya
PhD - IIT Madras
Profile page:
https://iith.ac.in/msme/vaidyam/

Piyush Vijay Jagtap
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/msme/piyush.jagtap/

Rajesh Korla
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/msme/rajeshk/

Sai Rama Krishna Malladi
PhD - Delft University of Technology, The Netherlands
Profile page:
https://iith.ac.in/msme/srkm/

Shourya Dutta Gupta
PhD - Swiss Federal Institute of Technology Lausanne
Profile page:
https://iith.ac.in/msme/shourya/

Subhradeep Chatterjee
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/msme/subhradeep/

Suresh Kumar Garlapati
PhD - Technische Universität Darmstadt, Germany
Profile page:
https://iith.ac.in/msme/gsuresh/

Adjunct Professor

K Bhanu Sankara Rao
Pratt & Whitney Chair Professor, University of Hyderabad
Profile page:
https://www.researchgate.net/profile/Kota-Bhanu-Sankara-Rao

Dheepa Srinivasan
Chief Engineer, Pratt and Whitney R&D Center, Bangalore
Profile page:
https://www.researchgate.net/scientific-contributions/Dheepa-Srinivasan-2138426256

Munirathnam N R
Ex-Director General, Centre for Materials for Electronics Technology (C-MET)
Profile page:
https://scholar.google.co.in/citations?user=cBxPmdgAAAAJ&hl=en

Prof Tata Narasinga Rao
Director, International Advanced Research Centre for Power Metallurgy & New Materials (ARCI)
Profile page:
https://www.arci.res.in/people-pages/1674039028_tn-rao-cv.pdf

Patents:

Filed:

1. Mudrika Khandelwal; Bacterial Cellulose Based Microfluidic PoC Device for AST; 202241030646.

Published:

1. Chandrasekhar Murapaka; Reconfigurable Logic Via Gate Controlled Skyrmion Motion; 202141057701.

2. Chandrasekhar Murapaka; Skyrmion Based Majority Logic Gate in A Nanomagnetic Device; 202241010372.

3. Chandrasekhar Murapaka; Nife/Femn Exchange Biased Systems for Bias-Field- Free Magnetization Dynamics; 202241051146.

4. Mudrika Khandelwal; Pharmaceutical Compositions and Delivery Systems for Prevention and Treatment of Candidiasis; US 17/276,478.

5. Ranjith Ramadurai; Ferroelectric Polymer (B-Pvdf) For Control and Mitigation of Microbes Under Small Voltage Signals; 202041050666.

6. Ranjith Ramadurai; A Device Configurable in a Microscope for Real Time Testing and Imaging of a Sample; 202041053912.

Publications:

1. Kamaraj A, Mandal G K, Shanmugam S P, & Roy G G. (2022). Quantification and analysis of slag carryover during liquid steel tapping from BOF vessel. Canadian Metallurgical Quarterly, 61(2). https://doi.org/10.1080/00084433.2022.2044688.

2. Kamaraj A, Murugaiyan P, Mandal G K, & Roy G G. (2022). The Role of Slag Carryover on the Non-metallic Inclusion Evolution and Magnetic Behavior in Electrical Steel. Metallurgical and Materials Transactions B: Process Metallurgy and Materials Processing Science, 53(4). https://doi.org/10.1007/s11663-022-02547-w.

3. Srivastava A, Kamaraj A, Mandal D, Mondal K, & Mandal G K. (2022). Role of Synthetic Slag Treatment on the Morphology of Non-Metallic Inclusions and Subsequent Cold Drawability of the High Carbon Wire Rod Steel. Metals and Materials International, 28(7). https://doi.org/10.1007/s12540-021-01060-0.

4. Kamaraj A, Tripathy S, Chalavadi G, Sahoo P P, & Misra S. (2022). Characterization and Assessment of Mold Flux for Continuous Casting of Liquid Steel Using an Inverse Mold Simulator. Steel Research International, 93(3). https://doi.org/10.1002/srin.202100121.

5. Veeman D, Alruqi M, Kumar Subramaniyan M, Shanmugam Nallathambhi S, Agnelo Browne M, & Kamaraj A. (2022). Fabrication of functionally graded material via gas tungsten arc welding based wire feeding additive manufacturing: Mechanical and microstructural characterization. Materials Letters, 324(undefined). https://doi.org/10.1016/j.matlet.2022.132786.

6. Najathulla B C, Deshpande A S, & Khandelwal M. (2022). Smartphone camera-based micron-scale displacement measurement: development and application in soft actuators. Instrumentation Science and Technology, 50(6). https://doi.org/10.1080/10739149.2022.2053153.

7. Mahanta U, Khandelwal M, & Deshpande A S. (2022). TiO2@SiO2 nanoparticles for methylene blue removal and photocatalytic degradation under natural sunlight and low-power UV light. Applied Surface Science, 576(undefined). https://doi.org/10.1016/j.apsusc.2021.151745.

8. Naganaboina V R, Anandkumar M, Deshpande A S, & Singh S G. (2022). Single-Phase High-Entropy Oxide Nanoparticles for Wide Dynamic Range Detection of CO2. ACS Applied Nano Materials, 5(3). https://doi.org/10.1021/acsanm.2c00855.

9. Naganaboina V R, Bonam S, Anandkumar M, Suresh Deshpande A, & Singh S G. (2022). Humidity-Independent Methane Gas Detection in Gd0.2La0.2Ce0.2Hf0.2Zr0.2O_2-Based Sensor Using Polynomial Regression Analysis. IEEE Electron Device Letters, 43(12). https://doi.org/10.1109/LED.2022.3215616.

10. Najathulla B C, Deshpande A S, & Khandelwal M. (2022). PEDOT: PSS/Bacterial Cellulose-based soft actuator under triangle and square wave: Deflection, response, and fidelity. Synthetic Metals, 286(undefined). https://doi.org/10.1016/j.synthmet.2022.117053.

11. Naganaboina V R, Anandkumar M, Deshpande A S, & Singh S G. (2022). Single-phase high-entropy oxide-based chemiresistor: Toward selective and sensitive detection of methane gas for real-time applications. Sensors and Actuators B: Chemical, 357(undefined). https://doi.org/10.1016/j.snb.2022.131426.

12. Paikaray B, Kuchibhotla M, Haldar A, & Murapaka C. (2022). Reconfigurable Logic Operations via Gate Controlled Skyrmion Motion in a Nanomagnetic Device. ACS Applied Electronic Materials, undefined(undefined). https://doi.org/10.1021/acsaelm.2c00122.

13. Pavithra C L P, Janardhana R K S K, Reddy K M, Murapaka C, Klement U, & Dey S R. (2022). Graphene Oxide Reinforced Magnetic FeCoNiCuZn High Entropy Alloy through Electrodeposition. Journal of the Electrochemical Society, 169(2).

https://doi.org/10.1149/1945-7111/ac4e56.

14. Paikaray B, Kuchibhotla M, Murapaka C, & Haldar A. (2022). Skyrmion Dynamics in Concentric & Eccentric Nano-Ring Structures. IEEE Transactions on Magnetics, 58(2). https://doi.org/10.1109/TMAG.2021.3086487.

15. Paikaray B, Sahoo S K, Manoj T, Sriram K, Basumatary H, Haldar A, & Murapaka C. (2022). Large Spin Pumping and Inverse Spin Hall Effect in Ta/Py Bilayer Structures. Physica Status Solidi (A). Applications and Materials Science, 219(11). https://doi.org/10.1002/pssa.202100608.

16. Ingle D S; Yadav A C; Kumari K; Singh S K; Babu D J; Rao K V. (2022). Post-Synthetic π-Extension of Perylene Conjugated Porous Polymer via APEX Reactions: Tunable Optical and Gas Storage Properties. Chem Commun 2023, 59 (4), 454–457. https://doi.org/10.1039/D2CC05340C.

17. Villalobos L F, Babu D J, Hsu K J, Van Goethem C, & Agrawal K V. (2022). Gas Separation Membranes with Atom-Thick Nanopores: The Potential of Nanoporous Single-Layer Graphene. Accounts of Materials Research, 3(10). https://doi.org/10.1021/accountsmr.2c00143.

18. Srideep D, Sriram K, Kotha S, Babu D J, Singh S K, Rao K V. (2022). Synthesis and Self-Assembly of Benzoperylene Benzimidazoles: Tunable Morphology with Aggregation-Induced Enhanced Emission. Chemistry – An Asian Journal 2022, 17 (8), e202200099. https://doi.org/10.1002/asia.202200099.

19. Saha J, Saha R, & Bhattacharjee P P. (2022). Microstructure and texture development in CoCrNi medium entropy alloy processed by severe warm cross-rolling and annealing. Intermetallics, 143(undefined). https://doi.org/10.1016/j.intermet.2022.107463.

20. S R Reddy, P P Bhattacharjee, and B S Murty. (2022). The Status of Bulk Metallic Glass and High Entropy Alloys Research. The INAE Volume on Structural Materials, Springer, 2022. https://doi.org/10.1007/978-981-16-8523-1_10.

21. Jana S, Panigrahi G, Ishtiyak M, Narayanswamy S, Bhattacharjee P P, Niranjan M K, & Prakash J. (2022). Germanium Antimony Bonding in Ba4Ge2Sb2Te10 with Low Thermal Conductivity. Inorganic Chemistry, 61(2). https://doi.org/10.1021/acs.inorgchem.1c02990.

22. Tripathy B, Saha R, & Bhattacharjee P P. (2022). Microstructure and unusually strong recrystallization texture of the FCC phase of a cost-effective high-strength dual-phase AlCrFe2Ni2 high entropy alloy. Intermetallics, 145(undefined). https://doi.org/10.1016/j.intermet.2022.107559.

23. Tripathy B & Bhattacharjee P P. (2022). Superior strength-ductility synergy of a cost-effective AlCrFe2Ni2 high entropy alloy with heterogeneous microstructure processed by moderate cryo-rolling and annealing. Materials Letters, 326(undefined). https://doi.org/10.1016/j.matlet.2022.132981.

24. Tripathy B, Malladi S R K, & Bhattacharjee P P. (2022). Development of ultrafine grained cobalt-free AlCrFe2Ni2 high entropy alloy with superior mechanical properties by thermo-mechanical processing. Materials Science and Engineering A, 831(undefined). https://doi.org/10.1016/j.msea.2021.142190.

25. Saha J, Saha R, & Bhattacharjee P P. (2022). Microstructure and texture of severely warm-rolled and annealed coarse-grained CoCrNi medium entropy alloy (MEA): A perspective on the initial grain size effect. Journal of Alloys and Compounds, 904(undefined). https://doi.org/10.1016/j.jallcom.2022.163954.

26. Sushma M V, Sabarigresan M, Jogdand A B, Yadav D N, Rengan A K, & Ramadurai R. (2022). Ferroelectric polarization of I ^{2}-polyvinylidene fluoride as control and mitigator of infectious organisms. Materials Today Communications, 32(undefined). https://doi.org/10.1016/j.mtcomm.2022.104067 .

27. Bhat A P & Ramadurai R. (2022). Estimation of gradient size of interfacial strain and its optimization for effective magnetoelectric coupling in (CoFe2O4) – (0.93Na0.5Bi0.5TiO3 – 0.07BaTiO3), 2-2 nano-composites. Ceramics International, 48(6) https://doi.org/10.1016/j.ceramint.2021.11.306.

28. M C Joshi, B Mahata, R Ramadurai. (2022). Growth of crack free Nd2Ti2O7 thin films using La0.7Sr0.3MnO3±δ as a template layer for high temperature pyroelectric applications. Ferroelectrics 602 (1), 10-18. https://doi.org/10.1080/00150193.2022.2149294.

29. S Murugan, A P Bhat, R Ramadurai. (2022). Ba0.85Ca0.15Zr0.1Ti0.9O3 (BCZT)/0.94(Na0.5Bi0.5) TiO3-0.06BaTiO3(NBT-BT) heterostructures for the applications of vibration sensing and energy harvester. Ferroelectrics 602 (1), 25-32. https://doi.org/10.1080/00150193.2022.2149296.

30. Gulivindala G, Karanam M K, Ramadurai R, & Chinthapenta V. (2022). Indentation based fracture toughness estimation of barium titanate thin film using experiments and simulations. Thin Solid Films, 755(undefined). https://doi.org/10.1016/j.tsf.2022.139325.

31. Thakur D, Sato Y, Sabarigresan M, Ramadurai R, &

Balakrishnan V. (2022). Enhanced optical emission at MoS2-WS2 heterostructure interface with n-N junction. Applied Surface Science, 606(undefined) https://doi.org/10.1016/j.apsusc.2022.154923.

32. Bhat A P, Joshi M C, Harshvardaan M, Ummethala G, Sakthikumaran P, Kibkalo L, Tavabi A H, Malladi S R K, Dunin-Borkowski R E, Manivannan A, & Ramadurai R. (2022). Ba0.85Ca0.15Zr0.1Ti0.90O3/CoFe2O4/Ba0.85Ca0.15Zr 0.1Ti0.90O3 Nanoscale Composite Films with 2–2 Connectivity for Magnetoelectric Actuation. ACS Applied Nano Materials, 5(12). https://doi.org/10.1021/acsanm.2c03239.

33. John R, Nagini M, Govind U, Malladi S R K, Murty B S, & Fabijanic D. (2022). Microstructural evolution and effect of heat treatment on the precipitation and mechanical behavior of Al0.7CoCrFeNi alloy. Journal of Alloys and Compounds, 904(undefined). https://doi.org/10.1016/j.jallcom.2022.164105.

34. Yadav S, Jana S, Panigrahi G, Malladi S K, Niranjan M K, & Prakash J. (2022). Five coordinated Mn in Ba4Mn2Si2Te9: synthesis, crystal structure, physical properties, and electronic structure. Dalton Transactions, 51(24). https://doi.org/10.1039/d2dt01167k.

35. Tripathy B, Malladi S R K, & Bhattacharjee P P. (2022). Development of ultrafine grained cobalt-free AlCrFe2Ni2 high entropy alloy with superior mechanical properties by thermo-mechanical processing. Materials Science and Engineering A, 831(undefined). https://doi.org/10.1016/j.msea.2021.142190.

36. Jana S, Panigrahi G, Ummethala G, Ghosh A. (2022). Extremely low thermal conductivity in BaSb2Se4: Synthesis, characterization, and DFT studies. Journal of Solid State Chemistry, 315(undefined). https://doi.org/10.1016/j.jssc.2022.123524.

37. Velpandian M, Ummethala G, Malladi S K, & Meduri P. (2022). Heterostructures of tin and tungsten selenides for robust overall water splitting. Journal of Colloid and Interface Science, 623(undefined). https://doi.org/10.1016/j.jcis.2022.05.052.

38. Janakiram S, Phani P S, Ummethala G, Jagdeesh H V, Malladi S K, Gautam J, & Kestens L A I. (2022). Insights on early recovery kinetics in ferrite - pearlite cold rolled high strength sheet steels. Materials Characterization, 193(undefined). https://doi.org/10.1016/j.matchar.2022.112332.

39. Jana S, Panigrahi G, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). A new non-stoichiometric quaternary sulfide Ba3.14(4) Sn0.61(1) Bi2.39(1)S8: Synthesis, crystal structure, physical properties, and electronic structure. Journal of Solid State Chemistry, 308(undefined). https://doi.org/10.1016/j.jssc.2022.122914.

40. Kumar V K, Ghosh S, Naresh V, Ummethala G, Malladi S R K, & Martha S K. (2022). Binder and conductive diluents free NaVPO4F based free-standing positive electrodes for sodium-ion batteries. Journal of The Electrochemical Society, 169(1), 010512. https://doi.org/10.1149/1945-7111/ac47eb.

41. Bhargavi K, Ray D, Chawdhury P, Malladi S, Shashidhar T, & Subrahmanyam C. (2022). Oxidation of Toluene by Ozone over Surface-Modified γ-Al2O3: Effect of Ag Addition. Catalysts, 12(4). https://doi.org/10.3390/catal12040421.

42. Bandaru P, Ummethala G, Malladi S R K, & Dutta-Gupta S. (2022). Microstructure Dictates the Behavior of Plasmons in Nanostructured Ag-Cu Alloy Films. The Journal of Physical Chemistry C, 126(37), 15915-15923. https://doi.org/10.1021/acs.jpcc.2c03099.

43. Jana S, Ishtiyak M, Govindaraj L, Arumugam S, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). Metal to insulator transition in Ba2Ge2Te5: Synthesis, crystal structure, resistivity, thermal conductivity, and electronic structure. Materials Research Bulletin, 147(undefined). https://doi.org/10.1016/j.materresbull.2021.111641.

44. Jana S, Panigrahi G, Tripathy B, Malladi S K, Sundaramoorthy M, Arumugam S, Niranjan M K, & Prakash J. (2022). Synthesis, characterization, and electronic structure of SrBi2S4. Journal of Solid State Chemistry, 312(undefined). https://doi.org/10.1016/j.jssc.2022.123250.

45. Panigrahi G, Jana S, Ishtiyak M, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). Chalcogen dependent metal vacancies and disorder in Ba2Ln1−xMn2−yS5 and Ba2−δLn1−xMn2−ySe5 (Ln = Pr, Nd, and Gd) structures. Journal of Alloys and Compounds, 901(undefined). https://doi.org/10.1016/j.jallcom.2021.163607.

46. Velpandian M, Ummethala G, Malladi S K, & Meduri P. (2022). Heterogeneous interface-induced electrocatalytic efficiency boosting of bimetallic Cu/Zn selenides for stable water oxidation and oxygen reduction reactions. Catalysis Science and Technology, 12(17). https://doi.org/10.1039/d2cy00472k.

47. Bhat A P, Joshi M C, Ummethala G, Kibkalo L, Tavabi A H, Malladi S R K, & Ramadurai R. (2022). Ba0.85Ca0.15Zr0.1Ti0.90O3/CoFe2O4/Ba0.85Ca0.15Zr 0.1Ti0.90O3 Nanoscale Composite Films with 2–2 Connectivity for Magnetoelectric Actuation. ACS Applied Nano Materials, 5(12), 17652-17663.

https://doi.org/10.1021/acsanm.2c03239.

48. Verma M, Sugathan S, Bhattacharya S, Mukherjee R. (2022). A computational analysis of universal behavior of thermal groove in a moving grain boundary. Scripta Materialia, 209, art. no. 114383, Cited 2 times. https://doi.org/10.1016/j.scriptamat.2021.114383
49. .

Pankaj P, Bhattacharyya S, & Chatterjee, S. (2022). Competition of core-shell and Janus morphology in bimetallic nanoparticles: Insights from a phase-field model Acta Materialia, 233, art. no. 117933, Cited 3 times.
50. https://doi.org/10.1016/j.actamat.2022.117933.

Kumar H, Dash A, Paul A, & Bhattacharyya S.(2022). A physics-informed neural network-based numerical inverse method for optimization of diffusion coefficients in NiCoFeCr multi principal element alloy. Scripta Materialia, 214, art. no. 114639, Cited 3 times. DOI:
51.
https://doi.org/10.1016/j.scriptamat.2022.114639
.

Bandaru P, Bhattacharyya S, & Dutta-Gupta S. (2022). Insights into propagating surface plasmons in Ag-Cu alloy thin films: Enhancement of spin angular momentum of light. Journal of Applied Physics, 132 (18), art. no. 183101. https://doi.org/10.1063/5.0119124.
52.

Pillanagrovi J & Dutta-Gupta S. (2022). Controlled assembly of gold nanoparticles in resonant gold nanoapertures for SERS applications. Nanotechnology, 33(48). https://doi.org/10.1088/1361-6528/ac8c49.
53.

Bandaru P, Bhattacharyya S, & Dutta-Gupta S. (2022). Insights into propagating surface plasmons in Ag-Cu alloy thin films: Enhancement of spin angular momentum of light. Journal of Applied Physics, 132(18). https://doi.org/10.1063/5.0119124.
54.

Bandaru P, Ummethala G, Malladi S R K, & Dutta-Gupta S. (2022). Microstructure Dictates the Behavior of Plasmons in Nanostructured Ag-Cu Alloy Films. Journal of Physical Chemistry C, 126(37). https://doi.org/10.1021/acs.jpcc.2c03099.
55.

Pankaj P, Bhattacharyya S, & Chatterjee S. (2022). Competition of core-shell and Janus morphology in bimetallic nanoparticles: Insights from a phase-field model. Acta Materialia, 233, 117933. https://doi.org/10.1016/j.actamat.2022.117933.

56. Athira K S, Pandey P, Prabhakar K V P, Chattopadhyay K, & Chatterjee S. (2022). Laser welding of a W-free precipitation strengthened Co-base superalloy. Journal of Materials Science, 57(13).

57. Chokkakula L P Pavithra, Reddy Kunda Siri Kiran Janardhana, Kolan Madhav Reddy, Chandrasekhar Murapaka, Uta Klement, and Suhash Ranjan Dey. (2022). Graphene Oxide Reinforced Magnetic FeCoNiCuZn High Entropy Alloy through Electrodeposition. Journal of the Electrochemical Society, 169, 2022, 022501. https://doi.org/10.1149/1945-7111/ac4e56.

58. Rameez R Tamboli, Benjamin Guennec, Hiroshi Fujiwara, Kei Ameyama, Basudev Bhattacharya, and Suhash R Dey. (2022). Comprehensive observations and interpretations in Al-rich interstitial-free high-strength steel via process induced structure evolution., Journal of Materials Engineering and Performance, 2022. https://doi.org/10.1007/s11665-022-07406-y.

59. Chokkakula L P Pavithra, S A Sankaranarayanan, M Pebam, Reddy Kunda Siri Kiran Janardhana, Aravind Rengan, and Suhash Ranjan Dey. (2022). Primary attempt towards bioapplicability of one-dimensional high entropy alloys. Materials Letters, 312, 2022, 131659. https://doi.org/10.1016/j.matlet.2022.131659.

60. Rameez R Tamboli, Srinivas Dudala, Dustin Andersen, Nathalie Valle, Santhan Eswara, Rajesh Korla, Hiroshi Fujiwara, Benjamin Guennec, Kei Ameyama, Basudev Bhattacharya, and Suhash R Dey. (2022). Quantitative prediction of aluminium and learning grain boundary character in aluminium-rich interstitial free steel. Scripta Materialia, 219, 2022, 114858. https://doi.org/10.1016/j.scriptamat.2022.114858.

61. Rameez R Tamboli, Benjamin Guennec, Hiroshi Fujiwara, Kei Ameyama, Basudev Bhattacharya, and Suhash R Dey. (2022). Fostering deep drawability through recrystallization texture strengthening in aluminum-rich interstitial free steel. Materials Characterization, 2022, 112264. https://doi.org/10.1016/j.matchar.2022.112264.

62. Rengasamy Dhanabal and Suhash R Dey. (2022). Perovskite solar cells: recent progress and strategies developed for minimizing interfacial recombination., Frontiers of Materials Science;16(2), 2022, 220595. https://link.springer.com/article/10.1007/s11706-022-0595-7.

Funded Research Projects:

1. https://doi.org/10.1007/s10853-022-07117-8. 3.

2.

Atul Suresh Deshpande; Pressure release fabrication of carbon foam using bituminous coal for ablative applications; 54.6 L. [G-353].

Chandrasekhar Murapaka; Development of novel spin Hall materials for spin-orbit torque based memory and logic devices; 20 L. [JICA-AC2023-07].

Chandrasekhar Murapaka; Spintronics based Digital logic Architecture Design for AI Applications; 60 L.

[SERB/EE/F091/2022-23/G546].

4. Chandrasekhar Murapaka; Ferrimagnet based artificial synaptic device for neuromorphic computing; 64.84 L. [SERB/MSME/F206/2022-23/G520].

5. Chandrasekhar Murapaka; Harnessing Pure Spin Current by Tailoring molecular spinterface; 30.04 L. [BRNS/MSME/F206/2022-23/G472].

6. Pinaki Prasad Bhattacharjee; Development of Borated Steels; 22 L. [S-227].

7. Ramadurai Ranjith; Through-process modeling of DS/SC superalloy turbine blades processed using modified bridgman route-validation with CMSX-4 alloy; 107.09 L. [ARDB(DRDO)/MSME/2022-23/G479].

8. Saswata Bhattacharya; Through-process modeling of DS/SC superalloy turbine blades processed using modified bridgman route-validation with CMSX-4 alloy; 107.09 L. [ARDB(DRDO)/MSME/2022-23/G479].

9. Saswata Bhattacharya; Assessment of high-fidelity diffusion coefficients in Ni-Al-X alloys and Ostwald ripening; 49.72 L. [SERB/MSME/F119/2021-22/G455 (Sanction date: February 2022)].

10. Saswata Bhattacharya; Computational approach using machine learing, CALPHD and first principal calculations for accelerated development of complex concentrated alloys; 29.9 L. [DMRL/MSME/2022-23/S258].

11. Subhradeep Chatterjee; National Center for Clean Coal Research & Development WP8 Welding.; 10.42 L. [G158].

Awards & Recognitions:

1. Ashok K received the Young Metallurgist Award 2021 from the Ministry of Steel, Govt of India.

2. Ashok K received Prof Shilowbadra Banerjee Award (for the best In-house project) from CSIR NML, Jamshedpur, "Preparation and Certification of Hydrogen Standard in Steel (OLP 370, PI: Ashok K)."

3. Ashok K received one of the top 3 nominees for the Institution of Engineering and Technology (IET) India Awards 2022 for the Youth Engineering Icon Award category.

4. Chandrasekhar Murapaka has been the visiting Faculty to NIMS Japan.

5. Chandrasekhar Murapaka has been the visiting Faculty to NTU Singapore.

6. Dr Mudrika Khandelwal received Women Excellence Award 2022 from SERB.

7. Pinaki Prasad Bhattacharjee received the ASM-IIM Visiting Lectureship to North America.

8. Ranjith Ramdurai has been inducted in the Journal of Physics D Applied Physics.

9. Saswata Bhattacharya has been the Invited to be the guest editor for "Crystals" for a special issue on "Phase-field Modeling".

10. Suhash Ranjan Dey has been member of the National Organizing Committee of Indian Institute of Metals ATM 2022, Hyderabad, India.

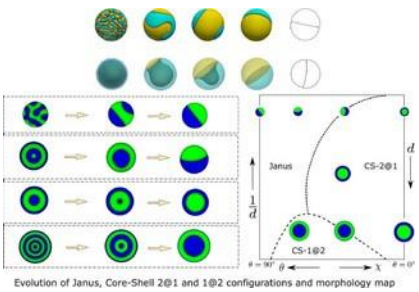
11. Kunda Siri Kiran Janardhana Reddy, student of Suhash Ranjan Dey received Best Poster Award 2022 IIM-ATM 2022.

12. Suhash Ranjan Dey has been selected as Associate Editor in the Editorial Board of Bulletin of Materials Science (Impact Factor 1.878).

13. Suhash Ranjan Dey received Research Excellence Award 2022 under the PhD Category (Mr Kunda Siri Kiran Janardhana Reddy).

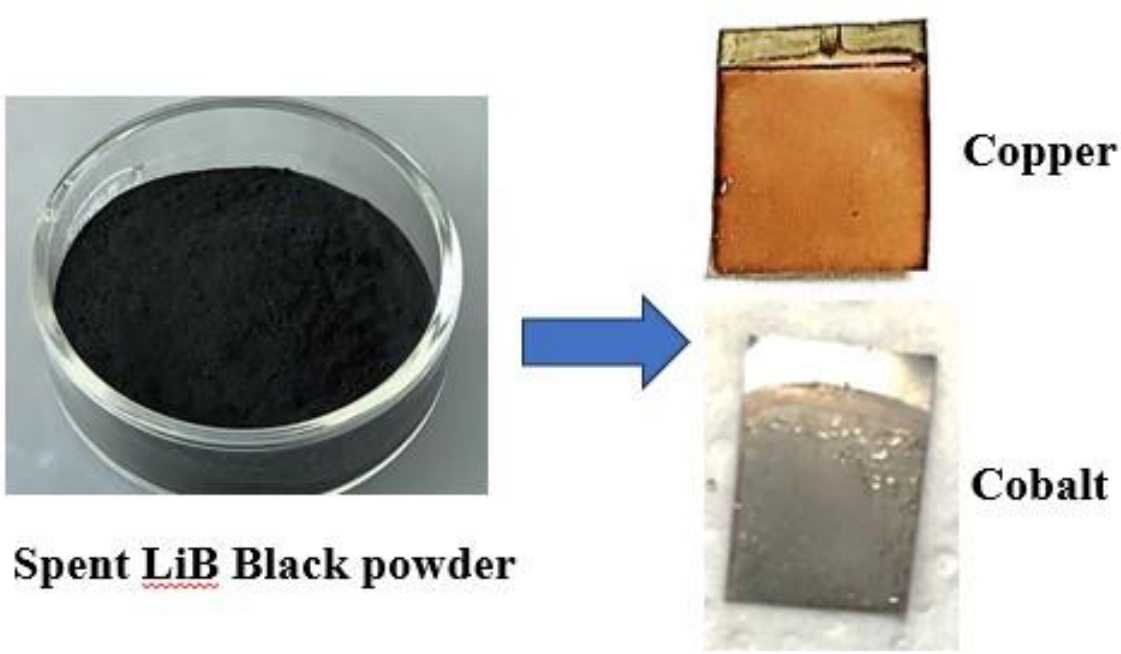
Research Highlights:

1. **Competition of Core-Shell and Janus Morphology in Bimetallic Nanoparticles: Insights from a Phase-Field Mode published in Acta Materialia, co-authored - Dr Saswata Bhattacharyya and Dr Subhradeep Chatterjee.**



Evolution of Janus, Core-Shell 2@1 and 1@2 configurations and morphology map

2. **TATA MaterialNEXT 3.0 Grande Finale on "Recovery of cobalt from spent lithium-ion batteries" by the Research group - Prof Suhash Ranjan Dey.**



Recovery of cobalt from spent lithium-ion batteries

Department of Mathematics

The Department of Mathematics, founded along with the Institute in 2008, aspires to evolve into an internationally acclaimed center for theoretical, interdisciplinary, and applicable mathematical research, supporting and complementing the expertise extant in and around Hyderabad. As one of the basic science departments, the department remains the fulcrum of teaching that offers a large share of the science credits for the entire community of students at IIT Hyderabad.

Our masters' students have done well in competitive exams, with many of them landing doctoral positions in various IITs and other national institutes of excellence - proof enough that the department was able to mitigate the effect of the pandemic through its innovative modes of instruction and discussion. The challenge thrown by the pandemic did not deter the department, which was quick to make up for the lost time and has kept up its research output both in terms of quantum and quality, as is visible from the impressive list of journals that have featured our submissions and the post-doctoral positions obtained by our recent graduates."

The department is proud to see the passing out of its students from the BTech (Mathematics and Computing) program with a 100% placement record, with student remunerations far exceeding the institute's average. We congratulate each of these pioneers who had placed their faith in us and have done us proud.

For more information, please visit: https://math.iith.ac.in/

Faculty

Head of the Department

Lakshmi Narayana P A
PhD - IIT Kharagpur
Professor
Profile page:
https://iith.ac.in/math/ananth/

Professor

Balasubramaniam Jayaram
PhD - Sri Satyasai Institute of Higher Learning
Profile page:
https://iith.ac.in/math/jbala/

Ramesh G
PhD - IIT Madras
Profile page:
https://iith.ac.in/math/rameshg/

Subrahmanya Sastry Challa
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/math/csastry/

Associate Professor

Pradipto Banerjee
PhD - University of South Carolina
Profile page:
https://iith.ac.in/math/pradipto/

Sukumar D
PhD - IIT Madras
Profile page:
https://iith.ac.in/math/suku/

Tanmoy Paul
PhD - ISI Calcutta
Profile page:

https://iith.ac.in/math/tanmoy/

Venkata Ganapathi Narasimha Kumar Ch
PhD - TIFR, Bombay
Profile
https://iith.ac.in/math/narasimha/

Venku Naidu Dogga
PhD - IIT Madras
Profile page:
https://iith.ac.in/math/venku/

Assistant Professor

Aiyappan S
PhD - IISc Bangalore
Profile page:

https://iith.ac.in/math/aiyappan/

Amit Tripathi
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/math/amittr/

Arunabha Majumdar
PhD - Indian Statistical Institute, Kolkata
Profile page:

https://iith.ac.in/math/arun.majum/

Bhakti Bhusan Manna
PhD - TIFR CAM, Bangalore
Profile page:
https://iith.ac.in/math/bbmanna/

Deepak Kumar Pradhan
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/math/dkpradhan/

Dhriti Sundar Patra
PhD - adavpur University
Profile page:
https://iith.ac.in/math/dhriti/

Jyotirmoy Rana
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/math/jrana/

Mrinmoy Datta
PhD - IIT Bombay
Profile page:
https://iith.ac.in/math/mrinmoy.datta/

Neeraj Kumar
PhD - University of Genova, Italy
Profile page:
https://iith.ac.in/math/neeraj/

Rajesh Kannan
PhD - IIT Madras
Profile page:
https://iith.ac.in/math/neeraj/

Sameen Naqvi
PhD - IIT Kanpur
Profile page:

https://iith.ac.in/math/sameen/

Sayantee Jana
PhD - McMaster University
Profile page:
https://iith.ac.in/math/sayantee.jana/

Vikas Krishnamurthy
PhD - Imperial College London
Profile page:
https://iith.ac.in/math/vikas.sk/

Publications:

1. Sebastian R & Tripathi A. (2022). Rank 2 Ulrich bundles on the general double plane cover. Journal of Pure and Applied Algebra, 226(2). https://doi.org/10.1016/j.jpaa.2021.106823 .
2. Ravindra G V, & Tripathi A. (2022). On the base case of a conjecture on ACM bundles over hypersurfaces. Geometriae Dedicata, 216(5). https://doi.org/10.1007/s10711-022-00711-9 .
3. Das J, Beyaztas B H, Mac-Ocloo M K, Majumdar A, & Mandal A. (2022). Testing Equality of Multiple Population Means under Contaminated Normal Model Using the Density Power Divergence. Entropy, 24(9). https://doi.org/10.3390/e24091189.
4. Majumdar A & Ghosh S. (2022). Competing analytical strategies of combining associated SNPs for estimating genetic risks. Journal of Genetics, 101(1). https://doi.org/10.1007/s12041-021-01349-4.
5. Majumdar A, Patel P, Pasaniuc B, & Ophoff R A. (2022). A summary-statistics-based approach to examine the role of serotonin transporter promoter tandem repeat polymorphism in psychiatric phenotypes. European Journal of Human Genetics, 30(5). https://doi.org/10.1038/s41431-021-00996-6 .
6. Gupta M & Jayaram B. (2022). Fuzzy compatibility relations and pseudo- monometrics: Some correspondences. Fuzzy Sets and Systems, Volume 451, 28 December 2022, Pages 342-360. https://doi.org/10.1016/j.fss.2022.08.001.
7. Manna B B, Ruf B, Sahoo A K, & Srikanth P N. (2022). Hopf reduction and orbit concentrating solutions for a class of superlinear elliptic equations. Journal of Functional Analysis, 282(12). https://doi.org/10.1016/j.jfa.2022.109459.
8. Sonkar M, Sasmal P, Theeda P, & Sastry C S. (2022). Sparsity-driven deterministic sampling strategy for coded aperture x-ray computed tomography. Measurement Science and Technology, 33(3). https://doi.org/10.1088/1361-6501/ac39d2 .
9. Najiya K Z, Sonkar M, & Sastry C S. (2022). Local Recovery Bounds for Prior Support Constrained Compressed Sensing. Mathematical Notes, 111(1-2). https://doi.org/10.1134/S0001434622010102.
10. Dwivedi S, & Patra D S. (2022). Some results on almost ⋆-Ricci-Bourguignon solitons. Journal of Geometry and Physics, 178, 104342. https://doi.org/10.1016/j.geomphys.2022.104519.
11. Patra D S, Ali A, & Mofarreh F. (2022). Characterizations of Ricci-Bourguignon Almost Solitons on Pseudo-Riemannian Manifolds. Mediterranean Journal of Mathematics, 19(4), 176. https://doi.org/10.1007/s00009-022-02085-4.
12. Patra D S. (2022). Some characterizations of ρ-Einstein solitons on Sasakian manifolds. Canadian Mathematical Bulletin, 65(4), 1036--1049. https://doi.org/10.4153/S0008439522000078.
13. Ali A, Mofarreh F, & Patra D S. (2022). Geometry of almost Ricci solitons on paracontact metric manifolds. Quaestiones Mathematicae, 45(8), 1167--1180. https://doi.org/10.2989/16073606.2021.1929539.
14. Ghosh A & Patra D S. (2022). On the m-quasi-Einstein almost contact manifolds. Publicationes Mathematicae, 101(3-4), 477--490. https://doi.org/10.5486/PMD.2022.9305.
15. Ramesh G & Sequeira S S. (2022). Absolutely norm attaining Toeplitz and absolutely minimum attaining Hankel operators. Journal of Mathematical Analysis and Applications, 516(1). https://doi.org/10.1016/j.jmaa.2022.126497.
16. Ramesh G & Sequeira S S. (2022). On the closure of absolutely norm attaining operators. Linear and Multilinear Algebra, undefined(undefined). https://doi.org/10.1080/03081087.2022.2126426.
17. Ramesh G & Osaka H. (2022). On operators which attain their norm on every reducing subspace. Annals of Functional Analysis,13(2).https://doi.org/10.1007/s43034-022-0167
18. Ramesh G, Sudip Ranjan B, & Venku Naidu D. (2022). A representation of compact C-normal operators. Linear and Multilinear Algebra, undefined(undefined). https://doi.org/10.1080/03081087.2022.2065234.
19. Ramesh G, Ranjan B S, & Naidu D V. (2022). Cyclic Composition operators on Segal-Bargmann space. Concrete Operators, 9(1). https://doi.org/10.1515/conop-2022-0133 .
20. Das P, Sarifuddin, Rana J, & Kumar Mandal P. (2022). Unsteady solute dispersion in the presence of reversible and irreversible reactions. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 478(2264). https://doi.org/10.1098/rspa.2022.0127.
21. Mahato I & Kannan M R. (2022). Eccentricity energy change of complete multipartite graphs due to edge deletion. Special Matrices, 10(1). https://doi.org/10.1515/spma-2021-0156.
22. Kannan M R & Pragada S. (2022). On the construction of cospectral graphs for the adjacency and the normalized Laplacian matrices. Linear and Multilinear Algebra, 70(15). https://doi.org/10.1080/03081087.2020.1821594.
23. Mehatari R, Kannan M R, & Samanta A. (2022). On the adjacency matrix of a complex unit gain graph. Linear and Multilinear Algebra, 70(9). https://doi.org/10.1080/03081087.2020.1776672.
24. Samanta A & Kannan M R. (2022). Gain distance matrices for complex unit gain graphs. Discrete Mathematics, 345(1). https://doi.org/10.1016/j.disc.2021.112634 .
25. Mahato I & Rajesh Kannan M. (2022). On the eccentricity matrices of trees: Inertia and spectral symmetry. Discrete Mathematics, 345(11). https://doi.org/10.1016/j.disc.2022.113067
26. Kannan M R, Pragada S, & Wankhede H. (2022). On the construction of cospectral nonisomorphic bipartite graphs. Discrete Mathematics, 345(8). https://doi.org/10.1016/j.disc.2022.112916.
27. Beelen P, Datta M, & Ghorpade S R. (2022). A Combinatorial Approach to the Number of Solutions of Systems of Homogeneous Polynomial Equations Over Finite Fields. Moscow Mathematical Journal, 22(4). https://doi.org/10.17323/1609-4514-2022-22-4-565-593.

28. Datta M & Manna S. (2022). A generalization of Gerzon's bound on spherical s-distance sets. Periodica Mathematica Hungarica, undefined(undefined). https://doi.org/10.1007/s10998-022-00501-6.

29. Banerjee P. (2022). On an application of the abc-theorem for polynomials to the squarefree neighbour problem. Acta Arithmetica, 206(2). https://doi.org/10.4064/aa220729-26-10.

30. Banerjee P & Bera R. (2022). Classifying families of orthogonal polynomials having Galois group the alternating group. Journal of Number Theory, 240(undefined). https://doi.org/10.1016/j.jnt.2021.12.009.

31. Srujana B, Verma D, & Naqvi S. (2022). Machine Learning vs. survival analysis models: a study on right censored heart failure data. Communications in Statistics: Simulation and Computation, undefined(undefined). https://doi.org/10.1080/03610918.2022.2060510.

32. Naqvi S, Ding W, & Zhao P. (2022). Stochastic comparison of parallel systems with Pareto components. Probability in the Engineering and Informational Sciences, 36(4). https://doi.org/10.1017/S0269964821000176.

33. Naqvi S, Chan P S, & Mishra D B. (2022). System signatures: A review and bibliometric analysis. Communications in Statistics - Theory and Methods, 51(7). https://doi.org/10.1080/03610926.2021.1937653.

43. Daptari S & Paul T. (2022). Uniqueness of Hahn–Banach extensions and some of its variants. Advances in Operator Theory, 7(3). https://doi.org/10.1007/s43036-022-00201-5.

35. Daptari S & Paul T. (2022). On Property- and Relative Chebyshev Centres in Banach Spaces. Numerical Functional Analysis and Optimization, 43(4). https://doi.org/10.1080/01630563.2022.2034853.

36. Sakajo T & Krishnamurthy V S. (2022). Quantized point vortex equilibria in a one-way interaction model with a Liouville-type background vorticity on a curved torus. Journal of Mathematical Physics, 63(6). https://doi.org/10.1063/5.0062659.

37. Krishnamurthy V S. (2022). Liouville Links and Chains on the Plane and Associated Stationary Point Vortex Equilibria. Communications on Pure and Applied Analysis, 21(7). https://doi.org/10.3934/cpaa.2022076.

Funded Research Projects

1. Pradipto Banerjee; Investigations into algebraic properties of integer polynomials; 2.2 L. [G443].

2. Challa Subrahmanya Sastry; Sparse Approximations with Prior Support Constraint and Application to Interior Tomography; 15.16 L.

3. G Ramesh; Invariant subspaces of a subclass of norm attaining operators; 6.0 L. [G294].

4. Balasubramaniam Jayaram; Monotone Metric Spaces in Machine Learning; 2 L. [MTR/2020/000506].

5. Deepak Kumar Pradhan; Interpolation Problems; 35 L. [DST/MATH/F316/2022-23/G529].

6. Venkata Ganapathi Narasimha Kumar Cheraku; Sign changes for the product of the Fourier coefficients of Hilbert modular forms; 2.2 L. [G198].

Awards and Recognitions:

1. Pradipto Banerjee received the Teaching Excellence Award, IIT Hyderabad, 2023.

Highlights:

1. National Conference on Commutative Algebra and Algebraic Geometry (CoCAAG 2023)

The conference is aimed at two major topics: Commutative Algebra and Algebraic Geometry, to promote the research activities. The four-day scientific event will bring together reputed mathematicians, young researchers, and graduate students working in commutative algebra and algebraic geometry from across the nation for fruitful discussions and exchange of ideas for research collaborations. The event will include invited talks, contributed talks, and poster presentations.

Organizers

- Dr Neeraj Kumar, Department of Mathematics, IIT Hyderabad (Convener)
- Dr Amit Tripathi, Department of Mathematics, IIT Hyderabad
- Dr Mrinmoy Datta, Department of Mathematics, IIT Hyderabad
- Dr Maria Francis, Department of Computer Science and Engineering, IIT Hyderabad

Sponsors:

- SERB (Science and Engineering Research Board), Govt. of India (Scheme: Assistance to Professional Bodies and Seminar Symposia).
- NBHM (National Board for Higher Mathematics), Department of Atomic Energy (DAE), Govt. of India (Scheme: Financial Assistance for Holding National and International Conferences).
- Department of Mathematics (IIT Hyderabad).
- Personal Project Grant (Dr. Neeraj Kumar, Dept. of Mathematics, IIT Hyderabad)

Snapshots from CoCAAG 2023 Conference

2. National Mathematics Day 2022 Celebration

Department of Mathematics, IIT Hyderabad decorously celebrated National Mathematics Day on Dec 22, 2022, on the occasion of the 135th birth anniversary of the great Mathematician Sri Srinivasa Ramanujan with inaugural remarks by Professor B S Murty, a talk on "Number theoretic problems solved over the pandemic" by professor Rajat Tandon, University of Hyderabad, and a talk by Dr Neeraj Kumar, IITH on "Generating functions," followed by Prize distribution to winners of DAV Campus School Mathematics Quiz.

National Mathematics Day 2022 Celebration

3. National Mathematics Day 2022 Celebration

Department of Mathematics, IIT Hyderabad, has successfully concluded the workshop on "Advanced Functional Analysis and its Applications - 2022". One of the fundamental subfields of analysis is functional analysis. This subject is offered at both the Master's and research levels by a number of universities and institutions. Depending on the needs of the teacher, this subject can be taught from a variety of perspectives. However, its core is the study of normed spaces, along with the study of function spaces over various domains, and the behaviour of the operators on normed spaces from both the linear and nonlinear point of view. Functional analysis, in its broad sense, includes the study of various aspects of topologies on vector spaces, stochastic theory, non-commutative harmonic analysis and many more. This topic is also used by students of mathematical economics, financial mathematics, actuarial science, electrical mechanical engineering. Our main goal is to provide some cutting-edge subjects in this area that will be beneficial to both lecturers and research scholars. An extensive knowledge of the relevant subject and its related domains is essential for a lecturer. We think that by attending this workshop, people will have a deeper understanding and exposure to the subject.

Snapshot from Advanced Functional Analysis and its Applications - 2022

Department of Mechanical and Aerospace Engineering

New Faculty Dr Prakar Gupta, Dr Vishu Unni, Dr Anurup Datta, Dr Prabhat Kumar, and Dr Sachidananda Behera joined the Department this year, bringing the total faculty strength to 32. We have started a new BTech program on Computational Mechanics spearheaded by Dr Niranjan Ghaisas. Dr K Badarinath, Dr V C Prakash, and Dr Venkata Subbiah were inducted into the reputed International Journal editorial board. Department Faculty colleagues received several projects from DST, Honeywell, DRDO, and other funding agencies. The work of Srinath Gudur and Shivam Shukla titled "Controlling waviness in additive manufacturing of thin walls by laser directed energy deposition process" has been selected for the best paper award at the AIMTDR Conference. This work is carried out with the guidance of Dr Gopinath and Dr Suryakumar. Ms Smita Santram Sontakke, Arkajyoti Jha, and Vinod V have been awarded the Prime Minister's Research Fellowship (PMRF).

A research article published by our PhD student Junaid Shaik got featured on the ASME website. A paper titled "Numerical investigation of aerospike semi-cone angle and a small bump on the spike stem in reducing the aerodynamic drag and heating of spiked blunt-body: New correlations for drag and surface temperature" by Mr Veeresh Tekure under the supervision of Dr Venkata Subbaiah has appeared in Physics of Fluids and selected as an editor's pick article. Dr Ranabir Dey's research on how self-propelling droplet microswimmers adapt to increasing viscosity in their surrounding by exhibiting a non-intuitive bimodal motility has appeared in Physical Review X. A paper titled "Experimental investigation of a nonspherical water droplet falling in air" by MAE PhD student.

Ms Meenu Agrawal, under the supervision of Dr Badarinath Karri, has been selected as an editor's pick article. IITH has signed a memorandum of understanding (MoU) with the ISRO Inertial System Unit (IISU) on January 13, 2022. As a part of this MoU, collaborative research will be done in the area of gyroscopes. Dr Chandrika Prakash Vyasarayani from the MAE department is involved in this work.

For more information, please visit: https://mae.iith.ac.in/

Faculty

Head of the Department

Ramji M
PhD - IIT Madras
Professor
Profile page:
https://iith.ac.in/mae/ramji_mano/

Professor

Ashok Kumar Pandey
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/mae/ashok/

N Venkata Reddy
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/mae/nvr/

Prasanth Kumar R
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/mae/rpkumar/

Raja Banerjee
PhD - University of Missouri Rolla - USA
Profile page:
https://iith.ac.in/mae/rajabanerjee/

Surya kumar S
PhD - IIT Bombay
Profile page:
https://iith.ac.in/mae/ssurya/

Venkatasubbaiah K
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/mae/kvenkat/

B Venkatesham
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/mae/venkatesham/

Vinayak Eswaran
PhD - State University of NY at Stony Brook, USA
Profile page:
https://iith.ac.in/mae/eswar/

Associate Professor

Chandrika Prakash Vyasarayani
PhD - University of Waterloo, Canada
Profile page:
https://iith.ac.in/mae/vcprakash/

Gangadharan Raju
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/~gangadharanr/

Harish Nagaraj Dixit
PhD - JNCASR, Bangalore
Profile page:
https://iith.ac.in/mae/hdixit/

Karri Badarinath
PhD - National University of Singapore
Profile page:
https://iith.ac.in/mae/badarinath/

Mahesh M S
PhD - University of Illinois, Urbana-Champaign, USA
Profile page:
https://iith.ac.in/mae/mahesh/

Nishanth Dongari
PhD - University of Strathclyde, Glasgow, UK
Profile page:
https://iith.ac.in/mae/nishanth/

Pankaj Sharadchandra Kolhe
PhD - The University of Alabama, Tuscaloosa
Profile page:
https://iith.ac.in/mae/psk/

Saravanan B
PhD - I'Institut National des Sciences Appliquees de Rouen, Francef
Profile page:
https://iith.ac.in/mae/saravananb/

Syed Nizamuddin Khaderi
PhD - University of Groingen, Netherlands
Profile page:
https://iith.ac.in/mae/snk/

Viswanath R R S R Chinthapenta
PhD - Brown University, USA
Profile page:
https://iith.ac.in/mae/viswanath/

Assistant Professor

Anirban Naskar
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/mae/anaskar/

Anurup Datta
PhD - Purdue University, USA
Profile page:
https://iith.ac.in/mae/anurup.datta/

Chandra Prakash
PhD - Purdue University
Profile page:
https://iith.ac.in/mae/cprakashj/

Gnanaprakash K
PhD - IIT Madras
Profile page:
https://iith.ac.in/mae/gnan/

Lakshmana Dora Chandrala
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/mae/lchandrala/

Muvvala Gopinath
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/mae/mgopinath/

Niranjan Shrinivas Ghaisas PhD - Purdue University ***Profile page:***

https://iith.ac.in/mae/nghaisas/

Prabhat Kumar
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/mae/pkumar/

Prakhar Gupta
PhD - IIT Delhi
Profile page:

https://iith.ac.in/mae/prakharg/

Ranabir Dey
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/mae/ranabir/

Sachidananda Behera
PhD - IIT Kanpur
Profile page:
https://iith.ac.in/mae/sbehera/

Safvan Palathingal
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/mae/safvan/

Sai Sidhardh
PhD - IIT Kharagpur
Profile page:
https://iith.ac.in/mae/sidhardh/

Sayak Banerjee
PhD - Stanford University, USA
Profile page:
https://iith.ac.in/mae/sayakb/

Vishnu R Unni
PhD - IIT Madras
Profile page:
https://iith.ac.in/mae/vishnu.runni/

Patents:

Filed:

1. Surya Kumar S, N Venkata Reddy; A Method for reduction of residual stresses in additive manufactured components through electropul; 202241020827.

2. Surya Kumar S; A novel area filling approach in metal additive manufacturing for reducing substrate distortion; 202241020913.

3. Surya Kumar S, N Venkata Reddy; Method and System Thereof to Fabricate Parts Using Metal Additive manufacturing and Double-Sided; 202241046376.

Publications:

1. Mehta S, Raju G, Kumar S, & Saxena P. (2022). Instabilities in a compressible hyperelastic cylindrical channel under internal pressure and external constraints. International Journal of Non-Linear Mechanics, 144(undefined). **https://doi.org/10.1016/j.ijnonlinmec.2022.104031.**

2. Jagerska, J, Alberti, S, Datta A, & Vlk M. (2022). Waveguide-Based Devices for Infrared and Raman Spectroscopy: Toward Real-World Applications. **https://doi.org/10.1016/B978-0-12-822548-6.00118-7**.

3. Sharma V, Eswaran V, & Chakraborty D. (2022). Influence of isolator section on the shock augmented mixing in SCRAMJET engine. Aerospace Science and Technology, 130(undefined). **https://doi.org/10.1016/j.ast.2022.107900.**

4. Athkuri S S C, Nived M R, & Eswaran V. (2022). The mid-point Green-Gauss gradient method and its efficient implementation in a 3D unstructured finite volume solver. International Journal for Numerical Methods in Fluids, 94(5). **https://doi.org/10.1002/fld.5059.**

5. Kirar P K, Kolhe P S, & Sahu K C. (2022). Coalescence and migration of a droplet on a liquid pool with an inclined bottom wall. Physical Review Fluids, 7(9). **https://doi.org/10.1103/PhysRevFluids.7.094001.**

6. Kumar M, Vanka S P, Banerjee R, & Mangadoddy N. (2022). Dominant Modes in a Gas Cyclone Flow Field Using Proper Orthogonal Decomposition. Industrial and Engineering Chemistry Research, 61(6). **https://doi.org/10.1021/acs.iecr.1c03357.**

7. George N B, Raghunathan M, Unni V R, Sujith R I, Kurths J, Surovyatkina E. (2022). Preventing a global transition to thermoacoustic instability by targeting local dynamics. (2022) Scientific Reports, 12 (1), art. no. 9305. **https://doi.org/10.1038/s41598-022-12951-6.**

8. Patnaik S, Sidhardh S, & Semperlotti F. (2022). Displacement-driven approach to nonlocal elasticity. European Journal of Mechanics, A/Solids, 92(undefined). **https://doi.org/10.1016/j.euromechsol.2021.104434.**

9. Kethavath N N, Mondal K, & Ghaisas N S. (2022). Large-eddy simulation and analytical modeling study of the wake of a wind turbine behind an abrupt rough-to-smooth surface roughness transition. Physics of Fluids, 34(12). **https://doi.org/10.1063/5.0129022.**

10. Muniappan S K, Bragadeshwaran A, Kasianantham N, Rajasekar V, Chinnadurai K, Balusamy S, & Ibrahim M I M. (2022). Development of biofuel from Nigella sativa biomass and its suitability for energy application. Biomass Conversion and Biorefinery, 12(3). **https://doi.org/10.1007/s13399-020-01118-w**.

11. Hari Govindha A, Katre P, Balusamy S, Banerjee S, & Sahu K C. (2022). Counter-Intuitive Evaporation in Nanofluids Droplets Due to Stick-Slip Nature. Langmuir, 38(49). **https://doi.org/10.1021/acs.langmuir.2c02590.**

12. Krishna G V, Narayanamurthy V, & Viswanath C. (2022). The buckling behavior of FRP strengthened cylindrical metallic shells with cut-outs. Composite Structures, 300(undefined). **https://doi.org/10.1016/j.compstruct.2022.116176.**

13. Jobin T M, Khaderi S N, & Ramji M. (2022). Interaction of a rigid line inclusion with various discontinuities using experimental and numerical techniques. Theoretical and Applied Fracture Mechanics, 121(undefined). **https://doi.org/10.1016/j.tafmec.2022.103482.**

14. M S Hasan, L Hoskoti, P Deepu, M M Sucheendran. (2022). Nonlinear oscillations of a flexible fiber under gravity waves The European Physical Journal Special Topics, 1-10. **https://link.springer.com/article/10.1140/epjs/s11734-022-00663-x**.

15. Kumar P. (2022). HoneyTop90: A 90-line MATLAB code for topology optimization using honeycomb tessellation. Optimization and Engineering, 24 (2), 1433-1460. **https://doi.org/10.1007/s11081-022-09715-6.**

16. Shaik J, Uchida T K, & Vyasarayani C P. (2022). Effect of Delay on Control of Direct Resonance of Ships in Beam Waves Using a Proportional-Derivative Controller with Delay. Journal of Computational and Nonlinear Dynamics, 17(6). **https://doi.org/10.1115/1.4053561.**

17. Paliwal I & Ramji M. (2022). A detailed study on the damage evolution and failure assessment of single-lap hybrid joints in CFRP laminates under tensile loading. Composite Structures, 299(undefined). **https://doi.org/10.1016/j.compstruct.2022.116021.**

18. Nayak G M, Kolhe P, & Balusamy S. (2022). Role of Buoyancy Induced Vortices in a Coupled-Mode of Oscillation in Laminar and Turbulent Jet Diffusion Flames. Flow, Turbulence and Combustion, 108(4). **https://doi.org/10.1007/s10494-021-00310-w**.

19. Jobin T M, Khaderi S N, & Ramji M. (2022). Interaction of a rigid line inclusion with various discontinuities using experimental and numerical techniques. Theoretical and Applied Fracture Mechanics, 121(undefined). 160. **https://doi.org/10.1177/1077546320945441.**

20. Sidhardh S, Patnaik S, & Semperlotti F. (2022). Fractional-Order Shell Theory: Formulation and Application to the Analysis of Nonlocal Cylindrical Panels. Journal of Applied Mechanics, Transactions ASME, 89(8). **https://doi.org/10.1115/1.4054677.**

21. Mangesh D Ratolikar and R Prasanth Kumar. (2022). Optimized Design of 5R Planar Parallel Mechanism for the Gait-Cycle of Quadruped Robots," Journal of Vibroengineering, Vol. 24, No. 1, pp 104-115, 2022.

.https://doi.org/10.21595/jve.2021.22131.

22. Katre P, Balusamy S, Banerjee S, & Sahu K C. (2022). An Experimental Investigation of Evaporation of Ethanol-Water Droplets Laden with Alumina Nanoparticles on a Critically Inclined Heated Substrate. Langmuir, 38(15). https://doi.org/10.1021/acs.langmuir.2c00306.

23. Ghosh B, Nishida K, Chandrala L, Mahmud S, Thapa S, Swaby C, Chen S, Khosla A A, Katz J, & Sidhaye V K. (2022). Epithelial plasticity in COPD results in cellular unjamming due to an increase in polymerized actin. Journal of Cell Science, 135 (4), art. no. jcs258513. https://doi.org/10.1242/jcs.258513.

24. Jobin T M, Khaderi S N, & Ramji M. (2022). A photoelastic investigation of partially debonded rigid line inclusion. International Journal of Mechanical Sciences, 217(undefined). https://doi.org/10.1016/j.ijmecsci.2021.107003.

25. Nived M R, Mukesh B S, Athkuri S S C, & Eswaran V. (2022). On the performance of RANS turbulence models in predicting static stall over airfoils at high Reynolds numbers. International Journal of Numerical Methods for Heat and Fluid Flow, 32(4). https://doi.org/10.1108/HFF-08-2021-0519.

26. Raghunathan M, George N B, Unni V R, Sujith R I, Kurths J, Surovyatkina E. (2022). Seeds of phase transition to thermoacoustic instability. New Journal of Physics, 24 (6), art. no. 063008. https://doi.org/10.1088/1367-2630/ac71bb.

27. Nived M R, Athkuri S S C, & Eswaran V. (2022). On the application of higherr-order Backward Difference (BDF) methods for computing turbulent flows. Computers and Mathematics with Applications, 117(undefined). https://doi.org/10.1016/j.camwa.2022.05.007.

28. Manikantan R, Ghosh Mondal T, Suriya Prakash S, & Vyasarayani C P. (2022). Parameter identification of Bouc–Wen type hysteresis models using homotopy optimization. Mechanics Based Design of Structures and Machines, 50(1). https://doi.org/10.1080/15397734.2020.1793776.

29. Kumar P. (2022). Topology optimization of stiff structures under self-weight for given volume using a smooth Heaviside function. Structural and Multidisciplinary Optimization, 65(4). https://doi.org/10.1007/s00158-022-03232-x.

30. Balaji A, Thani A, Biswas S, & Vyasarayani C P. (2022). Stability of a Cross-Flow Heat-Exchanger Tube With Asymmetric Supports. Journal of Computational and Nonlinear Dynamics, 17(11). https://doi.org/10.1115/1.4055594.

31. Abhijith M S & Venkatasubbaiah K. (2022). Numerical investigation on heat transfer performance of a confined slot jet impingement with different MEPCM-water slurries using two-phase Eulerian–Eulerian model. Thermal Science and Engineering Progress, 33(undefined). https://doi.org/10.1016/j.tsep.2022.101315.

32. Gurrala P, Balusamy S, Banerjee S, & Sahu K C. (2022). Evaporation of pure and binary droplets on curved substrates. International Journal of Heat and Mass Transfer, 196(undefined). https://doi.org/10.1016/j.ijheatmasstransfer.2022.123212.

33. A Jana, L Hoskoti, M M Sucheendran. (2022). A Numerical Study of the Flow Field Driven by a Submerged, High-Speed, Gaseous Jet. Journal of Fluids Engineering 144 (11), 111208. https://doi.org/10.1115/1.4054829.

34. Dey R, Buness C M, Hokmabad B V, Jin C, & Maass C C. (2022). Oscillatory rheotaxis of artificial swimmers in microchannels. Nature communications, 13(1), 1-10. Selected as Editor's highlight under Applied Physics and Mathematics. https://doi.org/10.1038/s41467-022-30611-1.

35. L Hoskoti, S S Gupta, M M. Sucheendran. (2022). Rotation - Induced Geometrical Stiffening of a Tapered, Pretwisted Blade. AIAA Journal 60 (9), 5462-5488. https://doi.org/10.2514/1.J061746.

36. Gurrala P, Balusamy S, Banerjee S, & Sahu K C. (2022). Evaporation of pure and binary droplets on curved substrates. International Journal of Heat and Mass Transfer, 196(undefined). https://doi.org/10.1016/j.ijheatmasstransfer.2022.123212.

37. H Gururani, S Chittajallu, M Ramji, S Basu, & V Chinthapenta. (2022). An In-Vitro Investigation on the Birefringence of the Human Cornea Using Digital Photoelasticity, Experimental Mechanics 63 (2), 205-219. https://doi.org/10.1007/s11340-022-00910-1.

38. Gulivindala G, Karanam M.K, Ramadurai R, & Chinthapenta V. (2022). Indentation based fracture toughness estimation of barium titanate thin film using experiments and simulations. Thin Solid Films, 755(undefined). https://doi.org/10.1016/j.tsf.2022.139325.

39. Ranjan P & Pandey A K. (2022). Effect of misaligned plates and varying interfacial area on bolted structures. International Journal of Mechanical Sciences, 233(undefined). https://doi.org/10.1016/j.ijmecsci.2022.107640.

40. Pant S, Tamboli S, & Khaderi S N. (2022). Mechanics of Distortion of Incident Signals Due to Screw Threads in a Tensile Split-Hopkinson Bar. Journal of Applied MahMechanics, Transactions ASME, 89(5). https://doi.org/10.1115/1.4053621.

41. Kumar P & Saxena A. (2022). An improved Material Mask Overlay Strategy for the desired discreteness of pressure-loaded optimized topologies. Structural and Multidisciplinary Optimization, 65(10). https://doi.org/10.1007/s00158-022-03401-y.

42. Purohit S, Swarnalatha V, Pandey A K, & Pal P. (2022). Wet anisotropic etching characteristics of Si {111} in NaOH-based solution for silicon bulk micromachining. Micro and Nano Systems Letters, 10(1). https://doi.org/10.1186/s40486-022-00162-7 .

43. Prakash C & Ghosh S. (2022). A self-consistent homogenization framework for dynamic mechanical behavior of fiber reinforced composites. Mechanics of Materials, 166(undefined). https://doi.org/10.1016/j.mechmat.2022.104222.

44. Sellan D & Balusamy S. (2022). Topology of turbulent premixed and stratified LPG/air flames. Aerospace Science and Technology, 120(undefined). https://doi.org/10.1016/j.ast.2021.107253.

45. Imam M, Chittajallu S N S H, Gururani H, Yamamoto H, Ito K, Parchuri P K, Mishra R, Sharma A, Richhariya A, & Chinthapenta V. (2022). Experimental study on improving the additively manufactured GMAW and TIG beads using FSP. Materials Today: Proceedings, 56(undefined). https://doi.org/10.1016/j.matpr.2022.01.154.

46. Bagchi S, Unni V R, Saha A. (2022). Application of network and causality based approach towards predicting onset of aeroelastic instability. AIAA Science and Technology Forum and Exposition, AIAA SciTech Forum 2022, art. no. AIAA 2022-0353. https://doi.org/10.2514/6.2022-0353.

47. Hari Govindha A, Katre P, Balusamy S, Banerjee S, & Sahu K C. (2022). Counter-Intuitive Evaporation in Nanofluids Droplets due to Stick-Slip Nature. Langmuir, 38(49). https://doi.org/10.1021/acs.langmuir.2c02590.

48. Naskar A & Paul S. (2022). Non-destructive measurement of grinding-induced deformation-depth using grazing incidence X-ray diffraction technique. NDT and E International, 126(undefined). https://doi.org/10.1016/j.ndteint.2021.102592.

49. Mohapatra R, Palathingal S, Narayanamurthy V, & Ramji M. (2022). Modeling of counter-bore and counter-sink screw lap joints. Mechanics Based Design of Structures and Machines, undefined(undefined). https://doi.org/10.1080/15397734.2022.2107540.

50. Mohapatra R, Palathingal S, Narayanamurthy V, & Ramji M. (2022). Modeling of counter-bore and counter-sink screw lap joints. Mechanics Based Design of Structures and Machines, undefined(undefined). https://doi.org/10.1080/15397734.2022.2107540.

51. Kant K & Banerjee R. (2022). Study of the secondary droplet breakup mechanism and regime map of Newtonian and power law fluids at high liquid-gas density ratio. Physics of Fluids, 34(4). https://doi.org/10.1063/5.0088144.

52. Chittajallu S N S H, Richhariya A, Tse K M, & Chinthapenta V. (2022). A Review on Damage and Rupture Modelling for Soft Tissues. Bioengineering, 9(1). https://doi.org/10.3390/bioengineering9010026.

53. Jobin T M, Khaderi S N, & Ramji M. (2022). A photoelastic investigatetion of partially debonded rigid line inclusion. International Journal of Mechanical Sciences, 217(unde

54. Dhadphale J M, Unni V R, Saha A, Sujith R I. (2022). Neural ODE to model and prognose thermoacoustic instability. Chaos, 32 (1), art. no. 013131. https://doi.org/10.1063/5.0064215.

55. Shaju, Aashish and Pandey, Ashok Kumar. (2022). Modelling transient response using PAC 2002-based tyre model. Vehicle System Dynamics, 60 (1). pp. 20-46. https://doi.org/10.1080/00423114.2020.1802048.

56. Nayak G M, Kolhe P, & Balusamy S. (2022). Role of Buoyancy Induced Vortices in a Coupled-Mode of Oscillation in Laminar and Turbulent Jet Diffusion Flames. Flow, Turbulence and Combustion, 108(4). https://doi.org/10.1007/s10494-021-00310-w .

57. Kumar P & Langelaar M. (2022). Topological synthesis of fluidic pressure-actuated robust compliant mechanisms. Mechanism and Machine Theory, 174(undefined). https://doi.org/10.1016/j.mechmachtheory.2022.1048.

58. Kirar P K, Soni S K, Kolhe P S, & Sahu K C. (2022). An experimental investigation of droplet morphology in swirl flow. Journal of Fluid Mechanics, 938(undefined). https://doi.org/10.1017/jfm.2022.146.

59. Purohit S, Swarnalatha V, Pandey A K, Sharma R K, & Pal P. (2022). Wet bulk micromachining characteristics of Si {110} in NaOH-based solution. Journal of Micromechanics and Microengineering, 32(12). https://doi.org/10.1088/1361-6439/ac9b64 .

60. Patnaik S, Hollkamp J P, Sidhardh S, & Semperlotti F. (2022). Fractional order models for the homogenization and wave propagation analysis in periodic elastic beams. Meccanica, 57(4). https://doi.org/10.1007/s11012-021-01371-x.

61. Gnanaprakash K, Yang M, & Yoh J J. (2022). Thermal decomposition behaviour and chemical kinetics of tungsten based electrically controlled solid propellants. Combustion and Flame, 238, 2022, 111752 https://doi.org/10.1016/j.combustflame.2021.111752.

62. Katre P, Balusamy S, Banerjee S, & Sahu K C. (2022). An Experimental Investigation of Evaporation of Ethanol-Water Droplets Laden with Alumina Nanoparticles on a Critically Inclined Heated Substrate. Langmuir, 38(15). https://doi.org/10.1021/acs.langmuir.2c00306.

63. Mehta S, Raju G, & Saxena P. (2022). Wrinkling as a mechanical instability in growing annular hyperelastic plates. International Journal of Mechanical Sciences, 229(undefined). https://doi.org/10.1016/j.ijmecsci.2022.107481 .

Funded Research Projects:

1. Anurup Datta; Design and development of a setup for high throughput manufacturing of mesoscale metallic structures through laser beam shaping; 32.16 L. [SERB/MAE/F287/2022-23/G504].

2. Ashok Kumar Pandey; Nonlocal Approach for Modeling Delamination in Composites; 40 L. [DRDO/CE/F050/2022-23/G469].

3. Chandrika Prakash Vyasarayani; Design and Development of an Experimental Setup for Measurement of 10 Inertial Parameters of Slender Flights/Projectiles; 88.83 L. [ARB/MAE/F090/2022-23/G537].

4. Gnanaprakash Kanagaraj; Characterization of fly ash from co-firing of coal/biomass blends in optimized swirl burner for utilization in cement-based materials; 116.11 L. [TPN/85552].

5. Gnanaprakash Kanagaraj; Electrically controlled solid propellants for variable thrust generation in lab-scale reaction control system; 32.99 L. [SRG/2023/000700].

6. Harish Nagaraj Dixit; Effect of Marangoni stresses and interfacial rheology on migration and deformation of surfactant-lad; 18.74 L. [CRG/2022/001947].

7. Harish Nagaraj Dixit; On the role of inertia and surfactants in moving contact line flows; 54.03 L. [G446].

8. Karri Badarinath; Establishing Hybrid hydrodynamic assisted with acoustic curitation water treatment facility for high

quality drinking water; 10.05 L. [SERB/MAE/F129/2022-23/G511].

9. M Ramji; Modeling and design of an integration scheme of carbon fiber reinforced silicon carbide composite panels to the metallic bulkhead using suitable insulation and fasteners; 26.92 L. [CARS DRDO/MAE/F023/2022-23/S262].

10. M Ramji; Dynamic Characterization of Tungsten and Aluminum Alloys; 40.96 L. [DRDO/MAE/F152/2022-23/G461].

11. Mahesh M S; Investigation of Thermoacoustics of a Hydrogen Burner System; 6.16 L. [SBEST/MAE/F219/2022-23/S240].

12. N Venkata Reddy; Circular Manufacturing Research and education colloboration with India and Japan-CIRMAN-322275 Funded: The Research Council of Norway (NOK 2000000); 164.15 L. [CIRMAN/MAE/F099/2022-23/S228].

13. Niranjan Shrinivas Ghaisas; Boundary layer and wind farm flows over heterogeneous terrain: ~~s~~ign-oriented model development usi; 43 L. [CRG/2022/006735].

14. Pankaj Sharadchandra Kolhe; Modelling and Performance Estimation of the Compressor Stage of a Micro-Gas Turbine; 6.16 L. [SBEST/MAE/F015/2022-23/S239].

15. R Gangadharan; NULL; 0 L. [DRDO/MAE/F153/2022-23/G543].

16. Raja Banerjee; The Experimental Investigation and Numerical Modelling of Heat Absorption Efficacy of Additive Enhanced Endothermic Rocket Fuels; 230.58 L. [DRDO/MAE/F219/2022-23/S253].

17. Raja Banerjee; Param Seva HPC Facility - National Supercomputing Facility; 0 L. [C-DAC/MAE/F124/2022-23/G492].

18. Raja Banerjee; Modelling and Performance Estimation of the Compressor Stage of a Micro-Gas Turbine; 6.16 L. [SBEST/MAE/F015/2022-23/S239].

19. Raja Banerjee; Development of an on-board spray controller model for UAVs using AI for precision agricultural application; 34.12 L. [SERB/MAE/F015/2021-22/G436].

20. Ranabir Dey; Effects of elastohydrodynamic stimuli on active droplet microswimmers in soft fluidic confinements; 33.04 L. [G423].

21. Safvan Palathingal; Design and Development of an Experimental Setup for Measurement of 10 Inertial Parameters of Slender Flights/ Projectiles; 88.83 L. [ARB/MAE/F090/2022-23/G537].

22. Sai Sidhardh; Modeling and design of an integration scheme of carbon fiber reinforced silicon carbide composite panels to the metallic bulkhead using suitable insulation and fasteners; 26.92 L. [CARS DRDO/MAE/F023/2022-23/S262].

23. Sai Sidhardh; Soft LS Dyna ANN Material ModelIITH; 7.5 L. [HONEYWELL/MAE/F268/2022-23/S215].

24. Sai Sidhardh; Fractional calculus framework for damage and fracture: modelling progressive damage using nonlocal theories and data-driven constitutive laws; 25.13 L. [SERB/MAE/F268/2022-23/G503].

25. Saravanan Balusamy; Design and development of a fuel-flexible burner for domestic and community cooking applications; 24.93 L. [PCRA/MAE/F151/2022-23/G477].

26. Sayak Banerjee; The Experimental Investigation and Numerical Modelling of Heat Absorption Efficacy of Additive Enhanced Endothermic Rocket Fuels; 230.58 L. [DRDO/MAE/F219/2022-23/S253].

27. Sayak Banerjee; Investigation of Thermoacoustics of a Hydrogen Burner System; 6.16 L. [SBEST/MAE/F219/2022-23/S240].

28. Syed Nizamuddin Khaderi; Dynamic Characterization of Tungsten and Aluminum Alloys; 40.96 L. [DRDO/MAE/F152/2022-23/G461].

29. Venkatesham Balide; Overall Noise Estimation of On-Board Power plant equipment; 9.95 L. [BHEL/MAE/F057/2022-23/S242].

30. Vinayak Eswaran; Development of a Hybrid RANS-LES Solver based on Kolmogorov's Hypothesis for Separated Flows; 29.84 L. [G367].

31. Viswanath R R S R Chinthapenta; Corneal Characterization under biaxial-loading in physiological conditions; 24.05 L. [SERB/MAE/F117/2022-23/G547].

32. Viswanath R R S R Chinthapenta; Study of Constitutive Modeling of Graphite for Thermal and Pressure loads; 11.74 L. [RCI DRDL/MAE/F117/2022-23/S251].

Awards and Recognitions:

1. Chandra Prakash Vyasarayani received the International Conference on Multiscale Materials Modelling Travel Award, 2022.

2. Chandrika Prakash Vyasarayani has been the Associate Editor of ASME journal of mechanisms and robotics.

3. Naveen N Kethavath, student of Niranjan Shrinivas Ghaisas won the Best Oral Presentation Award in ICFTES Conference, NIT Calicut.

4. Kingshuk Mondal, MTech (RA) student of Niranjan Shrinivas Ghaisas received "Appreciation in Research" award from IIT Hyderabad at the 15th Foundation Day, 2023.

5. Jaykumar Patel, PhD student of Niranjan Shrinivas Ghaisas has been awarded PMRF in the year 2022.

6. Vinayak Eswaran received the Teaching Excellence award, IIT Hyderabad.

7. Isha Paliwal, PhD student of M Ramji, has been awarded ISAMPE award for Smart Materials& systems, Technology Development (Student Category) -2022.

8. Safvan Palathingal received the Best Paper award at the SICE, IIT Hyderabad, India.

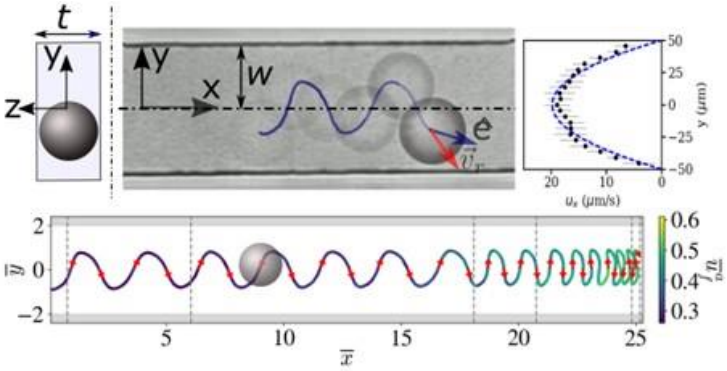
9. Harish Nagaraj Dixit received the Teaching Excellence Award.

Venkatesham Balide received the M S Narayanan's Memorial Lecture Award, by Acoustical society of India.

Research Highlights:

1. **Oscillatory rheotaxis of artificial swimmers in microchannels – Dr Ranabir Dey:**

In this work, we show that a self-propelled active droplet (a type of artificial microswimmer) navigates upstream of an external flow in a microchannel in an oscillatory trajectory, reminiscent of many biological microswimmers like bacteria. Comparing our experiments to a hydrodynamic theoretical model, we explain that the oscillatory upstream swimming of the spherical droplet is governed by the interaction of the finite-sized microswimmer with the microchannel walls and the shear flow characteristics. Our results provide a realistic understanding of the behaviour of active particles navigating in confined microflows relevant to many biotechnology applications.



Oscillatory rheotaxis of artificial swimmers in microchannels

Video link: https://www.youtube.com/watch?v=LNeOyIOrQ80
Publication: R. Dey†, C. M. Buness, B. V. Hokmabad, C. Jin, C. C. Maass†, "Oscillatory rheotaxis of artificial swimmers in microchannels", Nature Communications, 13 (1), 1-10, 2022 (Selected as Editor's highlight under Applied Physics and Mathematics). († corresponding authors)4

2. **Tajima Tailored Fiber Placement Machine:**

Tailored Fibre placement (TFP) is an advanced composite preform manufacturing technique based on the principle of embroidery for continuous placement of fibrous material along load paths in composite structures. The infiltration of TFP-preforms can be done with conventional processing techniques such as resin transfer moulding, vacuum bag moulding, pressing and autoclave moulding. Tajima TFP machine enables precise continuous fixation of fibres, wires, tubes, and roving in 0°-359° direction. Hence, it can be used to generate complex shapes and performs up to
1200 mm×1000 mm
area can be stitched. Moreover, multiple layers of different fibres can be stitched together.

Salient features:

- It can produce preforms with the desired shape, size, and fibre orientations, which leads to less material wastage.
- It can be useful for the fabrication of composite structures where stiffness can be varied along the plane, which is not possible with conventional composites.
- Different fibres can be stitched to create hybrid structures.
- This machine is capable of stitching wires as per the given drawings, which can be useful for smart structures.
- It can be used to make precise and complex parts for prosthetics, robotic applications and complex composite parts of aerospace structures.

Tajima Tailored Fiber Placement Machine

Department of Physics

The Department of Physics at IITH continues to stride forward in its path of excellence in research and education by performing ground-breaking research, implementing novel instructional methodologies, and designing new programs/courses joining hands with other departments and our partners in the industry. FY 22-23 has been an epochal year for the department when it jumped 100 points in QS World Rankings by Subject-2023 for Physics & Astronomy and ranked at 501-550 in the world.

In FY 22-23, the department launched a brand new MSc program in Medical Physics and an MTech program in Ophthalmic Engineering. The department has excellent faculties in five major research areas (condensed matter physics experiment, condensed matter theory, high energy physics, astrophysics, optics, quantum information, computation, and communications). Apart from the core teaching of the department, four of our faculties are involved in MTech (ISS) and one in MTech (EST). At present, the department has a total of 28 faculty members and 267 students (PhD, MSc, BTech Engineering Physics, MSc in Medical Physics, MTech in Ophthalmic Engineering). FY 22 – 23 has been a fruitful year in terms of research and student achievements. Faculties of our department have published nearly 274 international journal articles and delivered numerous talks at various conferences/workshops.

The Department established the Advanced Dark Sky Observatory (ADSO), a unique accomplishment among all MoE institutes (IITs, IISERs, and IISc). This is another impressive addition to the list of major cutting-edge research facilities set up in the department, such as XRD, VSM (FIST supported), MOKE, AFM, SQUID, Femtosecond Laser, etc., for in-house research as well as for supporting external users. Our faculties have built a departmental HPC facility with 384 computing cores and are also planning to expand it further.

Several members of our faculty were elected to prestigious scientific professional societies and science academies. Several members of the faculty were also inducted into the editorial boards of prestigious international journals such as the Editorial Board of Electronic Structure (Institute of Physics), Editorial Board of Frontier in Physics (AMO), and the Indian Journal of Physics and elevated to high ranks in technical professional organizations such as the IEEE. In addition, two of our faculty members are also involved in the Belle and Belle II experiment, and another faculty member is involved with the Compact Muon Solenoid (CMS) experiment at the CERN Large Hadron Collider (LHC). We are also part of the Dark Energy Survey and the Indian Pulsar Timing Array Consortium. Our faculties continue to establish various National and International collaborations and are actively involved in joint programs, such as GIAN, SPARC, and international bilateral research programs. Students of the department continue getting placed at various eminent National and International Universities/ Research Laboratories to pursue their higher studies. Our students obtained various international-level fellowships, such as the Marie Curie Postdoc fellowships, NIMS-ICGP fellowship, etc.

Physics faculties are actively involved in obtaining sponsored projects from DST, SERB, STARS, DRDO, Sree Padmavathi Venkateswara Foundation, IISc Bangalore, and many other funding agencies during FY 22 – 23, which is worth 287.81 L. The Department welcomes four new members of the faculty: Dr Alok Kumar Pan, Dr Archak Purkayastha, Dr Saranya Ghosh, and Dr Yogesh Kumar Srivastava. Dr Pan's research interests are in Quantum Information theory, Quantum Communications, Quantum foundations, Quantum Cryptography, and Quantum Metrology. Dr Purkayastha's research focuses on on-equilibrium quantum statistical physics, specifically in the theory of driven dissipative quantum many-body systems, having strong overlaps with quantum condensed matter, chemistry, information, and thermodynamics. Dr Ghosh specializes in Experimental high-energy physics, particularly on topics such as Higgs physics and the search for new physics beyond the Standard Model of particle physics. Dr Srivastava's expertise is in Terahertz spectroscopy, active/passive metamaterials, ultrafast quantum photonic devices, superconductors, and spintronics.

For more information, please visit: **https://physics.iith.ac.in/**

Faculty

Head of the Department

Prem Pal
PhD - IIT Delhi
Professor
Profile Page:
https://iith.ac.in/phy/prem/

Professor

Anjan Kumar Giri
PhD - Utkal University
Profile page:
https://iith.ac.in/phy/giria/

Kanchana V
PhD - Anna University
Profile page:
https://iith.ac.in/phy/kanchana/

Manish K Niranjan
PhD - University of Texas at Austin, USA
Profile page:
https://iith.ac.in/phy/manish/

Narendra Sahu
PhD - IIT Bombay
Profile page:
https://iith.ac.in/phy/nsahu/

Saket Asthana
PhD - IIT Bombay
Profile page:
https://iith.ac.in/phy/asthanas/

Associate Professor

Alok Kumar Pan
PhD - Bose Institute, Kolkata
Profile page:
https://iith.ac.in/phy/akp/

Anurag Tripathi
PhD - Harish-Chandra Research Institute
Profile page:
https://iith.ac.in/phy/tripathi/

Arabinda Haldar
PhD - IIT Bombay
Profile page:
https://iith.ac.in/phy/arabinda/

Bhuvanesh Ramakrishna
PhD - The Queens University of Belfast, UK
Profile page:
https://iith.ac.in/phy/bhuvan/

Jyoti Ranjan Mohanty
PhD - Paul Drude Institute / Humboldt University, Germany
Profile page:

https://iith.ac.in/phy/jmohanty/

Priyotosh Bandyopadhyay
PhD -Harish-Chandra Research Institute, Allahabad
Profile page:
https://iith.ac.in/phy/bpriyo/

Sai Santosh Kumar Raavi
PhD - University of Hyderabad
Profile page:
https://iith.ac.in/phy/sskraavi/

Shantanu Desai
PhD - Boston University, USA
Profile page:
https://iith.ac.in/phy/shantanud/

Suryanarayana Jammalamadaka
PhD - IIT Madras
Profile page:
https://iith.ac.in/phy/surya/

Vandana Sharma
PhD - Physical Research Laboratory, Ahmedabad
Profile page:
https://iith.ac.in/phy/vsharma/

Assistant Professor

Anupam Gupta
PhD - IISc Bangalore
Profile page:

https://iith.ac.in/phy/agupta/

Archak Purkayastha
PhD - ICTS-TIFR, Bengaluru
Profile page:
https://iith.ac.in/phy/archak.p/

Kirit Makwana
PhD - University of Wisconsin-Madison, WI, USA
Profile page:

https://iith.ac.in/phy/kdmakwana/

Mahesh Peddigari
PhD - IIT Guwahati
Profile page:
https://iith.ac.in/phy/mahesh.p/

Mayukh Pahari
PhD - Pt. Ravishankar Sukla University, Raipur
Profile page:

https://iith.ac.in/phy/mayukh/

Nithyanandan Kanagaraj
PhD - Pondicherry Central University, Puducherry
Profile page:
https://iith.ac.in/phy/nithyan/

Raghavendra Srikanth Hundi
PhD - Harish Chandra Research Institute
Profile page:

https://iith.ac.in/phy/rshundi/

Saranya Ghosh
PhD - Tata Institute of Fundamental Research
Profile page:
https://iith.ac.in/phy/saranya.ghosh/

Satish Laxman Shinde
PhD - IISc Bangalore
Profile page:
https://iith.ac.in/phy/shindesl/

Saurabh Sandilya
PhD - Tata Institute of Fundamental Research, Mumbai
Profile page:
https://iith.ac.in/phy/saurabh/

Shubho Ranjan Roy
PhD - Brown University, USA
Profile page:
https://iith.ac.in/phy/sroy/

Yogesh Kumar Srivastava PhD - NTU Singapore **Profile page:**
https://iith.ac.in/phy/yogesh.srivastava/

Adjunct Faculty

Adekunle Olusola Adeyeye
Trevelyan College, Durham University
Profile page:
https://www.durham.ac.uk/staff/adekunle-o-adeyeye/

Eung Jin Chun
School of Physics, Korea Institute of Advance Study
Profile page:
https://www.kias.re.kr/kias/people/faculty/viewMember.do?memberId=10125&trget=listFaculty&menuNo=408002

Eric Laenen
Institute of Theoretical Physics, University of Amsterdam
Profile page:
https://www.uva.nl/en/profile/l/a/e.l.m.p.laenen/e.l.m.p.laenen.html

Karim Trabelsi
IJCLab, France
Profile page:
https://www.linkedin.com/in/karim-trabelsi-0a789534/

Mariana Frank
Concordia University
Profile page:
https://www.concordia.ca/faculty/mariana-frank.html

Soumya Mohanty
University of Texas Rio Grande Valley
Profile page:
https://www.utrgv.edu/physics/people/faculty/soumya-mohanty/index.htm

Patents:

Published:

1. Vandana Sharma; Reconfigurable Unmanned Aerial Vehicle (UAV) within flight adaptive multimotor and method thereof; 202141027004.

2. Arabinda Haldar; Reconfigurable Logic Via Gate Controlled Skyrmion Motion; 202141057701.

3. Arabinda Haldar; Skyrmion Based Majority Logic Gate in a Nanomagnetic Device; 202241010372.

4. Arabinda Haldar; Nife/Femn Exchange Biased Systems for Bias-Field- Free Magnetization Dynamics; 202241051146.

Publications:

1. S Jia, ... & A Giri et al. (2022). Search for a Light Higgs Boson in Single-Photon Decays of Υ(1S) Using Υ(2S) →π+π−Υ(1S) Tagging Method. Phys. Rev. Lett. 128 (2022) 081804. https://doi.org/10.1103/PhysRevLett.128.081804.

2. Y Chen, ... & A Giri et al. (2022). Measurement of Two-Particle Correlations of Hadrons in e+e− Collisions at Belle. Phys Rev. Lett. 128 (2022) 142005. https://doi.org/10.48550/arXiv.2201.01694.

3. H Jeon, ..., A Giri et al. (2022). Search for the radiative penguin decays B0→K0SK0Sγ in the Belle experiment, Phys Rev. D 106 (2022) 012006. https://doi.org/10.1103/PhysRevD.106.012006.

4. li, ..., A Giri, et al. (2022). The first test of lepton flavor universality in the charmed baryon decays Ω0c→Ω− ℓ +ν ℓ using data from the Belle experiment. Phys. Rev. D 105 (2022) L091101. https://doi.org/10.48550/arXiv.2112.10367.

5. A Abud, ..., A Giri et al. (2022). Design, Construction, and Operation of the ProtoDUNE Liquid-Argon TPC. Jour of INST (JINST) 17 (2022) P01005. https://doi.org/10.1088/1748-0221/17/01/P01005.

6. Y Li, ..., A Giri et al. (2022). Measurements of the branching fractions of Ξ0c→ΛK0S, Ξ0c→Σ0K0S, and Ξ0c→Σ+K− decays at Belle. Phys Rev. D 105 (2022) L011102. https://doi.org/10.1103/PhysRevD.105.L011102.

7. K Inami, ..., A Giri et al. (2022). An improved search for the electric dipole moment of the τ lepton. JHEP 04 (2022) 110. https://doi.org/10.1007/JHEP04(2022)110.

8. C Hadjivasiliou, ..., A Giri et al. (2022). Search for B0 meson decays into Λ and missing energy with a hadronic tagging method at Belle. Phys. Rev. D 105 (2022) L051101. https://doi.org/10.48550/arXiv.2110.14086.

9. A Abud, ..., A Giri et al. (2022). Low exposure long

baseline neutrino oscillation sensitivity of the DUNE experiment. Phys. Rev. D 105 (2022) 072006. https://doi.org/10.1103/PhysRevD.105.072006.

10. B Brahma, A Giri. (2022). Exploring non-standard interaction effects in T2HK and DUNE. Euro Phys. J C (EPJC) 82 (2022) 1145. https://doi.org/10.1140/epjc/s10052-022-11134.

11. B Bhuyan, ..., A Giri et al. (2022). Search for the decay B0s→η′η. Phys. Rev. D 105 (2022) 012007. https://doi.org/10.1103/PhysRevD.104.L031101.

12. F Abudinen, ..., A Giri et al. (2022). Combined analysis of Belle and Belle II data to determine the CKM angle ϕ3 using B+→D(K0Sh−h+) h+ decays. JHEP 02 (2022) 063. https://link.springer.com/article/10.1007/JHEP02(2022)063 .

13. T Czank, ..., A Giri et al. (2022). Search for Z' -> mu (+) mu (-) in the L-mu - L-tau gauge-symmetric model at Belle. Phys. Rev. D 106 (2022) 012003. https://doi.org/10.1103/PhysRevD.106.012003.

14. T Pang, ..., A Giri et al. (2022). Search for the decay B0s→η′K0S. Phys. Rev. D 106 (2022) L051103. https://journals.aps.org/prd/abstract/10.1103/PhysRevD.106.L051103.

15. A Abud, ..., A Giri et al. (2022). Scintillation light detection in the 6-m drift-length protoDUNE dual phase liquid Argon TPC. Euro. Phys. J C (EPJC) 22 (2022) 618. https://link.springer.com/article/10.1140/epjc/s10052-022-10549-w.

16. S Li, ..., A Giri et al. (2022). First Measurement of the Λ+c→pη′ decay., JHEP 03 (2022) 090. https://link.springer.com/article/10.1007/JHEP03(2022)090 .

17. A Abud, ..., A Giri et al. (2022). Separation of track and shower like energy deposits in protoDUNE SP using a convolutional neural network. Euro Phys. J C (EPJC) 82 (2022) 903. https://link.springer.com/article/10.1140/epjc/s10052-022-10791-2.

18. X Wang, ..., A Giri et al. Study of γγ→γψ(2S) at Belle. (2022). Phys. Rev. D, 105 (2022) 112011. https://doi.org/10.1103/PhysRevD.105.112011.

19. M Acero, ..., A Giri et al. (2022). Improved measurement of neutrino oscillation parameters by the NOvA experiment. Phys. Rev. D 106 (2022) 032004. https://journals.aps.org/prd/abstract/10.1103/PhysRevD.106.032004.

20. U Gebauer, ... A Giri et al. (2022). Measurement of the branching fractions of B+ -> eta l nu-l decays only with signal side reconstruction in the full q^2 range. Phys. Rev. D, 106 (2022) 032013. https://doi.org/10.1103/PhysRevD.106.032013.

21. X Gao, ..., A Giri et al. (2022). Search for tetraquark states Xcc¯s¯s in D+sD+s(D*+sD*+s) final states at Belle. (2022). Phys. Rev. D 105 (2022) 032002. https://doi.org/10.1103/PhysRevD.105.032002.

22. T Bloomfield, ..., A Giri et al. (2022). Measurement of the branching fraction and CP asymmetry for B→¯D0π decays. Phys. Rev. D 105 (2022) 072007. https://doi.org/10.1103/PhysRevD.105.072007.

23. S Patra, ..., A Giri et al. (2022). Search for charged lepton flavor violating decays of ϒ(1S). JHEP 05 (2022) 095. https://link.springer.com/article/10.1007/JHEP05(2022)095.

24. E Waheed, ..., A Giri et al. (2022). Study of B¯¯¯0→D+h− (h=K/π) decays at Belle. Phys. Rev. D 105 (2022) 012003. https://doi.org/10.1103/PhysRevD.105.012003.

25. B Wang, ..., A Giri et al. (2022). Measurement of B(Bs→DsX) with Bs semileptonic tagging. https://doi.org/10.1103/PhysRevD.105.012004.

26. I Regev, K Guevorkian, A Gupta, O Pourqui, and L Mahadevan. (2022). Rectified random cell motility as a mechanism for embryo elongation. Development, 149(6), 199423 (2022). https://doi.org/10.1242/dev.199423.

27. Pal S, Agarwal N, Magnea L, & Tripathi A. (2022). Multiparton Webs Beyond Three Loops. Springer Proceedings in Physics, 277(undefined). https://doi.org/10.1007/978-981-19-2354-8_46.

28. Agarwal N, Pal S, Srivastav A, & Tripathi A. (2022). Building blocks of Cwebs in multiparton scattering amplitudes. Journal of High Energy Physics, 2022(6). https://doi.org/10.1007/JHEP06(2022)020.

29. B Paikaray, M Kuchibhotla, A Haldar, and C Murapaka. (2022). Reconfigurable logic operations via gate controlled skyrmion motion in a nanomagnetic device. ACS Applied Electronic Materials, 4, 2290 (2022). https://doi.org/10.1021/acsaelm.2c00122.

30. B Paikaray, S K Sahoo, T Manoj, K Sriram, H Basumatary, A Haldar, and C Murapaka. (2022). Large Spin Pumping and Inverse Spin Hall Effect in Ta/Py Bilayer Structures. Phys. Status Solidi A, 219, 2100608 (2022). https://doi.org/10.1002/pssa.202100608.

31. M Rahaman, L A Longchar, S K Sahoo, A Haldar, M M Raja, S N Kaul, & S Srinath. (2022). Effect of site disorder on the resonant microwave absorption in Co2Fe0.5Ti0.5Si Heusler alloy thin films. Journal of Magnetism and Magnetic Materials, 559, 169519

(2022). https://doi.org/10.1016/j.jmmm.2022.169519.

32. T Manoj, H P Perumal, B Paikaray, A Haldar, J Sinha, P P Bhattacharjee, & C Murapaka. (2022). Perpendicular magnetic anisotropy in a sputter deposited nanocrystalline high entropy alloy thin film", Journal of Alloy and Compounds, 167337 (2022). https://doi.org/10.1016/j.jallcom.2022.167337.

33. B Paikaray, S K Sahoo, T Manoj, K Sriram, H Basumatary, A Haldar, & C Murapaka. Large Spin Pumping and Inverse Spin Hall Effect in Ta/Py Bilayer Structures. Phys. Status Solidi A, 219, 2100608 (2022). https://doi.org/10.1002/pssa.202100608.

34. M Kuchibhotla, A Talapatra, A Haldar, and A O Adeyeye. (2022). Field orientation dependent magnetization reversal and dynamics in sub-100 nm wide permalloy nanowires. J. Phys. D: Appl. Phys., 55, 335001, (2022). https://doi.org/10.1088/1361-6463/ac72cf.

35. A Haldar. (2022). Functional nanostructures for bias-magnet-free and reconfigurable microwave magnetic devices. Materials Today Electronics 2, 100008 (2022). https://doi.org/10.1016/j.mtelec.2022.100008.

36. B Panigrahi, S K Sahoo, Syamlal S k, J Sinha, H Basumatary, M M Raja, and A Haldar. Effect of Ta capping layer on spin dynamics in Co50Fe50 thin films. Solid State Communications, 348-349, 114743 (2022). https://doi.org/10.1016/j.ssc.2022.114743.

37. Mitchison M T, Purkayastha A, Brenes M, Silva A, & Goold J. (2022). Taking the temperature of a pure quantum state. Physical Review A, 105(3). https://doi.org/10.1103/PhysRevA.105.L030201.

38. Purkayastha A. (2022). Lyapunov equation in open quantum systems and non-Hermitian physics. Physical Review A, 105(6). https://doi.org/10.1103/PhysRevA.105.062204.

39. Tupkary D, Dhar A, Kulkarni M, & Purkayastha A. (2022). Fundamental limitations in Lindblad descriptions of systems weakly coupled to baths. Physical Review A, 105(3). https://doi.org/10.1103/PhysRevA.105.032208.

40. Purkayastha A, Guarnieri G, Campbell S, Prior J, & Goold J. (2022). Periodically refreshed quantum thermal machines. Quantum, 6. https://doi.org/10.22331/Q-2022-09-08-801.

41. Chiaracane C, Purkayastha A, Mitchison M T, & Goold J. (2022). Dephasing-enhanced performance in quasiperiodic thermal machines. Physical Review B, 105(13). https://doi.org/10.1103/PhysRevB.105.134203.

42. Guarnieri G, Mitchison M T, Purkayastha A, Jaksch D, Buca B, & Goold J. (2022). Time periodicity from randomness in quantum systems. Physical Review A, 106(2). https://doi.org/10.1103/PhysRevA.106.022209.

43. Chintalwad S, Krishnamurthy S, Morris S, & Ramakrishna B. (2022). Intense -Ray Bursts following the Interaction of Laser Pulse with Steep Density Gradients. Laser and Particle Beams, 2022(undefined). https://doi.org/10.1155/2022/3586372.

44. Chintalwad S, Krishnamurthy S, Ramakrishna B, & Ridgers C P. (2022). Photon emission enhancement studies from the interaction of ultraintense laser pulses with shaped targets. Physical Review E, 105(2). https://doi.org/10.1103/PhysRevE.105.025205.

45. Sankaranarayanan S A, Thomas A, Revi N, Ramakrishna B, & Rengan A K. (2022). Iron oxide nanoparticles for theranostic applications - Recent advances. Journal of Drug Delivery Science and Technology, 70(undefined). https://doi.org/10.1016/j.jddst.2022.103196.

46. Sahoo A K, Talapatra A, Chelvane J A, & Mohanty J. (2022). Modification of magnetic properties in Tb–Fe/Gd–Fe/Tb–Fe trilayer using ion-beam irradiation. Applied Physics A: Materials Science and Processing, 128(3). https://doi.org/10.1007/s00339-022-05361-y.

47. Talapatra A, Gajera U, Prasad S, Arout Chelvane J, & Mohanty J R. (2022). Understanding the Magnetic Microstructure through Experiments and Machine Learning Algorithms. ACS Applied Materials and Interfaces, undefined(undefined). https://doi.org/10.1021/acsami.2c12848.

48. Sahoo A K, Chelvane J A, Samardak A Y, Ognev A V, Samardak A S, Ghosal P, & Mohanty J. (2022). Tuning magnetic interaction between two identical perpendicularly magnetized layers by a nonmagnetic spacer layer. Journal of Magnetism and Magnetic Materials, 563(undefined). https://doi.org/10.1016/j.jmmm.2022.169911.

49. Jena A K, Sahu M C, Sahoo S, Mallik S K, Pradhan G K, Mohanty J, & Sahoo S. (2022). Multilevel resistive switching in graphene oxide-multiferroic thin-film-based bilayer RRAM device by interfacial oxygen vacancy engineering. Applied Physics A: Materials Science and Processing, 128(3) https://doi.org/10.1007/s00339-021-05243-9.

50. Jena A K, Mallik S K, Sahu M C, Sahoo S, Sahoo A K, Sharma N K, Mohanty J, Gupta S K, Ahuja R, & Sahoo S. (2022). Strain-mediated ferromagnetism and low-field magnetic reversal in Co doped monolayer WS2. Scientific Reports, 12(1). https://doi.org/10.1038/s41598-022-06346-w.

51. Malick S, Singh J, Laha A, Kanchana V, Hossain Z, & Kaczorowski D. (2022). Electronic structure and physical properties of EuAuAs single crystal. Physical Review B, 105(4). https://doi.org/10.1103/PhysRevB.105.045103.

52. C V A, Rudenko A N, Manivel Raja M, & Kanchana V. (2022). Anomalous transverse effects and Magneto-Optical properties of Co-based Heusler Compounds. Computational Materials Science, 213(undefined). https://doi.org/10.1016/j.commatsci.2022.111625.

53. Singh J, Behatha A, Kharabadze S, Kolmogorov A N, Vaitheeswaran G, & Kanchana V. (2022). Prediction of Ground State Structures and Robust Weyl Fermionic States in MnRhP. Journal of Physical Chemistry C, 126(40). https://doi.org/10.1021/acs.jpcc.2c04603.

54. Sahoo S S, Sharma V K, Gupta M K, Mittal R, & Kanchana V. (2022). High thermopower and birefringence in layered mercury-based halides. Materials Today Communications, 32(undefined). https://doi.org/10.1016/j.mtcomm.2021.102824.

55. Singh J, Sahoo S S, Venkatakrishnan K, Vaitheeswaran G, & Errandonea D. (2022). High-pressure study of the aurophilic topological Dirac material AuI. Journal of Alloys and Compounds, 928(undefined). https://doi.org/10.1016/j.jallcom.2022.167178.

56. Rambabu P, Anusree C V, Manivel Raja M, & Kanchana V. (2022). Anomalous transverse effects in nodal line compounds Co2TaX (X = Al, Ga). Journal of Magnetism and Magnetic Materials, 562(undefined). https://doi.org/10.1016/j.jmmm.2022.169766.

57. Sahoo S S, Gupta M K, Mittal R, Vaitheeswaran G, & Kanchana V. (2022). Lattice dynamics and negative thermal expansion in layered mercury-based halides. Materials Today Communications, 31(undefined). https://doi.org/10.1016/j.mtcomm.2022.103323.

58. Sharma V K, Kanchana V, Gupta M K, & Mittal R. (2022). Scattering lifetime and high figure of merit in CsAgO predicted by methods beyond relaxation time approximation. Journal of Physics Condensed Matter, 34(29). https://doi.org/10.1088/1361-648X/ac6e1e.

59. Sharma V K, Singh B, Sarkar A B, Gupta M K, Mittal R, Agarwal A, Singh B, & Kanchana V. (2022). Topological phonons and electronic structure of Li2BaSi class of semimetals. Journal of Physics Condensed Matter, 34(12). https://doi.org/10.1088/1361-648X/ac4441.

60. Akun Liang, Lan-Ting Shi, Robin Turnbull, Francisco Javier Manjon, Jordi Ibanez, Catalin Popescu, M. Jasmin, Jaspreet Singh, Kanchana Venkatakrishnan, Ganapathy Vaitheeswaran, and Daniel Errandonea. (2022). Pressure-induced band-gap energy increase in a metal iodate. Physical Review B, 106(23). https://doi.org/10.1103/PhysRevB.106.235203.

61. Behatha A, Maitra T, Rudenko A N, & Kanchana V. (2022). Orbital ordering and quasi-two-dimensional magnetism in A MnF4 (A= K, Rb): A first-principles study. Physical Review B, 106(2). https://doi.org/10.1103/PhysRevB.106.024409.

62. Rishi G, Anusree C V, & Kanchana V. (2022). Evidence for topological features in the electronic and phononic bands of ZGeSb (Z = Hf, Zr, Ti) class of compounds. Journal of Physics Condensed Matter, 34(44). https://doi.org/10.1088/1361-648X/ac8c13.

63. Sharma V K, & Kanchana V. (2022). Tunable magnetoresistance in Li2BaSi. Physics Letters, Section A: General, Atomic and Solid State Physics, 456(undefined). https://doi.org/10.1016/j.physleta.2022.128541.

64. G R, V A C, & Kanchana V. (2022). Evidence for topological features in the electronic and phononic bands of ZGeSb (Z = Hf, Zr, Ti) class of compounds. Journal of physics. Condensed matter: an Institute of Physics journal, 34(44). https://doi.org/10.1088/1361-648X/ac8c13.

65. Sahoo S S & Kanchana V. (2022). Transport characteristics and lattice dynamics with phonon topology accentuation in layered CuTlX (X: S, Se). Physica Scripta, 97(12). https://doi.org/10.1088/1402-4896/aca059.

66. Maiti S, Makwana K, Zhang H, & Yan H. (2022). Cosmic-ray Transport in Magnetohydrodynamic Turbulence. Astrophysical Journal, 926(1). https://doi.org/10.3847/1538-4357/ac46c8.

67. Kwak, M S, Peddigari M, Lee, H Y, Min Y, Park, K-I, Kim, J-H, Yoon, W-H, Ryu, J, Yi, S N, Jang, J, Hwang, G-T. (2022). Exceeding 50 mW RMS-Output Magneto-Mechano-Electric Generator by Hybridizing Piezoelectric and Electromagnetic Induction Effects. Advanced Functional Materials, 32 (24) 2112028. https://doi.org/10.1002/adfm.202112028.

68. Park S, Choi H, Hwang G T, Peddigari M, Ahn C W, Hahn B D, Yoon W H, Lee J W, Park K I, Jang J, Choi J J, & Min Y. (2022). Molten-Salt Processed Potassium Sodium Niobate Single-Crystal Microcuboids with Dislocation-Induced Nanodomain Structures and Relaxor Ferroelectric Behavior. ACS Nano, 16(9). https://doi.org/10.1021/acsnano.2c06919.

69. Kwak M S, Peddigari M, Min Y, Choi J J, Kim J H, Listyawan M A, Ryu J, Hwang G T, Yoon W H, & Jang J. (2022). Boosting the lifespan of magneto-mechano-electric generator via vertical installation for

sustainable powering of Internet of Things sensor. Nano Energy, 101(undefined). https://doi.org/10.1016/j.nanoen.2022.107567 .

70. Peddigari M, Kwak M S, Kim H S, Min Y, Choi J-J, Yoon W-H, Jang J. (2022). Characterization of single-crystal macro-fiber composite-based piezoelectric energy harvesters in various temperature and humidity environments, 48 (8) 10821-10826. https://doi.org/10.1016/j.ceramint.2021.12.298.

71. Mamindla R, & Niranjan M K. (2022). Influence of phonon-assisted tunneling on photovoltaic properties of BaSi2 and BaGe2 p–n homojunction solar cell devices. Journal of Applied Physics, 131(18). https://doi.org/10.1063/5.0072523.

72. Yadav S, Jana S, Panigrahi G, Malladi S.K, Niranjan M.K, & Prakash J. (2022). Five coordinated Mn in Ba4Mn2Si2Te9: synthesis, crystal structure, physical properties, and electronic structure. Dalton Transactions, 51(24). https://doi.org/10.1039/d2dt01167k.

73. Ghosh A, Jana S, Niranjan M K, Behera S K, Constantin L A, & Samal P. (2022). Improved electronic structure prediction of chalcopyrite semiconductors from a semilocal density functional based on Pauli kinetic energy enhancement factor. Journal of Physics Condensed Matter, 34(7). https://doi.org/10.1088/1361-648X/ac394d.

74. Ghosh A, Jana S, Rauch T, Tran F, Marques M A L, Botti S, Constantin L A, Niranjan M K, & Samal P. (2022). Efficient and improved prediction of the band offsets at semiconductor heterojunctions from meta-GGA density functionals: A benchmark study. Journal of Chemical Physics, 57(12).https://doi.org/10.1063/5.0111693.

75. Mamindla R, Ghosh A, & Niranjan M K. (2022). Electron-phonon interaction effect on the photovoltaic parameters of indirect (direct) bandgap AlSb (GaSb) p-n junction solar cell devices: a density functional theoretical study. Physical Chemistry Chemical Physics, 24(39). https://doi.org/10.1039/d2cp03085c.

76. Jana S, Panigrahi G, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). A new non-stoichiometric quaternary sulfide Ba3.14(4) Sn0.61(1) Bi2.39(1) S8: Synthesis, crystal structure, physical properties, and electronic structure. Journal of Solid State Chemistry, 308(undefined). https://doi.org/10.1016/j.jssc.2022.122914.

77. Panigrahi G, Jana S, Ishtiyak M, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). Chalcogen dependent metal vacancies and disorder in Ba2Ln1−xMn2−yS5 and Ba2−δLn1−xMn2−ySe5 (Ln = Pr, Nd, and Gd) structures. Journal of Alloys and Compounds, 901(undefined). https://doi.org/10.1016/j.jallcom.2021.163607.

78. Barman S, Jana S, Panigrahi G, Yadav S, Niranjan M K, & Prakash J. (2022). Ba3Zr2Cu4S9: the first quaternary phase of the Ba–Zr–Cu–S system. New Journal of Chemistry, 46(33). https://doi.org/10.1039/d2nj02972c.

79. Jana S, Panigrahi G, Yadav S, Niranjan M K, & Prakash J. (2022). Synthesis, crystal structure, optical bandgap, and electronic structure of Cs2FeP2S6. Solid State Sciences, 128(undefined). https://doi.org/10.1016/j.solidstatesciences.2022.106891.

80. Panigrahi G, Yadav S, Jana S, Ramanujachary K V, Niranjan M K, & Prakash J. (2022). Ba4FeAgS6: a new antiferromagnetic and semiconducting quaternary sulfide. Dalton Transactions, 52(3). https://doi.org/10.1039/d2dt03209k.

81. Jana S, Panigrahi G, Ummethala G, Ghosh A, Malladi S K, Niranjan M K, & Prakash J. (2022). Extremely low thermal conductivity in BaSb2Se4: Synthesis, characterization, and DFT studies. Journal of Solid State Chemistry, 315(undefined). https://doi.org/10.1016/j.jssc.2022.123524 .

82. Ghosh A, Jana S, Niranjan M K, Tran F, Wimberger D, Blaha P, Constantin L.A, & Samal P. (2022). Correct and Accurate Polymorphic Energy Ordering of Transition-Metal Monoxides Obtained from Semilocal and Onsite-Hybrid Exchange-Correlation Approximations. Journal of Physical Chemistry C, 126(34). https://doi.org/10.1021/acs.jpcc.2c03517.

83. Panigrahi G, Yadav S, Jana S, Ghosh A, Niranjan M K, & Prakash J. (2022). Syntheses and characterization of two new layered ternary chalcogenides NaScQ2 (Q = Se and Te). New Journal of Chemistry, 46(46). https://doi.org/10.1039/d2nj04783g.

84. Jana S, Ishtiyak M, Govindaraj L, Arumugam S, Tripathy B, Malladi S K, Niranjan M K, & Prakash J. (2022). Metal to insulator transition in Ba2Ge2Te5: Synthesis, crystal structure, resistivity, thermal conductivity, and electronic structure. Materials Research Bulletin, 147(undefined). https://doi.org/10.1016/j.materresbull.2021.111641 .

85. Jana S, Panigrahi G, Tripathy B, Malladi S K, Sundaramoorthy M, Arumugam S, Niranjan M K, & Prakash J. (2022). Synthesis, characterization, and electronic structure of SrBi2S4. Journal of Solid State Chemistry, 312(undefined). https://doi.org/10.1016/j.jssc.2022.123250.

86. Jana S, Panigrahi G, Ishtiyak M, Narayanswamy S, Bhattacharjee P P, Niranjan M K, & Prakash J. (2022). Germanium Antimony Bonding in Ba4Ge2Sb2Te10 with

Low Thermal Conductivity. Inorganic Chemistry, 61(2). https://doi.org/10.1021/acs.inorgchem.1c02990.

87. Williams D R A, Pahari M, Baldi R D, McHardy I M, Mathur S, Beswick R J, Beri A, Boorman P, Aalto S, Alberdi A, Argo M K, Dullo B T, Fenech D M, Green D A, Knapen J H, Marta-Vidal I, Moldon J, Mundell C G, Muxlow T W B, Panessa F, Pacrez-Torres M, Saikia P, Shankar F, Stevens I R, & Uttley P. (2022). LeMMINGs - IV. The X-ray properties of a statistically complete sample of the nuclei in active and inactive galaxies from the Palomar sample. Monthly Notices of the Royal Astronomical Society, 510(4). https://doi.org/10.1093/mnras/stab3310.

88. N Castro Segura, C Knigge, K S Long, D Altamirano, M Armas Padilla, C Bailyn, D A H Buckley, D J K Buisson, J Casares, P Charles, J A Combi, V A Cúneo, N D Degenaar, S del Palacio, M Dıaz Trigo, R Fender, P Gandhi, M Georganti, C Gutiérrez, J V Hernandez Santisteban, F Jiménez-Ibarra, J Matthews, M Méndez, M Middleton, T Muñ oz-Darias, M O· zbey Arabacı, M Pahari, L Rhodes, T
D. Russell, S Scaringi, J van den Eijnden, G Vasilopoulos, F M Vincentelli & P Wiseman. (2022). A persistent ultraviolet outflow from an accreting neutron star binary transient. Nature, 603(7899). https://doi.org/10.1038/s41586-021-04324-2.

89. Triki H, Jose A, & Nithyanandan K. (2022). Chirped self-similar localized pulses on a continuous wave background in presence of cubic–quintic nonlinearity and self-frequency shift. Optik, 270(undefined). https://doi.org/10.1016/j.ijleo.2022.169876.

90. Z Wang, Q Jiang, N Kanagaraj, B Yu, Z Zhang. (2022). Spotlighting the Simultaneous Formation of Coherent and Incoherent Dissipative Solitons in an Er-Doped Bidirectional Ultrafast Fiber Laser. Physical Review Applied 18 (6), 064096 2022.

91. https://doi.org/10.1103/PhysRevApplied.18.064096.

92. Mahesh M L V, Pal P, Prasad V V B, & James A R. (2022). Improved Tunability and Energy Storage Density Properties of Low-Loss, Lead-Free (Ba0.50Sr0.50) TiO3 and Ba(Zr0.15Ti0.85)O3 Bilayer Thin Film Stacks. Journal of Electronic Materials, 51(2). https://doi.org/10.1007/s11664-021-09329-1.

93. Swarnalatha V, Purohit S, Pal P, & Sharma R K. (2022). It enhanced etching characteristics of Si {100} in a NaOH-based two-component solution. Micro and Nano Systems Letters, 10(1) https://doi.org/10.1186/s40486-022-00152-9.

Purohit S, Swarnalatha V, Pandey A K, & Pal P. (2022). Wet anisotropic etching characteristics of Si {111} in NaOH-based solution for silicon bulk micromachining. Micro and Nano Systems Letters, 10(1). https://doi.org/10.1186/s40486-022-00162-7.

94. Purohit S, Swarnalatha V, Pandey A K, Sharma R K, & Pal P. (2022). Wet bulk micromachining characteristics of Si {110} in NaOH-based solution. Journal of Micromechanics and Microengineering, 32(12). https://doi.org/10.1088/1361-6439/ac9b64.

95. Mahesh M L V, Pal P, Prasad V V B, & James A R. (2022). Fatigue and leakage current characteristics of lead free bilayer thin film structures. Ceramics International, 48(7). https://doi.org/10.1016/j.ceramint.2021.12.082.

96. Parashar S, Karan A, Avnish, Bandyopadhyay P, & Ghosh K. (2022). Phenomenology of scalar leptoquarks at the LHC in explaining the radiative neutrino masses, muon g-2, and lepton flavor violating observables. Physical Review D, 106(9). https://doi.org/10.1103/PhysRevD.106.095040.

97. Bandyopadhyay P, Karan A, Mandal R, & Parashar S. (2022). Distinguishing signatures of scalar leptoquarks at hadron and muon colliders. European Physical Journal C, 82(10). https://doi.org/10.1140/epjc/s10052-022-10809

98. Sen C, Bandyopadhyay P, Dutta S, & Kt A. (2022). Displaced Higgs production in Type-III seesaw at the LHC/FCC, MATHUSLA and muon collider. European Physical Journal C, 82(3). https://doi.org/10.1140/epjc/s10052-022-10176.

99. Bandyopadhyay P, Jangid S, & Karan A. (2022). Constraining scalar doublet and triplet leptoquarks with vacuum stability and perturbativity. European Physical Journal C, 82(6). https://doi.org/10.1140/epjc/s10052-022-10418.

100. Bandyopadhyay P, Mitra M, Padhan R, Roy A, & Spannowsky M. (2022). Secluded dark matter in gauged B − L model. Jousrnal of High Energy Physics, 2022(5). https://doi.org/10.1007/JHEP05(2022)182.

101. Ganguly J & Hundi R S. (2022). Lepton and quark mixing patterns with generalized CP transformations. Chinese Physics C, 46(10). https://doi.org/10.1088/1674-1137/ac763c.

102. Hundi R S & Sethi I. (2022). Analyses of scalar potential and lepton flavor violating decays in a model with A4 symmetry. Nuclear Physics B, 980(undefined). https://doi.org/10.1016/j.nuclphysb.2022.115764.

103. & Hundi R S. (2022). Lepton flavor violating Z and Higgs decays in the scotogenic model. European Physical JournalC,82(6). https://doi.org/10.1140/epjc/s10052-022-10453-3.

104. Biswas C, Palivela S G, Giribabu L, Soma V R, & Raavi S S K. (2022). Femtosecond excited-state dynamics and ultrafast nonlinear optical investigations of

ethynylthiophene functionalized porphyrin. Optical Materials, 127(undefined). https://doi.org/10.1016/j.optmat.2022.112232.

105. Biswas C, Gangadhar P S, Giribabu L, Chetti P, Banerjee D, Soma V R, & Raavi S S K. (2022). Ultrafast intramolecular charge transfer dynamics and nonlinear optical properties of phenothiazine-based push–pull zinc porphyrin. Journal of Photochemistry and PhotobiologyA:Chemistry,433(undefined). https://doi.org/10.1016/j.jphotochem.2022.114141.

106. Biswas A, Bakthavatsalam R, Das D K, Sam J, Mali B P, Biswas C, Maana N, Thomson S, Raavi S S K, Kurungot S, Gonnade R G, Dutta S, & Kundu J. (2022). Synergistic electronic coupling/cross-talk between the isolated metal halide units of zero dimensional heterometallic (Sb, Mn) halide hybrid with enhanced emission. Journal of Materials Chemistry C, 10(1). https://doi.org/10.1039/d1tc04704c.

107. Kumbhakar S, Giri B, Muley A, Karumban K S, Biswas C, Raavi S S K, & Maji S. (2022). Synthesis, characterization, structural and photophysical properties of heteroleptic ruthenium complexes containing 2-(1H-benzo[d]imidazol-2-yl) quinoline ligand towards electrocatalytic CO2 reduction. Journal of Chemical Sciences, 134(3). https://doi.org/10.1007/s12039-022-02063-z.

108. Ahmed M S, Biswas C, Miranda P B, & Raavi S S K. (2022). Nonlinear optical techniques for characterization of organic electronic and photonic devices. European Physical Journal: Special Topics, 231(4). https://doi.org/10.1140/epjs/s11734-021-00391-8 .

109. Ahmed M S, Biswas C, Banerjee D, Chetti P, Yang J S, Soma V R, & Raavi S S K. (2022). Femtosecond Third-Order Non-Linear Optical Properties of Unconstrained Green Fluorescence Protein Chromophores. Frontiers in Physics, 10(undefined). https://doi.org/10.3389/fphy.2022.914135.

110. Kumar A, Rao T D, Katta V S, Kumar Raavi S S, & Asthana S. (2022). Structural, impedance, and photoluminescence properties of Ho3+ substituted Na0·5Bi0·5TiO3. Physica B: Condensed Matter, 639(undefined). https://doi.org/10.1016/j.physb.2022.413926.

111. Kumar Das D, Bakthavatsalam R, Anilkumar V, Mali B P, Ahmed M S, Raavi S S K, Pallepogu R, & Kundu J. (2022). Controlled Modulation of the Structure and Luminescence Properties of Zero-Dimensional Manganese Halide Hybrids through Structure-Directing Metal-Ion (Cd2+ and Zn2+) Centers. Inorganic Chemistry, 61(13). https://doi.org/10.1021/acs.inorgchem.2c00160.

112. Goutham C, Ashok Kumar K V, Kumar Raavi S S, Subrahmanyam C, & Asthana S. (2022). Enhanced electrical and photocatalytic activities in Na0.5Bi0.5TiO3 through structural modulation by using anatase and rutile phases of TiO2. Journal of Materiomics, 8(1). https://doi.org/10.1016/j.jmat.2021.06.003.

113. Vemula S K & Raavi S S K. (2022). Ion-Implantation in Titania-Based Plasmonic Photo-anodes: A Review. Advanced Materials Interfaces, 9(23). https://doi.org/10.1002/admi.202200085.

Katta V S, Velpandian M, Challapalli S, Meduri P, & Raavi S S K. (2022). Defect engineered (Er3+/Nd3+) codoped TiO2 photoanodes for enhanced photoelectrochemical and photovoltaic applications. Sustainable Energy and
114. Fuels, 6(24). https://doi.org/10.1039/d2se01131j.

Goutham C, Ashok Kumar K V, Kumar Raavi S S, Subrahmanyam C, & Asthana S. (2022). Enhanced electrical and photocatalytic activities in Na0.5Bi0.5TiO3 through structural modulation by using anatase and rutile phases of TiO2. Journal of Materiomics, 8(1). https://doi.org/10.1016/j.jmat.2021.06.003 .

115. Banerjee K, Singh N, & Asthana S. (2022). Role of B-site disorder in the properties of lead-free Na0.5Bi0.5(Mg1/3Nb2/3) O3 ceramic: A possible electrocaloric material with low leakage current. Journal of Physics and Chemistry of Solids, 163(undefined).
116. https://doi.org/10.1016/j.jpcs.2022.110579.

Banerjee K & Asthana S. (2022). Scaling behavior of different shapes of hysteresis loops and recoverable energy storage density in Na0.5Bi0.5TiO3, K0.5Bi0.5TiO3, and Na0.25K0.25Bi0.5TiO3 ferroelectrics. Journal of Materiomics, 8(4).
117. https://doi.org/10.1016/j.jmat.2021.12.007.

Pal M, Srinivas A, & Asthana S. (2022). Enhanced magneto-electric properties and magnetodielectric effect in lead-free (1-x)0.94Na0.5Bi0.5TiO3-0.06BaTiO3–x CoFe2O4 particulate composites. Journal of Alloys and Compounds, 900(undefined).
118. https://doi.org/10.1016/j.jallcom.2021.163487.

Kumar A, Rao T D, Katta V S, Kumar Raavi S S, & Asthana S. (2022). Structural, impedance, and photoluminescence properties of Ho3+ substituted
119 Na0·5Bi0·5TiO3. Physica B: Condensed Matter, 639(undefined). https://doi.org/10.1016/j.physb.2022.413926.

120..Sahu R K & Asthana S. (2022). Improved recoverable energy storage density, breakdown strength, and relaxor nature in eco-friendly K+1-ion rich NBT ferroelectrics. Journal of Alloys and Compounds,

929(undefined).
https://doi.org/10.1016/j.jallcom.2022.167340.

120. Kumar A & Asthana S. (2022). Investigations on structural, dielectric, and impedance properties of ecofriendly Ho3+ / Nb5+ co-substituted Na0.5 Bi0.5TiO3. Journal of Alloys and Compounds, 927(undefined). https://doi.org/10.1016/j.jallcom.2022.166958.

121. S Ghosh as member (CMS Collaboration). (2022). Search for low-mass dilepton resonances in Higgs boson decays to four-lepton final states in proton-proton collisions at √s= 13 TeV. Eur. Phys. J. C 82 (2022) 290. https://doi.org/10.1140/epjc/s10052-022-10127-0 .

122. Inclusive and differential cross section measurements of single top quark production in association with a Z boson in proton-proton collisions at √s = 13 TeV. JHEP 02(2022)107. https://doi.org/10.1103/10.1007/JHEP02(2022)107.

123. S Ghosh as member (CMS Collaboration). (2022). Observation of B^0 \rightarrow \uppsi (2S) K^0_\mathrm {S}\uppi ^+\uppi ^- and B^0_\mathrm {s} \rightarrow \uppsi (2S)K^0_\mathrm {S} decay. Eur.Phys.J.C82(2022)499. https://doi.org/10.1140/epjc/s10052-022-10315-y .

124. S Ghosh as member (CMS Collaboration). (2022). Search for a W' boson decaying to a vector-like quark and a top or bottom quark in the all-jets final state at √s= 13 TeV. JHEP 09 (2022) 088. https://doi.org/10.1007/JHEP09%282022%29088

125. S Ghosh as member (CMS Collaboration). (2022). Search for high-mass resonances decaying to a jet and a Lorentz-boosted resonance in proton-proton collisions at √s = 13 TeV. CMS Collaboration. Phys. Lett. B 832 (2022) 137263. https://doi.org/10.1016/j.physletb.2022.137263.

126. S Ghosh as member (CMS Collaboration). (2022). Search for heavy resonances decaying to a pair of Lorentz-boosted Higgs bosons in final states with leptons and a bottom quark pair at √s = 13 TeV. JHEP 05 (2022) 005. https://doi.org/10.1007/JHEP05(2022)005.

127. S Ghosh as member (CMS Collaboration). (2022). Measurement of the Drell-Yan forward-backward asymmetry at high dilepton masses in proton-proton collisions at √s = 13 TeV. JHEP 08 (2022) 063. https://doi.org/10.1007/JHEP08(2022)063.

128. S Ghosh as member (CMS Collaboration). (2022). Study of dijet events with large rapidity separation in proton-proton collisions at √s= 2.76 TeV. JHEP 03 (2022) 189. https://doi.org/10.1007/JHEP03(2022)189.

129. S Ghosh as member (CMS Collaboration). (2022). Study of dijet events with large rapidity separation in proton-proton collisions at √s= 2.76 TeV. JHEP 03 (2022) 189. https://doi.org/10.1007/JHEP03(2022)189.

130. S Ghosh as member (CMS Collaboration). (2022). Measurement of the production cross section for Z + b jets in proton-proton collisions at √s= 13 TeV. Phys. Rev. D 105 (2022) 092014. https://doi.org/10.1103/PhysRevD.105.092014.

131. S Ghosh as member (CMS Collaboration). (2022). Search for higgsinos decaying to two Higgs bosons and missing transverse momentum in proton-proton collisions at √s = 13 TeV. JHEP 05 (2022) 014. https://doi.org/10.1007/JHEP05(2022)014.

132. S Ghosh as member (CMS Collaboration). (2022). Search for electroweak production of charginos and neutralinos in proton-proton collisions at √s = 13 TeV. JHEP 04 (2022) 147. https://doi.org/10.1007/JHEP04(2022)147.

133. S Ghosh as member (CMS Collaboration). (2022). Precision measurement of the W boson decay branching fractions in proton-proton collisions at √s= 13 TeV. Phys. Rev. D 105 (2022) 072008. https://doi.org/10.1103/PhysRevD.105.072008.

134. S Ghosh as member (CMS Collaboration). (2022). Search for heavy resonances decaying to WW, WZ, or WH boson pairs in a final state consisting of a lepton and a large-radius jet in proton-proton collisions at √s = 13 TeV. Phys. Rev. D 105 (2022) 032008. https://doi.org/10.1103/PhysRevD.105.032008.

135. S Ghosh as member (CMS Collaboration). (2022). Search for heavy resonances decaying to ZZ or ZW and axion-like particles mediating nonresonant ZZ or ZH production at √s= 13 TeV. JHEP 04 (2022) 087. https://doi.org/10.1007/JHEP04(2022)087.

136. S Ghosh as member (CMS Collaboration). (2022). Inclusive nonresonant multilepton probes of new phenomena at √s = 13 TeV. Phys. Rev. D 105 (2022) 112007. https://doi.org/10.1103/PhysRevD.105.112007.

137. S Ghosh as member (CMS Collaboration). (2022). Search for Higgs boson pair production in the four b quark final state in proton-proton collisions at √s= 13 TeV. Phys. Rev. Lett. 129 (2022) 081802. https://doi.org/10.1103/PhysRevLett.129.081802.

138. S Ghosh as member (CMS Collaboration). (2022). Measurements of the associated production of a W boson and a charm quark in proton-proton collisions at √s= 8 TeV. Eur. Phys. J. C 82 (2022) 1094. https://doi.org/10.1140/epjc/s10052-022-10897-7.

139. S Ghosh as member (CMS Collaboration). (2022). Search for a right-handed W boson and a heavy neutrino in proton-proton collisions at √s = 13 TeV. JHEP 04 (2022) 047. https://doi.org/10.1007/JHEP04(2022)047.

140. S Ghosh as member (CMS Collaboration). (2022). Search for resonances decaying to three W bosons in the hadronic final state in proton-proton collisions at √s= 13 TeV. Phys. Rev. D 106 (2022) 012002. https://doi.org/10.1103/PhysRevD.106.012002.

141. S Ghosh as member (CMS Collaboration). (2022). Search for a heavy resonance decaying into a top quark and a W boson in the lepton+jets final state at √s=13 TeV. JHEP 04 (2022) 048. https://doi.org/10.1007/JHEP04(2022)048.

142. S Ghosh as member (CMS Collaboration). (2022). Measurement of the inclusive and differential tt¯γ cross sections in the dilepton channel and effective field theory interpretation in proton-proton collisions at √s= 13 TeV. JHEP 05 (2022) 091. https://doi.org/10.1007/JHEP05(2022)091.

143. S Ghosh as member (CMS Collaboration). (2022). Search for charged-lepton flavor violation in top quark production and decay in pp collisions at √s= 13 TeV. JHEP 06 (2022) 082. https://doi.org/10.1007/JHEP06(2022)082.

144. S Ghosh as member (CMS Collaboration). (2022). Search for resonances decaying to three W bosons in proton-proton collisions at √s = 13 TeV. Phys. Rev. Lett. 129 (2022) 021802. https://doi.org/10.1103/PhysRevLett.129.021802.

145. S Ghosh as member (CMS Collaboration). (2022). Search for Wγ resonances in proton-proton collisions at √s= 13 TeV using hadronic decays of Lorentz-boosted W bosons. Phys. Lett. B 826 (2022) 136888. https://doi.org/10.1016/j.physletb.2022.136888.

146. S Ghosh as member (CMS Collaboration). (2022). Measurement of W±γ differential cross sections in proton-proton collisions at √s = 13 TeV and effective field theory constraints. Phys. Rev. D 105 (2022) 052003. https://doi.org/10.1103/PhysRevD.105.052003.

147. S Ghosh as member (CMS Collaboration). (2022). Measurement of the inclusive and differential WZ production cross sections, polarization angles, and triple gauge couplings in pp collisions at √s = 13 TeV. JHEP 07 (2022) 032. https://doi.org/10.1007/JHEP07(2022)032.

148. S Ghosh as member (CMS Collaboration). (2022). Search for flavor-changing neutral current interactions of the top quark and the Higgs boson decaying to a bottom quark-antiquark pair at √s = 13 TeV. JHEP 02 (2022) 169. https://doi.org/10.1007/JHEP02(2022)169.

149. S Ghosh as member (CMS Collaboration). (2022). Using Z boson events to study parton-medium interactions in PbPb collisions. Phys. Rev. Lett. 128 (2022) 122301. https://doi.org/10.1103/PhysRevLett.128.122301.

150. S Ghosh as member (CMS Collaboration). (2022). Search for long-lived particles decaying into muon pairs in proton-proton collisions at √s = 13 TeV collected with a dedicated high-rate data stream. JHEP 04 (2022) 062. https://doi.org/10.1007/JHEP04(2022)062.

151. S Ghosh as member (CMS Collaboration). (2022). Search for single production of a vector-like T quark decaying to a top quark and a Z boson in the final state with jets and missing transverse momentum at √s= 13 TeV. JHEP 05 (2022) 093. https://doi.org/10.1007/JHEP05(2022)093.

152. S Ghosh as member (CMS Collaboration). (2022). Measurement of the Higgs boson width and evidence of its off-shell contributions to ZZ production. Nat. Phys. 18 (2022) 1329. https://doi.org/10.1038/s41567-022-01682-0 .

153. S Ghosh as member (CMS Collaboration). (2022). Identification of hadronic tau lepton decays using a deep neural network. JINST 17 (2022) P07023. https://doi.org/10.1088/17480221/17/07/P0702.

154. S Ghosh as member (CMS Collaboration). (2022). Search for supersymmetry in final states with two or three soft leptons and missing transverse momentum in proton-proton collisions at √s = 13 TeV. JHEP 04 (2022) 091. https://doi.org/10.1007/JHEP04(2022)091.

155. S Ghosh as member (CMS Collaboration). (2022). Search for long-lived particles decaying to leptons with large impact parameter in proton-proton collisions at √s = 13 TeV. Eur. Phys. J. C 82 (2022) 153. https://doi.org/10.1140/epjc/s10052-022-10027.

156. S Ghosh as member (CMS Collaboration). (2022). Observation of the B+c meson in PbPb and pp collisions at sqrt(sNN)= 5.02 TeV and measurement of its nuclear modification factor. Phys. Rev. Lett. 128 (2022) 252301. https://doi.org/10.1103/PhysRevLett.128.252301.

157. S Ghosh as member (CMS Collaboration). (2022). Measurement and QCD analysis of double-differential inclusive jet cross sections in proton-proton collisions at s√ = 13 TeV. J. High Energ. Phys. 2022, 142 (2022). https://doi.org/10.1007/JHEP02(2022)142.

158. S Ghosh as member (CMS Collaboration). (2022). A new calibration method for charm jet identification

validated with proton-proton collision events at √s = 13 TeV. JINST 17 (2022) P03014. https://doi.org/10.1088/1748-221/17/03/P03014

159. S Ghosh as member (CMS Collaboration). (2022). Strategies and performance of the CMS silicon tracker alignment during LHC Run 2. Nucl. Instrum. Methods A 1037 (2022) 166795. https://doi.org/10.1016/j.nima.2022.166795.

160. S Ghosh as member (CMS Collaboration). (2022). Measurement of the inclusive and differential Higgs boson production cross sections in the decay mode to a pair of τ leptons in pp collisions at √s = 13 TeV. Phys. Rev. Lett. 128 (2022) 081805. https://doi.org/10.1103/PhysRevLett.128.081805 .

161. S Ghosh as member (CMS Collaboration). (2022). Measurement of double-parton scattering in inclusive production of four jets with low transverse momentum in proton-proton collisions at √s = 13 TeV. JHEP 01 (2022) 177. https://doi.org/10.1007/JHEP01(2022)177.

162. S Ghosh as member (CMS Collaboration). (2022). A portrait of the Higgs boson by the CMS experiment ten years after the discovery. Nature 607 (2022) 60. https://doi.org/10.1038/s41586-022-04892-x.

163. S Ghosh as member (CMS Collaboration). (2022). Search for a massive scalar resonance decaying to a light scalar and a Higgs boson in the four b quarks final state with boosted topology. Phys. Lett. B 842 (2022) 137392. https://doi.org/10.1016/j.physletb.2022.137392.

164. S Ghosh as member (CMS Collaboration). (2022). Search for new particles in an extended Higgs sector with four b quarks in the final state at √s= 13 TeV. Phys. Lett. B 835 (2022) 137566. https://doi.org/10.1016/j.physletb.2022.137566.

165. S Ghosh as member (CMS Collaboration). (2022). First search for exclusive diphoton production at high mass with tagged protons in proton-proton collisions at √s= 13 TeV. Phys. Rev. Lett. 129 (2022) 011801. https://doi.org/10.1103/PhysRevLett.129.011801.

166. S Ghosh as member (CMS Collaboration). (2022). Search for heavy resonances decaying to Z(νν¯) V (qq') in proton-proton collisions at √s= 13 TeV. Phys. Rev. D 106 (2022) 012004. https://doi.org/10.1103/PhysRevD.106.012004.

167. S Ghosh as member (CMS Collaboration). (2022). Probing charm quark dynamics via multiparticle correlations in PbPb collisions at sqrt(sNN)= 5.02 TeV. Phys. Rev. Lett. 129 (2022) 022001. https://doi.org/10.1103/PhysRevLett.129.022001.

167. S Ghosh as member (CMS Collaboration). (2022). Measurement of the inclusive tt¯ production cross section in proton-proton collisions at √s= 5.02 TeV. JHEP 04 (2022) 144. https://doi.org/10.1007/JHEP04(2022)144.

168. S Ghosh as member (CMS Collaboration). (2022). Nuclear modification of ϒ states in pPb collisions at sqrt(sNN)= 5.02 TeV. Phys. Lett. B 835 (2022) 137397. https://doi.org/10.1016/j.physletb.2022.137397.

169. S Ghosh as member (CMS Collaboration). (2022). Search for long-lived heavy neutral leptons with displaced vertices in proton-proton collisions at √s = 13 TeV. JHEP 07 (2022) 081. https://doi.org/10.1007/JHEP07(2022)081 .

170. S Ghosh as member (CMS Collaboration). (2022). Search for long-lived particles produced in association with a Z boson in proton-proton collisions at √s = 13 TeV. JHEP 03 (2022) 160. https://doi.org/10.1007/JHEP03(2022)160.

171. S Ghosh as member (CMS Collaboration). (2022). Evidence for WW/WZ vector boson scattering in the decay channel ℓνqq produced in association with two jets in proton-proton collisions at √s = 13 TeV. Phys. Lett. B 834 (2022) 137438. https://doi.org/10.1016/j.physletb.2022.137438 .

172. S Ghosh as member (CMS Collaboration). (2022). Search for invisible decays of the Higgs boson produced via vector boson fusion in proton-proton collisions at √s= 13 TeV. Phys. Rev. D 105 (2022) 092007. https://doi.org/10.1103/PhysRevD.105.092007.

173. S Ghosh as member (CMS Collaboration). (2022). Study of quark and gluon jet substructure in Z+jet and dijet events from pp collisions. JHEP 01 (2022) 188. https://doi.org/10.1007/JHEP01(2022)188.

174. S Ghosh as member (CMS Collaboration). (2022). Evidence for X (3872) in Pb-Pb Collisions and Studies of its Prompt Production at sqrt (s_{NN}) =5.02 TeV. Phys. Rev. Lett. 128 (2022) 032001. https://doi.org/10.1103/PhysRevLett.128.032001.

175. S Ghosh as member (CMS Collaboration). (2022). Analysis of the CP structure of the Yukawa coupling between the Higgs boson and τ leptons in proton-proton collisions at √s= 13 TeV. JHEP 06 (2022) 012. https://doi.org/10.1007/JHEP06(2022)012.

176. S Ghosh as member (CMS Collaboration). (2022). Search for resonant production of strongly coupled dark matter in proton-proton collisions at 13 TeV. JHEP 06 (2022) 156. https://doi.org/10.1007/JHEP06(2022)156.

178. S Ghosh as member (CMS Collaboration). (2022). .

Observation of B0s mesons and measurement of the B0s / B+ yield ratio in PbPb collisions at sqrt(sNN)= 5.02 TeV. Phys. Lett. B 829 (2022) 137062. https://doi.org/10.1016/j.physletb.2022.137062.

179. Goto T, Ito S i, Shinde S L, Ishibiki R, Hikita Y, Matsuda I, Hamada I, Hosono H, & Kondo T. (2022). Carbon dioxide adsorption and conversion to methane and ethane on hydrogen boride sheets. Communications Chemistry, 5(1). **https://doi.org/10.1038/s42004-022-00739-8 .**

180. H Kusaka, R Ishibiki, M Toyoda, T Fujita, T Tokunaga, A Yamamoto, M Miyakawa, K Matsushita, K Miyazaki, L Li, S L Shinde, M Lima, T Sakurai, E Nishibori, T Masuda, K Horiba, K Watanabe, S Saito, M Miyauchi, T Taniguchi, H Hosono and T Kondo. (2022). Crystalline boron monosulfide nanosheets with tunable bandgaps. Journal of Materials Chemistry A, 9, 24631-24640. **https://doi.org/10.1039/D2TA90033E.**

181. Gao X Y, Li Y, Shen C P et al. (2022). Search for tetraquark states Xcc¯s¯s in D+sD+s(D*+sD*+s) final states at Belle. Physical Review D, 105(3) **https://doi.org/10.1103/PhysRevD.105.032002.**

182. Jeon H B, Kang K H et al. (2022). Search for the radiative penguin decays B0 → KS0 KS0 γ in the Belle experiment. Physical Review D, 106(1). **https://doi.org/10.1103/PhysRevD.106.012006.**

183. Abudinen F, Aggarwal L et al. (2022). Erratum to: Combined analysis of Belle and Belle II data to determine the CKM angle ϕ3 using B+ → D(K0Sh+h−) h+ decays. Journal of High Energy Physics, 2022(12). **https://doi.org/10.1007/JHEP12(2022)034.**

184. Wang X L, Gao B S, et al. (2022). Study of γγ →γψ (2S) at Belle. Physical Review D, 105(11). **https://doi.org/10.1103/PhysRevD.105.112011.**

185. Bloomfield T, Sevior M E et al. (2022). Measurement of the branching fraction and CP asymmetry for B → D ¯ 0π decays. Physical Review D, 105(7). **https://doi.org/10.1103/PhysRevD.105.072007.**

186. Czank T, Jaegle I et al. (2022). Search for Z′ →μ+μ- in the Lμ-Lτ gauge-symmetric model at Belle. Physical Review D, 106(1). **https://doi.org/10.1103/PhysRevD.106.012003.**

187. Pang T, Savinov V et al. (2022). Search for the decay B0s→η′K0S. Physical Review D, 106(5). **https://doi.org/10.1103/PhysRevD.106.L051103.**

188. Li Y, Cui J et al. (2022). Measurements of the branching fractions of Ξc0→ΛKS0, Ξc0→Σ0KS0, and Ξc0→Σ+K- decays at Belle. Physical Review D, 105(1) **https://doi.org/10.1103/PhysRevD.105.L011102.**

189. Hadjivasiliou C, Fulsom B et al. (2022). Search for B0 meson decays into Λ and missing energy with a hadronic tagging method at Belle. Physical Review D, 105(5). **https://doi.org/10.1103/PhysRevD.105.L051101.**

190. Li Y B, Shen C P, et al. (2022). First test of lepton flavor universality in the charmed baryon decays ωc0 → ω-ℓ +ν ℓ using data of the Belle experiment. Physical Review D, 105(9). **https://doi.org/10.1103/PhysRevD.105.L091101.**

191. Li S X, Cui J X, et al. (2022). First measurement of the Λc+ → pη′ decay. Journal of High Energy Physics, 2022(3). **https://doi.org/10.1007/JHEP03(2022)09.**

192. Bhuyan B, Nath K J et al. (2022). Search for the decay Bs0 →ηη. Physical Review D, 105(1). **https://doi.org/10.1103/PhysRevD.105.012007.**

193. Wang B, Kinoshita K et al. (2022). Measurement of B (Bs →dsX) with Bs semileptonic tagging. Physical Review D, 105(1). **https://doi.org/10.1103/PhysRevD.105.012004.**

194. Chen Y C, Lee Y J et al. (2022). Measurement of Two-Particle Correlations of Hadrons in e+e-Collisions at Belle. Physical Review Letters, 128(14). **https://doi.org/10.1103/PhysRevLett.128.142005.**

195. Jia S, Shen C P et al. (2022). Search for a Light Higgs Boson in Single-Photon Decays of Υ (1S) Using Υ (2S) →π+π- Υ (1S) Tagging Method. Physical Review Letters, 128(8). **https://doi.org/10.1103/PhysRevLett.128.081804.**

196. Adamczyk K, Aggarwal L et al. (2022). The design, construction, operation and performance of the Belle II silicon vertex detector. Journal of Instrumentation, 17(11). **https://doi.org/10.1088/1748-0221/17/11/P11042 .**

197. Patra S, Bhardwaj V et al. (2022). Search for charged lepton flavor violating decays of Υ (1S). Journal of High Energy Physics, 2022(5). **https://doi.org/10.1007/JHEP05(2022)095.**

198. Abudinen F, Akopov N et al. (2022). B-flavor tagging at Belle II. European Physical Journal C,82(4). **https://doi.org/10.1140/epjc/s10052-022-10180.**

199. Abudinen F, Aggarwal L et al. (2022). Combined analysis of Belle and Belle II data to determine the CKM angle ϕ3 using B+ → D(K0Sh+h−) h+ decays. Journal of High Energy Physics, 2022(2). **https://doi.org/10.1007/JHEP02(2022)063.**

200. Waheed E, Urquijo P et al. (2022). Study of B ¯ 0 →d+h- (h=K/π) decays at Belle STUDY of B ¯ 0 →d+h- (h=K/π). Physical Review D, 105(1).

https://doi.org/10.1103/PhysRevD.105.012003.

201. Inami K, Hayasaka K et al. (2022). An improved search for the electric dipole moment of the τ lepton. Journal of High Energy Physics, 2022(4). https://doi.org/10.1007/JHEP04(2022)110.

202. Gebauer U, Beleno C et al. (2022). Measurement of the branching fractions of the B+ →ηâ " + νâ " and B+ →η′â " + νâ " decays with signal-side only reconstruction in the full q2 range. Physical Review D, 106(3). https://doi.org/10.1103/PhysRevD.106.032013.

203. Bora K, Holanda R F L, Desai S, & Pereira S H. (2022). A test of the standard dark matter density evolution law using galaxy clusters and cosmic chronometers. European Physical Journal C, 82(1). https://doi.org/10.1140/epjc/s10052-022-09987-

204. Gatti M, Pandey S et al. (2022). Cross-correlation of Dark Energy Survey Year 3 lensing data with ACT and Planck thermal Sunyaev-Zel'dovich effect observations. I. Measurements, systematics tests, and feedback model constraints. Physical Review D, 105(12). https://doi.org/10.1103/PhysRevD.105.123525.

205. Amon A, Gruen D et al. (2022). Dark Energy Survey Year 3 results: Cosmology from cosmic shear and robustness to data calibration. Physical Review D, 105(2). https://doi.org/10.1103/PhysRevD.105.023514.

206. Pandey S, Gatti M et al. (2022). Cross-correlation of Dark Energy Survey Year 3 lensing data with ACT and Planck thermal Sunyaev-Zel'dovich effect observations. II. Modeling and constraints on halo pressure profiles. Physical Review D, 105(12). https://doi.org/10.1103/PhysRevD.105.123526.

207. Lee S, Troxel M A et al. (2022). Galaxy–galaxy lensing with the DES-CMASS catalogue: measurement and constraints on the galaxy-matter cross-correlation. Monthly Notices of the Royal Astronomical Society, 509(2). https://doi.org/10.1093/mnras/stab3028.

208. Cawthon R, Elvin-Poole J et al. (2022). Dark Energy Survey Year 3 results: Calibration of lens sample redshift distributions using clustering redshifts with BOSS/eBOSS. Monthly Notices of the Royal Astronomical Society, 513(4). https://doi.org/10.1093/mnras/stac1160.

209. Gunapati G, Jain A, Srijith P K, & Desai S. (2022). Variational inference as an alternative to MCMC for parameter estimation and model selection. Publications of the Astronomical Society of Australia, 39(undefined). https://doi.org/10.1017/pasa.2021.64.

210. Zacharegkas G, Chang C et al. (2022). Dark Energy Survey Year 3 results: Galaxy-halo connection from galaxy-galaxy lensing. Monthly Notices of the Royal Astronomical Society, 509(3). https://doi.org/10.1093/mnras/stab3155.

211. Gatti M, Jain B et al. (2022). Dark Energy Survey Year 3 results: Cosmology with moments of weak lensing mass maps. Physical Review D, 106(8). https://doi.org/10.1103/PhysRevD.106.083509.

212. Gatti M, Jain B et al. (2022). Dark Energy Survey Year 3 results: Cosmology with moments of weak lensing mass maps. Physical Review D, 106(8). https://doi.org/10.1103/PhysRevD.106.083509 .

213. Rodriguez-Monroy M, Weaverdyck N et al. (2022). Dark Energy Survey Year 3 results: Galaxy clustering and systematics treatment for lens galaxy samples. Monthly Notices of the Royal Astronomical Society, 511(2). https://doi.org/10.1093/mnras/stac104.

214. Golden-Marx J B, Miller C J et al. (2022). The Observed Evolution of the Stellar Mass-Halo Mass Relation for Brightest Central Galaxies. Astrophysical Journal, 928(1).https://doi.org/10.3847/15384357/ac4cb4 .

215. Singha J, Joshi B C, Bandyopadhyay D, Grover H, Desai S, Arumugam P, & Banik S. (2022). Pulsar timing irregularities and neutron star interior in the era of SKA: an Indian outlook. Journal of Astrophysics and Astronomy, 43(2). https://doi.org/10.1007/s12036-022-09874-z .

216. Abbott T M C, Aguena M, Alarcon A et al. (2022). Dark Energy Survey Year 3 results: Cosmological constraints from galaxy clustering and weak lensing. Physical Review D, 105(2). https://doi.org/10.1103/PhysRevD.105.023520.

217. Krishak A & Desai S. (2022). Search for a distance-dependent Baryonic Tully-Fisher Relation at low redshifts The Open Journal of Astrophysics, vol. 5, issue 1, id. 9 (2022). https://doi.org/10.21105/astro.2206.06760.

218. Gatti M, Giannini G et al. (2022). Dark Energy Survey Year 3 Results: Clustering redshifts - Calibration of the weak lensing source redshift distributions with redMaGiC and BOSS/eBOSS. Monthly Notices of the Royal Astronomical Society, 510(1). https://doi.org/10.1093/mnras/stab3311.

219. Sanchez C, Prat J et al. (2022). Dark Energy Survey Year 3 results: Exploiting small-scale information with lensing shear ratios. Physical Review D, 105(8). https://doi.org/10.1103/PhysRevD.105.083529.

220. Wetzell V, Jeltema T E et al. (2022). Velocity dispersions of clusters in the Dark Energy Survey Y3 redMaPPer catalogue. Monthly Notices of the Royal Astronomical Society, 514(4).

https://doi.org/10.1093/mnras/stac1623.

221. Abbott T M C, Aguena M et al. (2022). Dark Energy Survey Year 3 results: A 2.7% measurement of baryon acoustic oscillation distance scale at redshift 0.835. Physical Review D, 105(4). https://doi.org/10.1103/PhysRevD.105.043512.

222. Nobleson K, Agarwal N et al. (2022). Low-frequency wideband timing of InPTA pulsars observed with the uGMRT. Monthly Notices of the Royal Astronomical Society, 512(1). https://doi.org/10.1093/mnras/stac532.

223. Varga T N, Gruen D et al. (2022). Synthetic galaxy clusters and observations based on Dark Energy Survey Year 3 Data. Monthly Notices of the Royal Astronomical Society, 509(4). https://doi.org/10.1093/mnras/stab3269.

224. Gupta R, Srijith P K, & Desai S. (2022). Galaxy morphology classification using neural ordinary differential equations. Astronomy and Computing, 38(undefined). https://doi.org/10.1016/j.ascom.2021.100543.

225. Bhavanam S R, Channappayya S S, Srijith P K, & Desai S. (2022). Cosmic Ray rejection with attention augmented deep learning. Astronomy and Computing, 40 100625. https://doi.org/10.1016/j.ascom.2022.100625.

226. Singh A & Desai S. (2022). Search for cosmological time dilation from gamma-ray bursts - A 2021 status update. Journal of Cosmology and Astroparticle Physics, 2022(2). https://doi.org/10.1088/14757516/202/010.

227. Everett S, Yanny B et al. (2022). Dark Energy Survey Year 3 Results: Measuring the Survey Transfer Function with Balrog. Astrophysical Journal, Supplement Series, 258(1).https://doi.org/10.3847/15384365/ac26c1 .

228. Chen R, Scolnic D et al. (2022). Measuring Cosmological Parameters with Type Ia Supernovae in redMaGiC Galaxies. Astrophysical Journal, 938(1). https://doi.org/10.3847/1538-4357/ac8b82.

229. Chan M H, Desai S, & Del Popolo A. (2022). There is no universal acceleration scale in galaxies. Publications of the Astronomical Society of Japan, 74(6). https://doi.org/10.1093/pasj/psac083.

230. Drlica-Wagner A, Ferguson P S et al. (2022). The DECam Local Volume Exploration Survey Data Release 2. Astrophysical Journal, Supplement Series, 261(2). https://doi.org/10.3847/1538-4365/ac78eb.

231. Kovaics A, Vielzeuf P et al. (2022). Dark Energy Survey Year 3 results: Imprints of cosmic voids and superclusters in the Planck CMB lensing map. Monthly Notices of the Royal Astronomical Society, 515(3). https://doi.org/10.1093/mnras/stac2011.

232 Mau S, Nadler E O, Wechsler R H et al. (2022). Milky Way Satellite Census. IV. Constraints on Decaying Dark Matter from Observations of Milky Way Satellite Galaxies. Astrophysical Journal, 932(2). https://doi.org/10.3847/1538-4357/ac6e65.

233. Pradyumna S & Desai S. (2022). Characterization of the GRB prompt fundamental plane using Fermi-GBM data. Journal of High Energy Astrophysics, 35(undefined). https://doi.org/10.1016/j.jheap.2022.06.003.

234. Scaramella R, Amiaux J et al. (2022). Euclid preparation: I. the Euclid Wide Survey. Astronomy and Astrophysics, 662(undefined). https://doi.org/10.1051/0004-6361/202141938 .

235. Stone Z, Shen Y, Burke C J et al. (2022). Optical variability of quasars with 20-yr photometric light curves. Monthly Notices of the Royal Astronomical Society, 514(1). https://doi.org/10.1093/mnras/stac1259.

236. Pasumarti V & Desai S. (2022). Search for spatial coincidence between IceCube neutrinos and radio pulsars. Journal of Cosmology and Astroparticle Physics, 2022(12). https://doi.org/10.1088/1475-7516/2022/12/002 .

237. Doux C, Jain B, Zeurcher D et al. (2022). Dark energy survey year 3 results: Cosmological constraints from the analysis of cosmic shear in harmonic space. Monthly Notices of the Royal Astronomical Society, 515(2). https://doi.org/10.1093/mnras/stac1826.

238. Joshi B C, Gopakumar A et al. (2022). Nanohertz gravitational wave astronomy during SKA era: An InPTA perspective. Journal of Astrophysics and Astronomy, 43(2). https://doi.org/10.1007/s12036-022-09869-w .

239. Tarafdar P, Nobleson K et al. (2022). The Indian Pulsar Timing Array: First data release. Publications of the Astronomical Society of Australia, 39(undefined). https://doi.org/10.1017/pasa.2022.46.

240. Prat J, Blazek J et al. (2022). Dark energy survey year 3 results: High-precision measurement and modeling of galaxy-galaxy lensing. Physical Review D, 105(8). https://doi.org/10.1103/PhysRevD.105.083528.

241. Akhazhanov A, More A et al. (2022). Finding quadruply imaged quasars with machine learning -I. Methods. Monthly Notices of the Royal Astronomical Society, 513(2). https://doi.org/10.1093/mnras/stac925.

242. Hartley W G, Choi A et al. (2022). Dark Energy Survey Year 3 Results: Deep Field optical + near-infrared

images and catalogue. Monthly Notices of the Royal Astronomical Society, 509(3). https://doi.org/10.1093/mnras/stab3055.

243. Kovics A, Jeffrey N, Gatti M et al. (2022). The des view of the Eridanus supervoid and the CMB cold spot. Monthly Notices of the Royal Astronomical Society, 510(1). https://doi.org/10.1093/mnras/stab3309.

244. Desai S. (2022). Combined significance of spatial coincidence of high energy neutrinos from PSR B1509-58 by Super-Kamiokande and MACRO. Journal of Cosmology and Astroparticle Physics, 2022(8). https://doi.org/10.1088/14757516/2022/08/001.

245. Bhave A, Kulkarni S, Desai S, & Srijith P K. (2022). Two dimensional clustering of Gamma-Ray Bursts using durations and hardness. Astrophysics and Space Science, 367(4). https://doi.org/10.1007/s10509-022-04068-z .

246. Pradyumna S & Desai S. (2022). A test of galaxy cluster fundamental plane for the X-COP sample. Journal of Cosmology and Astroparticle Physics, 2022(1). https://doi.org/10.1088/14757516/2022/01/058.

247. MacCrann N, Becker M R, McCullough J et al. (2022). Dark Energy Survey Y3 results: Blending shear and redshift biases in image simulations. Monthly Notices of the Royal Astronomical Society, 509(3). https://doi.org/10.1093/mnras/stab2870.

248. Bhagvati S & Desai S. (2022). Search for variability in Newton's constant using local gravitational acceleration measurements. Classical and Quantum Gravity, 39(1). https://doi.org/10.1088/1361-6382/ac3c8c.

249. Lokken M, Hlozek R et al. (2022). Superclustering with the Atacama Cosmology Telescope and Dark Energy Survey. I. Evidence for Thermal Energy Anisotropy Using Oriented Stacking. Astrophysical Journal, 933(2). https://doi.org/10.3847/1538-4357/ac7043.

250. Wiseman P, Vincenzi M et al. (2022). A galaxy-driven model of type Ia supernova luminosity variations. Monthly Notices of the Royal Astronomical Society, 515(3). https://doi.org/10.1093/mnras/stac1984.

251. Rosell A C, Rodriguez-Monroy M et al. (2022). Dark energy survey year 3 results: Galaxy sample for BAO measurement. Monthly Notices of the Royal Astronomical Society, 509(1). https://doi.org/10.1093/mnras/stab2995.

252. Porredon A, Crocce M et al. (2022). Dark Energy Survey Year 3 results: Cosmological constraints from galaxy clustering and galaxy-galaxy lensing using the MagLim lens sample. Physical Review D, 106(10). https://doi.org/10.1103/PhysRevD.106.103530.

253. Reddy Ch T T & Desai S. (2022). Classification of pulsars using Extreme Deconvolution. New Astronomy, 91(undefined). https://doi.org/10.1016/j.newast.2021.101673.

254. Bernardinelli P H, Bernstein G M et al. (2022). A Search of the Full Six Years of the Dark Energy Survey for Outer Solar System Objects. Astrophysical Journal, Supplement Series, 258(2). https://doi.org/10.3847/1538-4365/ac3914.

255. Tucker D L, Wiesner M P et al. (2022). SOAR/Goodman Spectroscopic Assessment of Candidate Counterparts of the LIGO/Virgo Event GW190814. Astrophysical Journal, 929(2). https://doi.org/10.3847/1538-4357/ac5b60 .

256. Derose J, Wechsler R H et al. (2022). Dark Energy Survey Year 3 results: Cosmology from combined galaxy clustering and lensing validation on cosmological simulations. Physical Review D, 105(12). https://doi.org/10.1103/PhysRevD.105.123520.

257. Lee S, Huff E M, Choi A et al. (2022). Probing gravity with the DES-CMASS sample and BOSS spectroscopy. Monthly Notices of the Royal Astronomical Society, 509(4). https://doi.org/10.1093/mnras/stab3129.

258. Chan K C, Avila S, et al. (2022). Dark Energy Survey Year 3 results: Measurement of the baryon acoustic oscillations with three-dimensional clustering. Physical Review D, 106(12). https://doi.org/10.1103/PhysRevD.106.123502.

259. Zurcher D, Fluri J et al. (2022). Dark energy survey year 3 results: Cosmology with peaks using an emulator approach. Monthly Notices of the Royal Astronomical Society, 511(2). https://doi.org/10.1093/mnras/stac078.

260. Holanda R F L, Bora K, & Desai S. (2022). A test of the evolution of gas depletion factor in galaxy clusters using strong gravitational lensing systems. European PhysicalJournalC,2(6). https://doi.org/10.1140/epjc/s10052-022-10503-w

261. O'Donnell J H, Wilkinson R D, Diehl H T, Aros-Bunster C et al. (2022). The Dark Energy Survey Bright Arcs Survey: Candidate Strongly Lensed Galaxy Systems from the Dark Energy Survey 5000 Square Degree Footprint. Astrophysical Journal, Supplement Series, 259(1).https://doi.org/10.3847/15384365/ac470b .

262. Muller A, Smith M et al. (2022). The dark energy survey 5-yr photometrically identified type Ia supernovae. Monthly Notices of the Royal Astronomical Society, 514(4). https://doi.org/10.1093/mnras/stac1691.

263. Govindaraj G & Desai S. (2022). Low redshift calibration of the Amati relation using galaxy clusters. Journal of

Cosmology and Astroparticle Physics, 2022(10). https://doi.org/10.1088/1475-516/2022/10/069.

264. Jana A K, Raja M M, Chelvane J A, Ghosal P, & Jammalamadaka S N. (2022). Ferromagnetic Thickness Variation Exchange Bias in IrMn (111)/Fe2CoSi Hybrid Structure. Journal of Superconductivity and Novel Magnetism, 35(5). https://doi.org/10.1007/s10948-022-06194-9 .

265. RajeshKumar Roul, ApuKumar Jana, B B Nayak and S Narayana Jammalamadaka. (2022). Pseudo magnetic properties and evidence for vortex state in Fe2NiGe Heusler alloy thin films. Journal of Magnetism and Magnetic Materials 69401, 556 (2022). https://doi.org/10.1016/j.jmmm.2022.169401 .

266. Kotnana G, Babu P D, & Jammalamadaka S N. (2022). Metamagnetic Transitions and Magnetocaloric Properties of HoCr1-xFexO3 (x = 0.25 and 0.75) Compounds. Journal of Superconductivity and Novel Magnetism, 35(7). https://doi.org/10.1007/s10948-022-06225-5 .

267. Jana A K & Jammalamadaka S N. (2022). Spin transfer torque bias (STTB) due to domain wall resistance in an infinitely long ferromagnetic nanowire. Nanotechnology, 33(10). https://doi.org/10.1088/1361-6528/ac23f4.

268. Apu Kumar Jana, M Manivel Raja, J Arout Chelvane, James Wang, & S Narayana Jammalamadaka. (2022). Anomalous domain wall dynamics in Ir50Mn50/Fe2CoSi bilayers. Journal of Magnetism and Magnetic Materials, 560, 169656 (2022). https://doi.org/10.1016/j.jmmm.2022.169656 .

269. Jetty P, Sahu D P, & Jammalamadaka S. (2022). Analog Resistive Switching in Reduced Graphene Oxide and Chitosan-Based Bio-Resistive Random Access Memory Device for Neuromorphic Computing Applications. Physica Status Solidi - Rapid Research Letters, 16(2). https://doi.org/10.1002/pssr.202100465.

270. Jana A K, Raja M M, Chelvane J A, & Jammalamadaka S N. (2022). Thickness-Dependent Magnetostatic Interactions and Domain State Configuration in Fe2CoSi Thin Films–FORC Analysis. IEEE Transactions on Magnetics, 58(1). https://doi.org/10.1109/TMAG.2021.3121327.

271. Arnab Sen, Abhisek Sinha, Sanket Sen, V Sharma, and R Gopal. (2022). Above-threshold ionization of argon with ultrashort orbital-angular-momentum beams, Phys. Rev. A 106, 023103 (2022). https://doi.org/10.1103/PhysRevA.106.023103.

272. Sanket Sen, S Mandal, Arnab Sen, R Gopal, L Ben Ltaief, S Turchini, D Catone, N Zema, M Coreno, R Richter, M Mudrich, S R Krishnan, V Sharma. (2022). Fragmentation dynamics of doubly charged camphor molecule following C 1s Auger decay. Phys. Chem. Chem. Phys., 24, 2944, (2022). https://doi.org/10.1039/D1CP05176H.

273. Kumar D, Gupta M, Srivastava Y K, Devi K M, Kumar R, & Roy Chowdhury D. (2022). Photoinduced dynamic tailoring of near-field coupled terahertz metasurfaces and its effect on Coulomb parameters. Journal of Optics (United Kingdom), 24(4). https://doi.org/10.1088/2040-8986/ac4d71.

274. Wang W, Srivastava Y K, Gupta M, Wang Z, & Singh R. (2022). Photoswitchable Anapole Metasurfaces. Advanced Optical Materials, 10(4). https://doi.org/10.1002/adom.202102284 .

275. Parashar S, Karan A, Avnish, Bandyopadhyay P, & Ghosh K (2022), Phenomenology of scalar leptoquarks at the LHC in explaining the radiative neutrino masses, muon g-2, and lepton flavor violating observables, Physical Review D, 106(9) https://doi.org/10.1103/PhysRevD.106.095040.

276. Bandyopadhyay P, Karan A, Mandal R, & Parashar S (2022), Distinguishing signatures of scalar leptoquarks at hadron and muon colliders, European Physical JournalC,82(10) https://doi.org/10.1140/epjc/s10052-022-108099.

277. Bandyopadhyay P, Jangid S, & Karan A (2022), Constraining scalar doublet and triplet leptoquarks with vacuum stability and perturbativity. European Physical Journal C, 82(6) https://doi.org/10.1140/epjc/s10052-022-104186

278. Bandyopadhyay P, Mitra M, Padhan R, Roy A, & Spannowsky M (2022), Secluded dark matter in gauged B â˜ L model, Journal of High Energy Physics, 2022(5) https://doi.org/10.1007/JHEP05(2022)182.

279. Sen C, Bandyopadhyay P, Dutta S, & Kt A (2022), Displaced Higgs production in Type-III seesaw at the LHC/FCC, MATHUSLA and muon collider. European PhysicalJournalC,82(3) https://doi.org/10.1140/epjc/s10052-022-10176-5 .

Funded Research Projects:

1. Alok Kumar Pan; Device-independent quantum randomness certification using non-projective measurements; 6 L. [SERB/PHY/F321/2022-23/G548].

2. Alok Kumar Pan; Probing multipartite non-local correlations in various quantum network configurations and randomness certification; 19 L. [SERB/PHY/F321/2022-23/G551].

3. Anjan Kumar Giri; Indian institutions Fermilab collaboration in Neutrino Physics; 175 L. [G-218].

4. Anupam Gupta; Collective behaviour in turbulent environment; 15 L. [DST/NSM/R&D_HPC_Applications/2021/05].

5. Anupam Gupta; Mathematical modeling of tissue morphogenesis with viscoelastic extracellular matrix; 6.6 L. [SERB/PHY/F244/2022-23/G527].

6. Arabinda Haldar; Harnessing Pure Spin Current by Tailoring molecular spinterface; 30.04 L. [BRNS/MSME/F206/2022-23/G472].

7. Arabinda Haldar; Spintronics based Digital Logic Architecture Design for AI Applications; 60 L. [SERB/EE/F091/2022-23/G546].

8. Arabinda Haldar; Spin wave dispersions and nanoscale imaging of magnons using Brillouin light scattering spectro-microscopy; 42.19 L. [SERB-CRG/PHY/F182/2022-23/G540]

9. Bhuvanesh Ramakrishna; Laser driven ion sources for cancer therapy; 80 L. [G255].

10. Bhuvanesh Ramakrishna; Laser driven ion sources for cancer therapy; 80 L. [G255].

11. Jyoti Ranjan Mohanty; Magnetization Dynamics in Ferrimagnetic Heterostructure with Domain Wall Junctions; 0.04 L. [IEEE/PHY/F103/2022-23/S245].

12. Mahesh Peddigari; Composite-engineered lead-free ceramic thick films for high energy storage density capacitor applications; 25 L. [SG/IITH/F298/2022-23/SG-157].

13. Nithyanandan Kanagaraj; Design and Development of a multifuNctional all-fiber laser system for The "On-demand" generation of structured laser light (DENTO); 20 L. [AC2023-5].

14. Priyotosh Bandyopadhyay; Understanding Higher Guage Symmetrics at the LHC; 2.2 L. [G327].

15. Priyotosh Bandyopadhyay; Data and Machine learning at the LHC; 5 L. [AV/KAR/2022/0167].

16. Raavi Sai Santosh Kumar; Charge transfer dynamics in non-fullerene small molecule organic solar cell; 61.21 L. [G318].

17. Saurabh Sandilya; Measurements related to Rare B-decays (and to set-up a High Energy Physics photo-detector laboratory); 24.12 L. [SERB/PHY/F245/2022-23/G517].

18. Shantanu Desai; Explorations in Astrophysical Data Mining, Astrostatistics and Astroinformatics; 44 L. [G207].

19. Shinde Satish Laxman; Investigating the optically excited hot carrier in transition metal nitrides for energy application; 25 L. [SG/IITH/F300/2022-23/SG-158].

20. Priyotosh Bandyopadhyay; Understanding Higher Guage Symmetrics at the LHC; 22.2222358; [G327].

21. Priyotosh Bandyopadhyay; Data and Machine learning at the LHC; 522.2222; [AV/KAR/2022/0167].

22. Alok Kumar Pan; Device-independent quantum randomness certification using non-projective measurements; 689; [SERB/PHY/F321/2022-23/G548].

23. Dr Alok Kumar Pan; Probing multipartite non-local correlations in various quantum network configurations and randomness certification; 196; [SERB/PHY/F321/2022-23/G551].

Awards & Recognitions:

1. Arabinda Haldar has been elected as "Early Career Editorial Board" member for Materials Today Electronics (Elsevier) journal, 2022.

2. Arabinda Haldar has been the Session Chair for ICONN 2023, SRM Institute of Science and Technology, Chennai, 2023.

3. Arabinda Haldar has been the "Review Editor" on the Editorial Board of Quantum Materials (specialty section of Frontiers in Materials), 2022.

4. Arabinda Haldar "Review Editor" on the Editorial Board of Quantum Materials (specialty section of Frontiers in Materials), 2022.

5. Bhuvanesh Ramakrishna has been elevated to the rank of Senior Member of IEEE this year.

6. Mayukh Pahari has been elected as the Honored Life Member of the Astronomical Society of India.

7. Nithyanandan Kanagaraj has been elected as Vice-Chair of the OSA Technical Group "Lasers in Manufacturing".

8. Nithyanandan Kanagaraj has been elected as Events Officer of the OSA Technical Group "Ultrafast Phenomena".

9. Nithyanandan Kanagaraj has been Elevated to OSA Senior Member.

10. Priyotosh Bandyopadhyay received the Teacher Excellence Award IITH 2023.

11. Priyotosh Bandyopadhyay received DST-Karyashala, INR 5lakhs for the Data and Machine learning at the

LHC, IIT Hyderabad, India

12. Priyotosh Bandyopadhyay has been the Visiting Professor at the Korea Institute for Advanced Study, South Korea, for the summer of 2023 with an International travel grant.

13. Raavi Sai Santosh Kumar has been selected for membership in the Indian National Young Academy of Science (INYAS) (2022-2026).

14. Raavi Sai Santosh Kumar received the Visiting Researcher Fellowship at the National Institute of Materials Science (NIMS), Tsukuba, Japan.

15. Saket Asthana's PhD Student, Dr Krishnarjun Banerjee (PhD - 2022), received the Prestigious Marie Curie Postdoctoral Position from the Queen Mary University of London

16. Shantanu Desai has been inducted into the Stanford top 2% scientists for 2022.

17. Suryanarayana Jammalamadaka's PhD student, Mr Prince Kumar, received the PMRF Fellowship.

18. Yogesh Kumar Srivastava received the NTU Open Research Award 2022.

Highlights:

1. Seminars/Workshops conducted

- The Department of Physics organized the National Science Day on 28th Feb 2023 to commemorate the first Indian Nobel Laureate CV Raman's contribution to Science. Dr Radhakrishnan, former Chairman of ISRO, was the Guest of Honor and delivered a special lecture titled "Trsyt with an Amazing ISRO and my Life Lessons."
- Indo-UK Workshop on Translating Laboratory Astrophysics to Instrumentation for Human Assistance: organized by Dr Vandana Sharma.
- Karyashala (SERB) on "Data and Machine Learning at the LHC". Priyotosh organised during 21-28/08/22. Around 50 students, including 5 experts attended the workshop.
- The Physics Department initiated the monthly student seminar and student meeting series in January 2023 on the final Wednesday of each month. The series has been successful so far, leading to further interaction among the students and between the students and the faculty.
- The third edition of the international workshop series on "Quantum Information in QFT and AdS/CFT" was held in hybrid mode for three days, 16-18th Sept. 2022.
- We have organized many seminars in astrophysics/high energy nuclear physics over the last year. This list can be found at https://physics.iith.ac.in/HEP/video.html .
- Soft and Active Matter Seminar Series cycle II, from May 2022- April 2023.

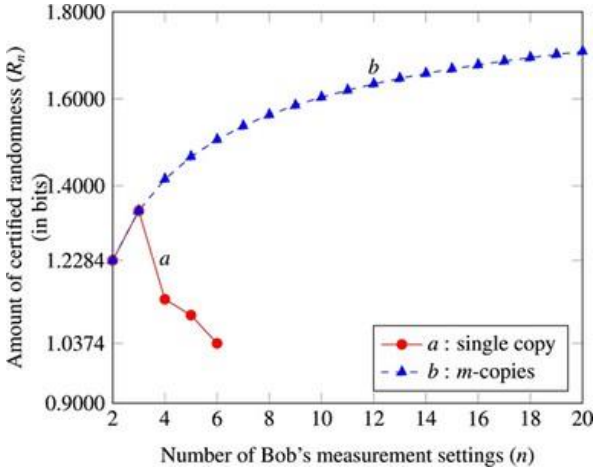
2. New Infrastructure/Labs set up:

Advanced Darksky Observatory (ADO) is established. The first in-campus research observatory among all IITs aims to provide cutting-edge astronomy and engineering research. It hosts a 0.5meter Robotic optical telescope (largest among small telescope categories) with a magnification of ~1000x and capable of resolving a structure as small as 25 km on the surface of the moon, individual rings of Saturn.

Research Highlights:

3. Device-independent randomness certification using multiple copies of entangled states – Dr Alok Kumar Pan

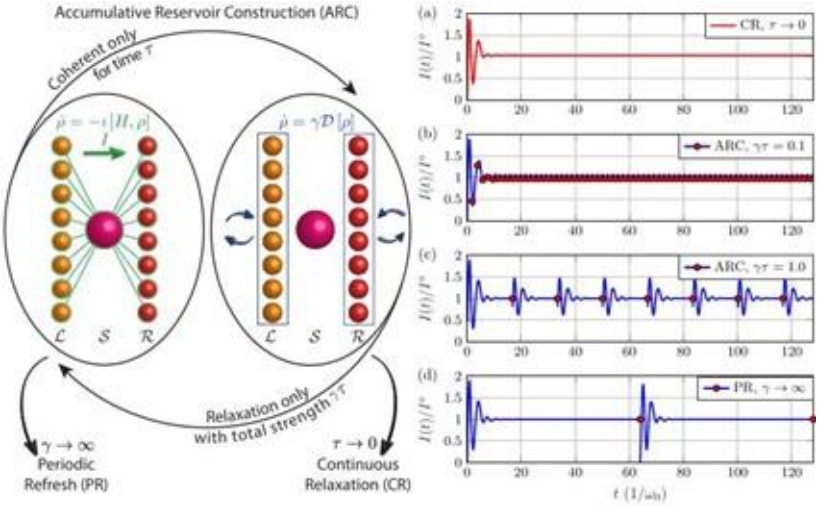
Our research group is focused on exploring various state-of-the-art aspects of quantum foundations, quantum secure communication, quantum sensing, and quantum information theory. Currently, we are actively working on the following research topics: the device-independent and semi-device-independent self-testing of quantum instruments, quantum contextuality and nonlocality, quantum network, weak measurement-based quantum sensing, joint measurability, classicality, and negativity of quasiprobability, the quantum advantage in communication complexity games, device-independent quantum cryptography, information-theoretic advantage of the indefinite causal order of quantum channels, etc. We remain open to including more topics on students' demand. In recent years, we have published quite a significant number of research articles in high-visibility journals on the above-mentioned topics. A complete list of publications can be found at this url: https://scholar.google.co.in/citations?hl=en&user=65c_QkIAAAAJ&view_op=list_works&sortby=pubdate. Citation of below work: Mahato, S. S., & Pan, A. (2022). Device-independent randomness certification using multiple copies of entangled states. Physics Letters A, 456, 128534. https://doi.org/10.1016/j.physleta.2022.128534



corresponding to the optimal quantum Bell violation with different measurement settings of Bob. In particular, the red curve 'a' shows the amount of randomness for different n when a single copy of a maximally entangled two-qubit state is shared between Alice and Bob. It is found that the amount of randomness decreases with the increase of the number of measurement settings n. On the other hand, if m = ⌊n/2⌋ copies of bipartite maximally entangled state are shared between Alice and Bob, then the amount of randomness increases with the increase of n as shown by the dashed blue curve 'b'. Thus, ⌊n/2⌋ copies of the bipartite maximally entangled state provide an advantage over a single copy in the quantification of certified randomness. (For interpretation of the colours in the figure(s), the reader is referred to the web version of this article.)

4. The Accumulative Reservoir Computation method to calculate dynamics of dissipative quantum systems – Dr Archak Purkayastha

We focus on exploring the physics of driven dissipative quantum many-body systems. Over the last year, we have formulated two classes of analytical and numerical techniques to simulate the dynamics of such systems (Refs [1], [2] given below). We have further taken steps towards formulating the theory for describing the thermodynamics of such systems and have discovered the possibility of new types of far-from-equilibrium quantum thermal machines (Ref. [3] given below).



The Accumulative Reservoir Computation method to calculate dynamics of dissipative quantum systems (taken from Ref. [2])

Ref. [1] Lyapunov equation in open quantum systems and non-Hermitian physics, Archak Purkayastha, Phys. Rev. A 105 (6), 062204 (2022).
https://doi.org/10.1103/PhysRevA.105.062204

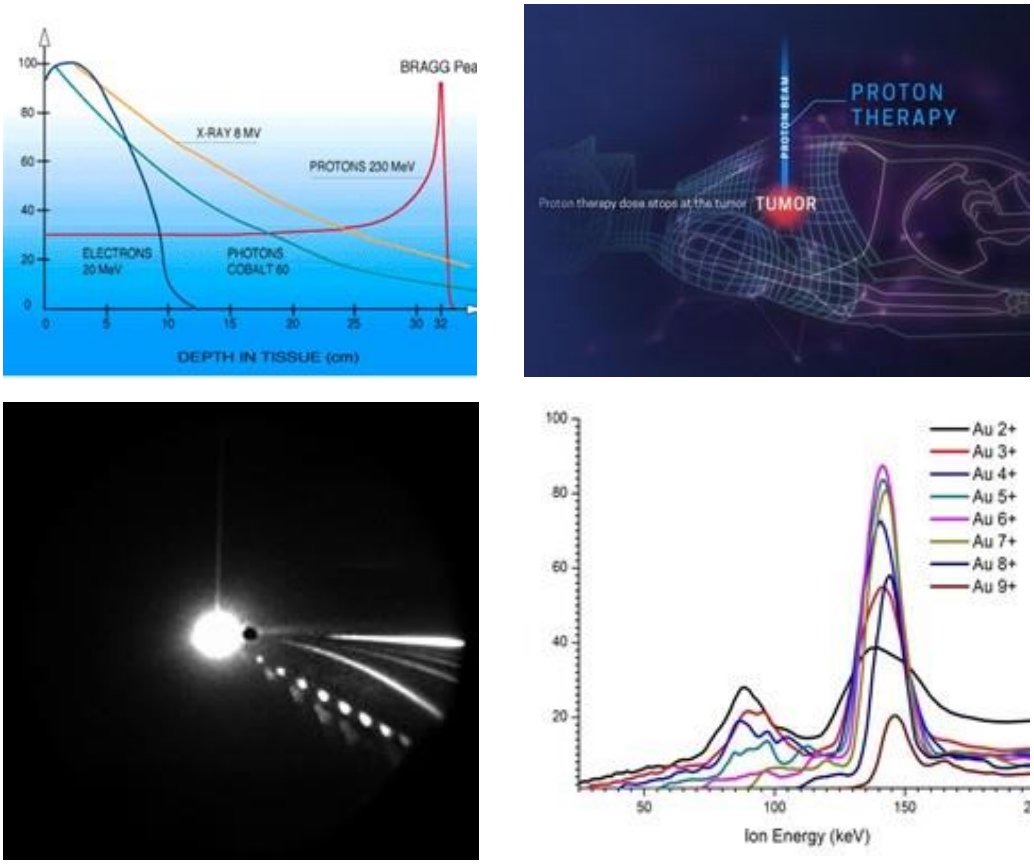
Ref. [2] Accumulative reservoir construction: Bridging continuously relaxed and periodically refreshed extended reservoirs, Gabriela Wójtowicz, Archak Purkayastha, Michael Zwolak, and Marek M. Rams, Phys. Rev. B 107, 035150 (2023). https://doi.org/10.1103/PhysRevB.107.035150 .

Ref. [3] Periodically refreshed quantum thermal machines, Archak Purkayastha, Giacomo Guarnieri, Steve Campbell, Javier Prior6, John Goold, Quantum 6, 801, (2022). https://doi.org/10.22331/q-2022-09-08-801.

5. Acceleration of gold ions to 100 KeV from a Tabletop Laser - Dr Bhuvanesh Ramakrishna

The interaction of intense laser pulses with matter is opening up new frontiers in physics via the production of extreme pressures, temperatures and intense electric and magnetic fields. This has led to the use of high-power laser radiation for exploring the properties of hot dense matter, the production of high-energy particles and radiation and the development of schemes for "tabletop ion acceleration". These advances are driven by rapid developments in ultrashort pulse laser technology, which have enabled new regimes in laser power and intensity to be reached.Laser-driven compact ion therapy is to investigate the usefulness of employing laser-driven ion beams f

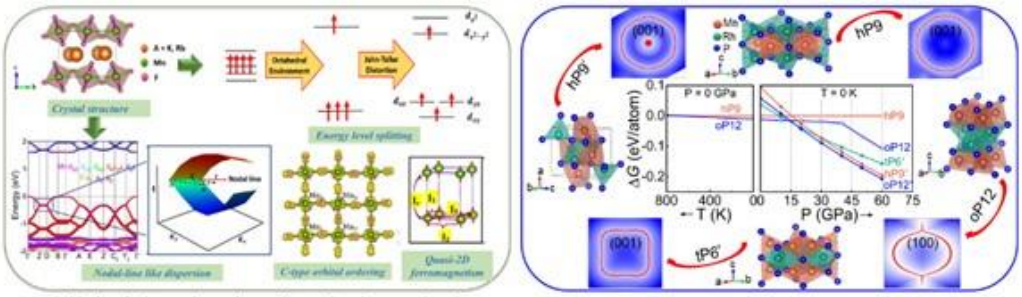
for "cancer therapy. This would provide possibilities of better dose conformity to the treatment target when compared to commonly used photon or electron beams. Proton beams have low entrance dose, sharp penumbra, rapid fall off at the distal edge of the dose distribution, and the maximum rate of energy loss at the end of the range, i.e. the Bragg peak effect.



Recent Results: Acceleration of gold ions to 100 KeV from a Table-top Laser

6. Computational Condensed Matter Physics - Prof Kanchana V

Our group mainly focuses on unravelling the complexities of crystalline materials and predicting their diverse thermal, electronic, magnetic, and topological properties through first-principles calculations. Energy harvesting has emerged as a focal point for our group, particularly in the domain of thermoelectric materials. In search of promising thermoelectric materials, we found CsAgO to be a promising candidate, boasting a remarkable figure of merit. Furthermore, investigations into n-type LaAgTeO have revealed exceptional thermoelectric performance, surpassing that of other oxide materials, while exhibiting an unprecedentedly low lattice thermal conductivity. [Physical Review Materials, 7(2), 025405 (2023); Journal of Physics: Condensed Matter, 34(29), 295502 (2022)]. The investigation of electronic structure, precisely the topological characteristics of diverse types of quantum materials, is also the current area of concentration, like Heusler compounds for their transport properties, hexagonal 111-type topological materials, perovskite-like structures, etc. [Journal of Magnetism and Magnetic Materials, 562, 169766 (2022); Computational Materials Science, 213, 111625 (2022)]. The electronic band structure calculations of rare-earth-based compound GdAgGe reveal that it has a nodal line with drumhead surface states coupled with a nonzero Berry phase, making it a nontrivial nodal-line semimetal [Physical Review B, 107(8), 085137 (2023)]. Topological features have been discovered in materials in electronic or phononic bands, but seldom in both for a compound such as the ZGeSb (Z=Hf, Ti, and Zr) class of compounds, which is quite uncommon in materials [Journal of Physics: Condensed Matter, 34(44), 445502 (2022)]. Topological metals and semimetals have received a lot of attention recently due to their unusual properties both under normal and high pressure, although they have not been extensively studied. One such compound with non-trivial topological properties robust to high pressure is MnRhP [The Journal of Physical Chemistry C, 126(40), 17328-37 (2022)]. AuI has uncovered a movable Dirac point with hourglass band dispersion, remaining steadfast even amidst the transformative amorphization induced by high pressure [Journal of Alloys and Compounds, 928, 167178 (2022)]. We have also shed light on orbital ordering and quasi-two-dimensional magnetism in AMnF4 compounds (A = K, Rb), which revealed quasi-two-dimensional ferromagnetic behaviour, nodal-line-like dispersions, and staggered orbital ordering phenomena, paving the way for further exploration [Physical Review B, 06(2), 024409 (2022)]. The diversity of available materials is greatly expanded by their unique features, allowing for more extensive investigations of their structure-property relationships and opening new possibilities for developing device applications.



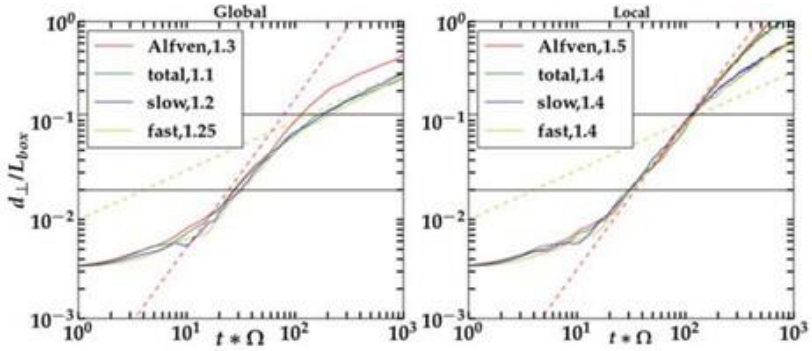
Orbital ordering and quasi-two-dimensional magnetism in $AMnF_4$ (A = K, Rb): A first-principles study

Prediction of Ground State Structures and Robust Weyl Fermionic States in MnRhP

Computational Condensed Matter Physics

7. **Cosmic-ray Transport in Magnetohydrodynamic Turbulence – Dr Kirit Makwana**

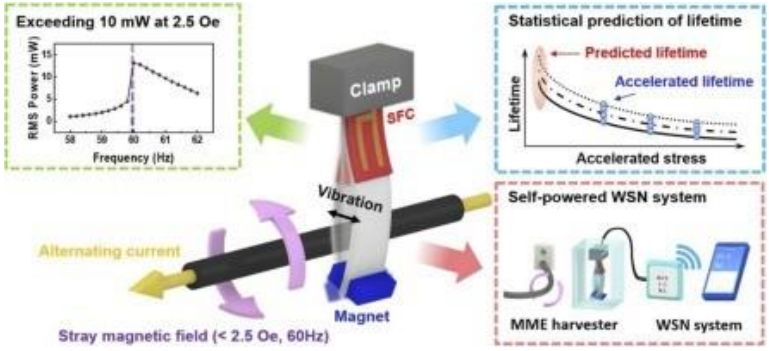
Our group conducts research to understand basic phenomena in space, astrophysical, and laboratory plasmas. We use theoretical and computational techniques to understand turbulence and magnetic reconnection in solar and astrophysical plasmas. Recently, we have been able to perform novel and very precise simulations of kinetic Alfven waves in solar wind plasma, which show that these wave modes have the potential to explain the observed sub-ion range solar wind turbulence. We were also able to demonstrate the phenomenon of super-diffusion of particles in magnetohydrodynamic turbulence in our simulations [Cosmic-ray Transport in Magnetohydrodynamic Turbulence, Astrophys. J. 926, 94].



Cosmic-ray Transport in Magnetohydrodynamic Turbulence

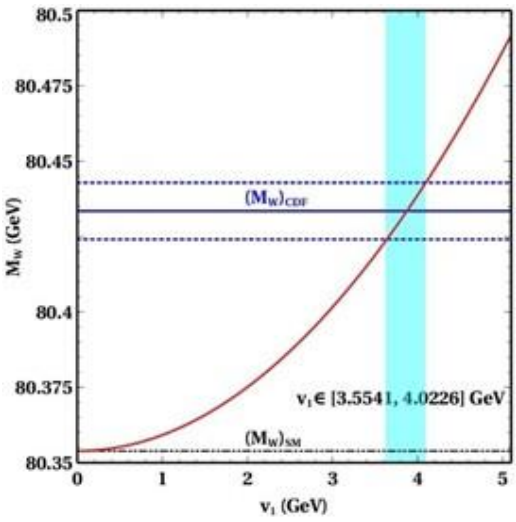
8. **Boosting the lifespan of magneto-mechano-electric generator via vertical installation for sustainable powering of Internet of Things sensor – Dr Mahesh Peddigari**

Our research group primarily focuses on the processing and development of highly dense dielectric ceramic thin/thick films for energy storage/electrocaloric/piezoelectric applications. We also focus on designing and developing piezoelectric and magnetoelectric composites for sensing and energy-harvesting applications. In the last year, we proposed a novel approach to simultaneously enhance the output power efficiency and lifetime of the magneto-mechano-electric (MME) generators for powering self-powered WSNs utilizing the second harmonic vibration mode of the cantilever and vertical installation, which was published in Nano Energy, 101, 107567 (2022). We also explored the hardener-type dopant effect on the energy generation performance of the PMN-PZT based MME generators (J. Mater. Chem. A, 11, 3364 (2023). (Nano Energy, 101, 107567 (2022), https://doi.org/10.1016/j.nanoen.2022.107567)



Magneto-mechano-electric generators for self-powered wireless sensor network applications

9. Type II Dirac seesaw with observable ΔNeff in the light of W-mass anomaly – Prof Narendra Sahu

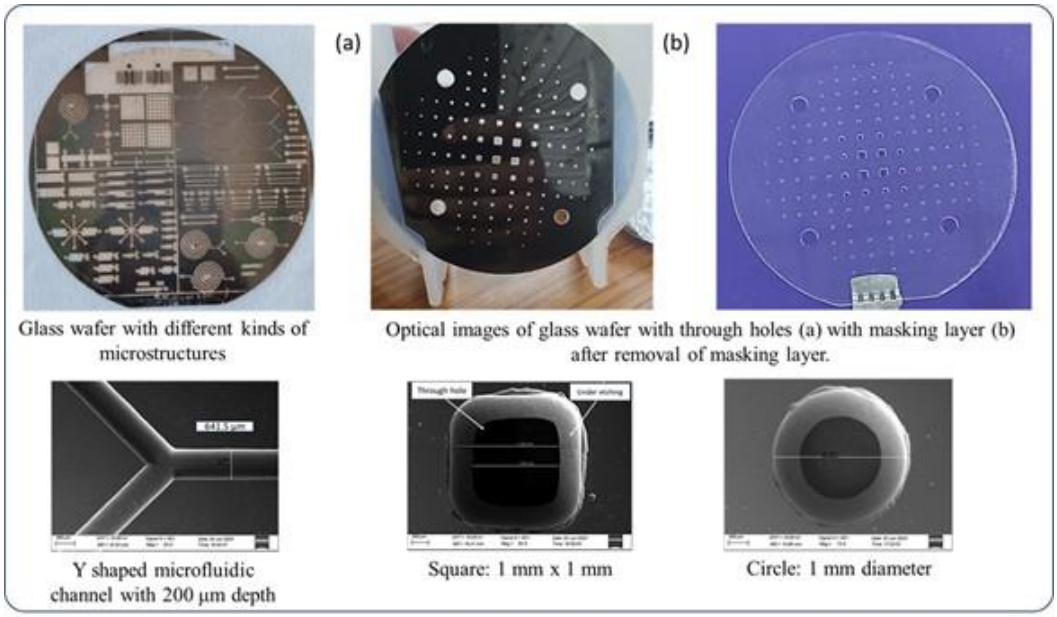


Type II Dirac seesaw with observable ΔNeff in the light of W-mass anomaly

In the last year, our group, in collaboration with Prof. R.N. Mohapatra from Maryland University, has proposed a gauged 〖 U(1) 〗 _(L_e-L_μ-L_(τ)) symmetry which predicts a 4th sequential generation of chiral fermions (leptons and quarks) which are yet to be discovered at the collider. In this scenario, the breaking of 〖 U(1) 〗 _(L_e-L_μ-L_(τ)) gauge symmetry is responsible for neutrino mass via type-I seesaw mechanism, while the real part of 〖U(1)〗_(L_e-L_μ-L_(τ))symmetry breaking scalar field (say ϕ) plays the role of dark matter. Since ϕ is unstable, for it to qualify as a dark matter, its lifetime must be larger than the age of the Universe, implying that the relic of ϕ is generated through a freeze-in mechanism. We show that the mass of ϕ must be less than 1 MeV. This result is published in Phys. Lett B 843 (2023) 138001. Our group also devised a couple of models to explain the W-mass anomaly reported by CDF -II collaboration with their updated measurement. The CDF collaboration reported that the new measurement of W-boson mass is found to be M_W=(80433.5±9.4)MeV using the data corresponding to 8.8 〖 fb 〗 ^(-1)integrated luminosity collected at CDF-II detector of the Fermilab Tevatron collider. This newly measured value has a 7σ deviation from the standard model expectation (M_W = 80357 ± 6 MeV). We show that if the Standard Model is extended with a hypercharge zero scalar triplet, then its vacuum expectation value (v_1=3.79 GeV) can explain the CDF-II measured W-boson mass (as shown in the figure below) without affecting the Z-boson mass. This result is published in Phys. Lett B 833 (2022), 137297.

10. Wet bulk micromachining characteristics of Si{110} in NaOH-based solution - Prof Prem Pal

We in the MEMS and Micro/Nano Systems Laboratory perform both basic and applied research in MEMS and Micro/Nanosystems. Our research work focuses on MEMS processes, Silicon and Glass micromachining, the Study of thin films for MEMS, Surface texturing for solar cell applications, etc. Glass wet bulk micromachining is focused on fabricating through holes and deep cavities/grooves in 4-inch diameter glass wafer.

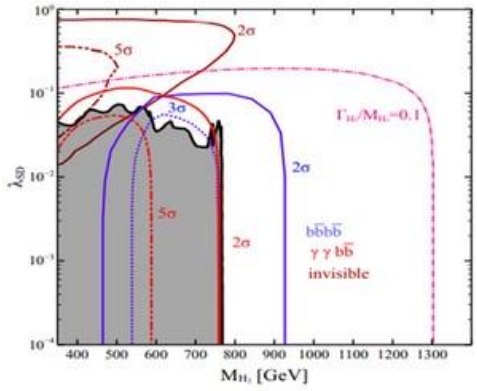


Wet bulk micromachining characteristics of Si{110} in NaOH-based solution

11. Secluded dark matter in gauged B – L model – Dr Priyotosh Bandyopadhyay

We mainly focused on probing beyond Standard Model scenarios at LHC and future colliders. Various exotic decay modes leading to displaced signatures are predicted and simulated. In this context, various seesaw scenarios are studied in (Eur.Phys.J.C 82 (2022) 3, 230, JHEP 02 (2023) 103). Leptoquarks, which are proposed in many unified theories, can explain some anomalies. However, they have been elusive in collider experiments. We proposed single Leptoquark production at the LHC and muon collider (Eur.Phys.J.C 82 (2022) 10, 916). Leptoquarks can generate Majrana neutrino mass at one-loop; such scenarios are looked for in Phys.

Rev.D106 (2022) 9, 095040. In another context, fermionic semi-annihilating dark matter is searched via indirect experiment for the first time (Phys. Rev.D 107 (2023) 1, 015020). In the context of the B-L scenario, another exotic scenario is both studied in the context of different dark matter data as well as collider search modes are proposed (JHEP 05 (2022) 182). Finally, the study of first-order phase transition and gravitational waves in inert singlet and triplet models is looked into (Phys. Rev.D 107 (2023) 5, 055032).

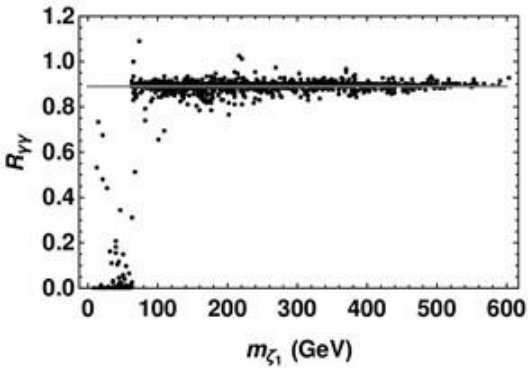


HL-LHC prediction for pp → H2jj → jj + MET, pp → H2 → H1H1 → 2b + 2γ and pp → H2 → H1H1 → 4b indicated by brown, red and blue color contours in MH2 – λSD plane. The black-shaded region is ruled out from the ATLAS search for H2 → ZZ

12. Global minimum and Higgs to diphoton decay – Dr Raghavendra Srikanth Hundi

Our focus is on studies beyond the standard model in the area of particle physics. In the last year, we have worked on the global minimum of the Dirac scotogenic model, where there can exist multiple minima, but the model prefers one of them to be the global minimum. We have shown that the desired minimum of the model can be the global minimum, apart from addressing other phenomenological quantities on Higgs to diphoton decay and dark matter (Phys. Rev. D 108 (2023) 1, 015006).

Also, we have been working on lepton flavour violation, which involves computing branching ratios of 2- and 3-body lepton decays and also the conversion rate of mu to e.

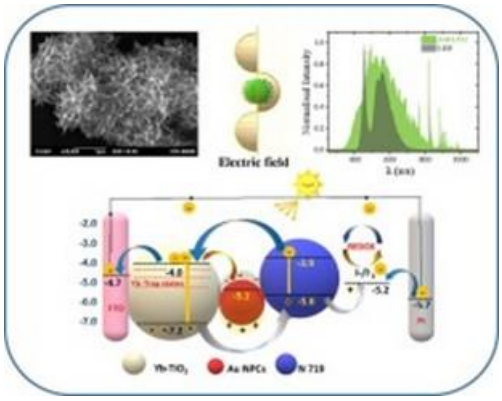


13. Plasmonic Au NPs embedded Ytterbium-doped TiO2 nanocomposites photoanodes for efficient indoor photovoltaic devices - Dr Sai Santosh Kumar Raavi

Our group works in advanced transient optical spectroscopy for various functional materials characterisation and provides critical inputs to aid in the fabrication and optimisation of devices using these materials. To this end, they employ a plethora of techniques encompassing femtosecond transient absorption spectroscopy, steady-state and time-resolved photoluminescence spectroscopy with TCSPC, cw-photoinduced absorption Spectroscopy, Transient Photocurrent spectroscopy, etc. In addition to these, we also fabricate DSSC and QDSC solar cell devices and develop interlayers like doped TiO2 for efficient interfaces. The group also contributes to the ultrafast nonlinear optical characterization of the various molecular systems.

Innovation in the field of Solar Cells:

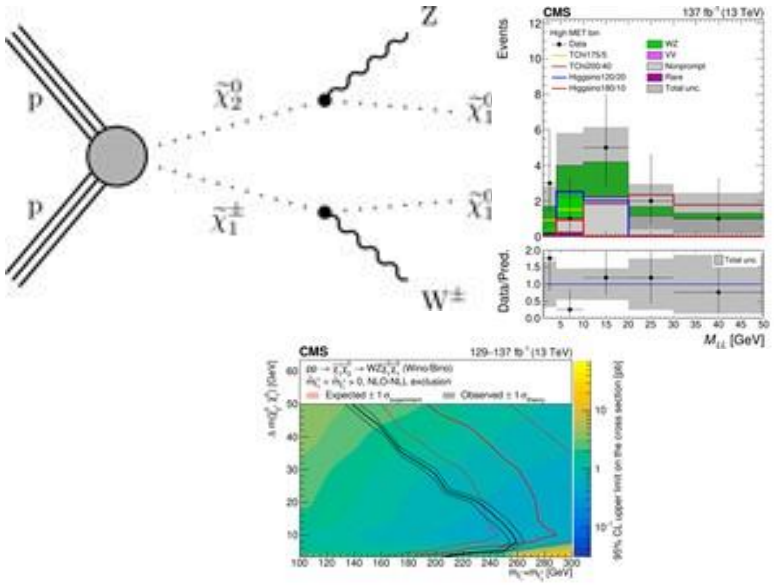
- Developed integrated thermally evaporated organic Solar cell module with 56 cells integrated into 5 cm x 2 cm ITO substrate. A patent application is already filed.
- Developed efficient photoanodes for eco-friendly and economical indoor photovoltaic devices and achieved best >13.8% for indoor PV. Additionally, the same photoanodes were used for efficient water-splitting devices.



Plasmonic Au NPs embedded Ytterbium-doped TiO2 nanocomposites photoanodes for efficient indoor photovoltaic devices.

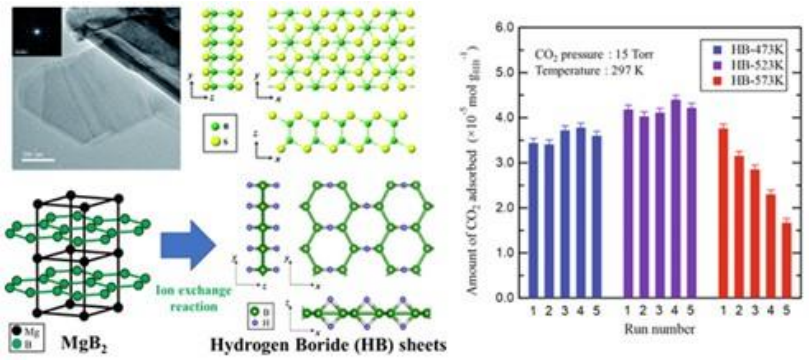
14. Experimental High Energy Physics research at the Large Hadron Collider and particle detector R&D – Dr Saranya Ghosh

Our group works on experimental high energy physics, particularly on the search for new particles, Dark Matter, studies of the HIggs boson and particle detector R&D. The group is focusing on physics at the Large Hadron Collider (LHC) using the data collected by the Compact Muon Solenoid (CMS) experiment. We are working towards having IITH become an independent member of the CMS collaboration, and towards that goal, we have applied and been accepted into the India-CMS collaboration, which is the collaboration of Indian institutes that are a part of the CMS experiment that is a major step toward being accepted into the CMS collaboration and our group can work on the CMS experiment data in collaboration with other Indian groups. This will also make IITH eligible for funding from the Indian government agencies (DAE and DST) for work on the CMS experiment as an independent member. Following administrative steps towards joining the CMS collaboration are ongoing. Further, a particle detector development laboratory is in the process of being set up at IITH with certain equipment acquired and more equipment in the process of getting acquired. In parallel, research work is ongoing on the search for beyond Standard Model physics using the data collected at the CMS experiment inspired by supersymmetry models and on searches for Dark Matter candidates at the LHC. While the studies are still ongoing, the work is an extension of a previous analysis that was published in 2022: J. High Energ. Phys. 2022, 91 (2022).



15. 2D boron monosulfide (BS) nanosheets and Hydrogen boride (HB) nanosheets for hydrogen generation and CO2 conversion - Dr Satish Laxman Shinde

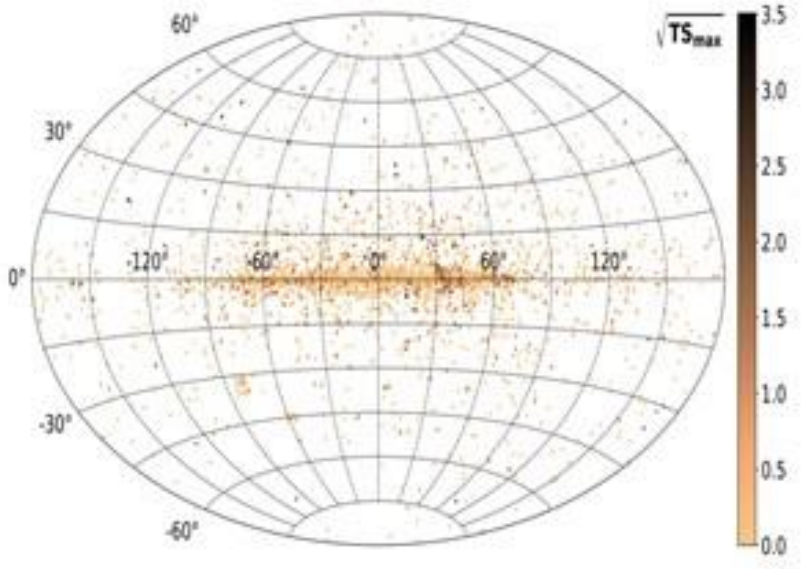
Our group mainly work in the field of nano-/quantum- photonics, plasmonics/thermo-plasmonics, optical spectroscopy, and 2D materials for energy harvesting. Currently, we are working on synthesizing plasmonic materials, fabrication of various heterostructures of plasmonic metal/oxides hybrid systems for wavelength conversion, detectors, and catalytic applications, and plasmonic architectonics for photothermal energy conversion. In the past year, we have been exploring 2D materials for hydrogen generation and CO2 conversion. Recently, we have demonstrated that the 2D boron monosulfide (BS) nanosheets have several stable phases and unique electronic structures, endowing them with interesting attributes, including superconducting, thermoelectric, and hydrogen storage properties (Journal of Materials Chemistry A 10 (9), 4999-4999 (2022)). Also, it demonstrated the adsorption of CO2 and its conversion to CH4 and C2H6 using hydrogen-deficient 2D hydrogen boride (HB) sheets (Communications Chemistry 5, 1, 1-10 (2022)). We are also working on the development of a metamaterials-based energy harvester quantum photonic devices for infrared detectors/imaging.



2D boron monosulfide (BS) nanosheets and Hydrogen boride (HB) nanosheets for hydrogen generation and CO2 conversion

16. Search for spatial coincidence between IceCube neutrinos and radio pulsars – Dr Shantanu Desai

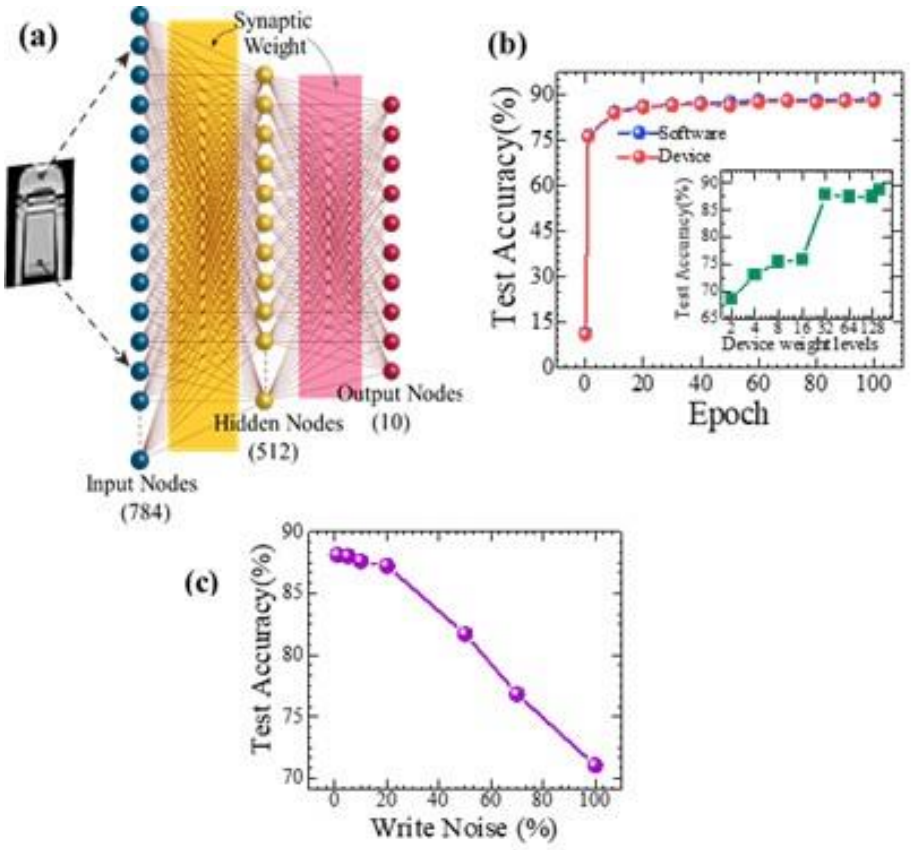
Our group is involved in the search for nanoHz gravitational waves and precision pulsar timing as part of the Indian pulsar timing array consortium (InPTA). InPTA had its first data release last August, consisting of Dispersion measures and timing estimates of 14 millisecond pulsars using 3.5 years of data. A study of single pulsar noise analysis has also been done using this data release (A Srivastava et al., 2023). We are also conducting joint searches for stochastic gravitational wave background along with the European pulsar timing array consortium. In addition, we continue to also work on a diverse range of problems in astrophysics, including Cosmology, galaxy clusters, neutrino astrophysics, Gamma Ray bursts, Machine Learning and Astrostatistics. In cosmology, we have shown that observations of constancy of dark matter surface density from galactic scale haloes are consistent with predictions from LCDM (Gopika, Desai & Paranjape 23). We have also shown that the Radial acceleration relation observed for spiral galaxies is not universal and is not obeyed for elliptical galaxies and galaxy clusters. In the area of neutrino astrophysics, we have done searches for neutrinos from radio pulsars using the IceCube point source catalogue (Pasumarti & Desai 2022). In more ``nuts and bolts'' related topics, we have also come up with a novel algorithm based on attention-augmented deep learning to remove cosmic rays from images of photometric surveys from Dark Energy Camera and Hubble Space Telescope (S. Bhavanam et al. 2022). This algorithm can be used to remove cosmic rays from images of next-generation surveys such as Vera Rubin LSST.



Skymap distribution of √TSmax in Galactic coordinates using Aitoff projection (from Pasumarti & Desai, JCAP,12 002P)

17. Illustration of the artificial neural network (ANN) used for the FMNIST image recognition – Prof Dr Suryanarayana Jammalamadaka

Our group, Magnetic Materials and Device Physics (MMDP) at IIT Hyderabad explores the Magnetic and Quantum transport properties of nanostructured thin films and point contact devices, respectively. Apart from that, we also develop and characterise resistive random access memory devices (RRAM) for bio-sensing, image recognition and neuromorphic applications. Despite all the above, understanding the physics of various magnetic thin films/devices under external stimuli such as magnetic field, electric field, and light is of great interest. Micromagnetic simulations support our experimental data. Important results that we would like to highlight for 22-23 are α -Fe2O3-based artificial synaptic RRAM device for pattern recognition using artificial neural networks [Nanotechnology 34 265703 (2023)], Spin transfer torque Bias (STTB) due to domain wall resistance in an infinitely long ferromagnetic nanowire [Nanotechnology. 1361-6528, (2022)], Anomalous domain wall dynamics in Ir50Mn50/Fe2CoSi bilayers [JMMM 560, 169656 (2022)] and Pseudo magnetic properties and evidence for vortex state in Fe2NiGe Heusler alloy thin films [JMMM 69401, 556 (2022)].



(a) Illustration of the artificial neural network (ANN) used for the FMNIST image recognition

(b) Test accuracy (%) evolution during the training process with respect to the number of epochs. The blue curve depicts the fully software-based implementation, whereas the red curve depicts the synaptic device Ag/α-Fe2O3/FTO based ANN. Inset shows the test accuracy (%) dependence on the number of quantized device weight levels (c) Test accuracy (%) variation with the write noise (%).

18. Outreach Activities

a) Skill Development workshop in Optical Designing-IV, 22nd April 2023, Dr. Vandana Sharma
b) Student workshop for Manthan School, 26th Nov 2022, Dr. Vandana Sharma
c) Fun with Science, DST-MANAK, 25th April 2022, Dr Vandana Sharma
Embarking on a scientific journey is a captivating escapade for kids. Thus, a mesmerizing 2-hour DST-MANAK workshop unfolded, catering to eager middle and high school students. Witnessing captivating demonstrations of optics and wave phenomena delighted the young minds, igniting an enchanting realm of excitement and wonder within them.
d) Skill Development workshop in Optical Designing-III, 25th – 26th February 2022, Dr. Vandana Sharma

Advanced Dark Sky Observatory (ADSO) at IIT Hyderabad

Inventing & Innovating in Technology for Humanity

VIRTUAL DEPARTMENTS

Department of Climate Change

The Department of Climate Change has set out on a multidimensional journey embracing a range of essential research fields to solve the urgent issues posed by climate change. Our department's initiatives cover a variety of cutting-edge and significant projects with an uncompromising dedication to increasing environmental sustainability. One such initiative focuses on crafting a representative electric car driving cycle tailored to the unique terrain and road conditions of India. This endeavor seeks to refine energy consumption estimation for electric vehicles, driving the nation closer to sustainable and clean transportation solutions. Additionally, our researchers are pioneering the utilization of Physics-Informed Deep Learning Techniques to identify, characterize, and forecast high-precipitation events in the Indian subcontinent. This groundbreaking approach promises to enhance our understanding of extreme weather phenomena, contributing to more effective climate adaptation and mitigation strategies. Alongside these efforts, our department is at the forefront of developing combustion kinetic models and conducting CFD modeling for innovative fuels, such as Ammonia-Hydrogen-Methane-Diesel blends, which hold the potential to revolutionize combustion technology and reduce emissions. We are also delving into climate responsiveness concerning Hyderabad's built heritage, and investigating the vulnerability of coastal communities in protected islands to the dual challenges of climate change and anthropogenic impacts. These dynamic research pursuits underscore our commitment to tackling climate change comprehensively, across diverse dimensions and forging a sustainable future for generations to come.

In our relentless quest for solutions, the Department of Climate Change remains dedicated to the rigorous pursuit of knowledge, innovative research, and actionable insights. Our journey is marked by collaboration, curiosity, and a steadfast belief that each study, and each project, contributes to a more sustainable and resilient world in the face of climate change. Together, we work to meet the present challenges and foster a brighter, greener future.

For more information, please visit: https://cc.iith.ac.in/

Faculty

Head of the Department

Pritha Chatterjee
Civil Engineering
Assistant Professor
Profile page:
https://iith.ac.in/ce/pritha/

Professor

Kishalay Mitra
Chemical Engineering
Profile page:
https://iith.ac.in/che/kishalay/

Sathya Peri
Computer Science & Engineering
Profile page:
https://iith.ac.in/cse/sathya_p/

Associate Professor

Suhash Ranjan Dey
Materials Science And Metallurgical Engineering
Profile page:
https://iith.ac.in/msme/suhash/

Asif Qureshi
Civil Engineering
Profile page:
https://iith.ac.in/ce/asif/

Debraj Bhattacharyya
Civil Engineering
Profile page:
https://iith.ac.in/ce/debrajb/

Somnath Maji
Chemistry
Profile page:
https://iith.ac.in/chy/smaji/

Ganesh M P
Liberal Arts
Profile page:
https://iith.ac.in/la/mpganesh/

Haripriya Narasimhan
Liberal Arts
Profile page:
https://iith.ac.in/la/haripriya/

Kaushik Nayak
Electrical Engineering
Profile page:
https://iith.ac.in/ee/knayak/

Raavi Sai Santosh Kumar
Physics
Profile page:
https://iith.ac.in/phy/sskraavi/

Assistant Professor

Aalok Khandekar
Liberal Arts
Profile page:
https://iith.ac.in/la/aalok/

Ambika S
Civil Engineering
Profile page:
https://iith.ac.in/ce/ambika/

Deepu J Babu
Materials Science And Metallurgical Engineering
Profile page:
https://iith.ac.in/msme/deepu.babu/

Maheswaran R
Civil Engineering
Profile page:
https://iith.ac.in/ce/rmaheswaran/

Niranjan Shrinivas Ghaisas
Mechanical & Aerospace Engineering ***Profile page:***
https://iith.ac.in/mae/nghaisas/

Satish Kumar Regonda
(Assistant Professor- *Civil Engineering)*
Profile page:
https://iith.ac.in/ce/satishr/

Sayak Banerjee
Mechanical & Aerospace Engineering
Profile page:
https://iith.ac.in/mae/sayakb/

Shiva Ji
Design
Profile page:
https://iith.ac.in/des/shivaji/

Adjunct Faculty

Chetan Singh Solanki
IIT Bombay
Profile page:

https://www.ese.iitb.ac.in/faculty/ch etan-singh-solanki

Internal Adjunct Faculty

Shruti Upadhyaya
PhD - IIT Bombay
Profile page:
https://iith.ac.in/ce/shrutiau/

Books:

1. Shiva Shankar, Y., Khan, M.L., Qureshi, A. (2023) Spatial applications of crop models in the Indian context and sustainability. In: Sustainable Agriculture and the Environment, Eds: M. Farooq, N. Gogoi, M. Pisante. Academic Press, ISBN: 978-0-323-90500-8. **https://doi.org/10.1016/B978-0-323-90500-8.00017-8**

2. Bhatia, M., Khan, M.L. Qureshi, A. (2022) Microbial remediation of mercury-contaminated soils. In: Microbes and Microbial Biotechnology for Green Remediation (Chapter 34), Elsevier, ISBN 978-032390452-0, 978-032390453-7, **doi: 10.1016/B978-0-323-90452-0.00039-6.**

3. Comparative Study of Automated Deep Learning Techniques for Wind Time Series Forecasting in "Statistical Modeling in Machine Learning", Editors: Goswami, T. and Sinha, G. R., Elsevier, 2022, 327-356 [Authors: Pujari, N. K., Miriyala, S. S., Mitra, K.]

4. Stochastic Optimization of Industrial Grinding Operation through Data-Driven Robust Optimization in "Statistical Modeling in Machine Learning", Editors: Goswami, T. and Sinha, G. R., Elsevier, 2022, 249-267 [Authors: Pantula, P. D., Miriyala, S. S., Mitra, K.]

5. Nonlinear System Identification of Environmental pollutants using Recurrent Neural Networks and Global Sensitivity Analysis in "Statistical Modeling in Machine Learning", Editors: Goswami, T. and Sinha, G. R., Elsevier, 2022, 307-326 [Authors: Miriyala, S. S., Ravi kiran, I., Mitra, K.]

6. Artificial Intelligence based Uncertainty Quantification technique for External flow CFD simulations in "Statistical Modeling in Machine Learning", Editors: Goswami, T. and Sinha, G. R., Elsevier, 2022, 79-92 [Authors: Miriyala, S. S., Jadhav, P. D., Banerjee, R., Mitra, K.]

7. Performance improvement in hot rolling process with novel Neural Architectural search in "Machine Learning in Industry", Editors: Dutta, S. and Davim, J. P., Springer, 2022 [Authors: Soumitri, M. S., Mohanti, I., and Mitra, K.]

Publications:

1. Parmar, J., Qureshi, A. (2023) Accounting of the use and emissions of polychlorinated biphenyl compounds (PCBs) in India, 1951-2100. Environmental Science & Technology, doi: 10.1021/acs.est.2c09438.

2. Vudamala, K., Chakraborty, P., Chatragadda, R., Tiwari, A.K., Qureshi, A. (2023) Distribution of organochlorine pesticides in surface and deep waters of the Southern Indian Ocean and coastal Antarctic waters. Environmental Pollution, **https://doi.org/10.1016/j.envpol.2023.121206.**

3. Joy, A., Qureshi, A. (2023) Reducing mercury emissions from coal-fired power plants in India: possibilities and challenges. Ambio, doi: 0.1007/s13280-022-01773-5.37)

4. Ray, T., Malasiya, D. Verma, A., Purswani, E., Qureshi, A., Khan, M.L., Verma, S. (2023) Characterization of Spatial–Temporal Distribution of Forest Fire in Chhattisgarh, India, Using MODIS-Based Active Fire Data, Sustainability, 15(9), 7046; **https://doi.org/10.3390/su15097046.**

5. Kapoor, T.S., Navinya, C., Gupta, A., Lokhande, P., Rathi, S., Goel, A., Sharma, R., Arya, R., Mandal, T.K., Jithin, K.P., Shiva Nagendra, S.M., Imran, M., Kumari, J., Muthalagu, A., Qureshi, A., Najar, T.A., Jehangir, A., Haswani. D., Raman, R.S., Rabha, S., Saikia, B.K., Lian, Y., Pandithurai, G., Chaudhary, P., Sinha, B., Dhandapani, A., Iqbal, J., Mukherjee, S., Chatterjee, A., Venkataraman, C., Phuleria, H. (2023) Reassessing the availability of crop residue as a bioenergy resource in India: A field-survey based study. Journal of Environmental Management, **https://doi.org/10.1016/j.jenvman.2023.118055 .**

6. Navinya, C, Kapoor, T.S., Gupta, A., Lokhande, P., Sharma, R., Prasad, L., Shiva Nagendra, S.M., Kumari, J., Habib, G., Arya, R., Mandal, T.K., Muthalagu, A., Qureshi, A., Najar, T.A., Jehangir, A., Jain. S., Goel, A., Rabha, S., Saikia, B.K., Chaudhary, P., Sinha, B., Haswani. D., Raman, R.S., Dhandapani, A., Iqbal, J., Mukherjee, S., Chatterjee, A., Lian, Y., Pandithurai, G., Venkataraman, C., Phuleria, H. (2023) Heating and lighting: Understanding overlooked energy-consumption activities in the Indian residential sector. Environmental Research Communications, doi: 10.1088/2515-7620/acca6f.

7. Nath, S., Qureshi, A., & Das, S. (2023). Role of bulking agents, process optimization, and different earthworm species in the vermiremediation process of industrial wastes: A review. Notulae Scientia Biologicae, 15(2), 11490. **https://doi.org/10.55779/nsb15211490.**

8. Ray, T., Khan, M.L, Qureshi, A., Verma, S. (2022). MODIS-derived Fire Characteristic and Greenhouse Gases Emission from Cropland Residue Burning in Central India. Sustainability. 14(24), 16612; **https://doi.org/10.3390/su142416612.**

9. Qureshi, A. (2022) Mercury in the environment around industrially impacted Locations in India: a mini-review. Bulletin of Environmental Contamination & Toxicology, **doi: 10.1007/s00128-022-03548-w.**

10. Maheshwarkar, P., Ralhan, A., Raman, R.S., Tibrewal, K., Venkataraman, C., Dhandapani, A., Kumar, R.N., Mukherjee, S., Chatterje, A., Rabha, S., Saikia, B.K., Bhardwaj, A., Chaudhary, P., Sinha, B., Lokhande, P., Phuleria, H.C, Roy, S., Imran, M., Habib, G., Hashmi, M.A., Qureshi, A., Qadri, A.M., Gupta, T., Lian, Y., Pandithurai, G., Prasad, L., Murthy, S., Deswal, M., Laura, J.S., Chhangani, A.K., Najar, T.A., Jehangir, A. (2022) Understanding

Understanding the influence of meteorology and emission sources on PM2.5 mass concentrations across India: first results from the COALESCE network. Journal of Geophysical Research: Atmospheres, doi: 10.1029/2021JD035663.

11. Majumdar, A. Qureshi, A. (2022) Thinking about infertility from a mixed methods perspective: the need to look at toxicity in rural India. Sexual and Reproductive Health Matters, doi: 10.1080/26410397.2021.1999565.

12. Shende, P., Qureshi, A. (2022) Burden of diseases in fifty-three urban agglomerations of India due to particulate matter (PM2.5) exposure. Environmental Engineering Research, 22(3), 210042, doi: 10.4491/eer.2021.042.

13. 2023 (with Kanaka Himabindu Pottumuthu) 'Smart City Stories: Case study of a city in South India' in Madhulika Sahoo et al (ed) Ethnographic Research in Social Sciences, Routledge UK.

14. 2022 (with Nimmi Rangaswamy) 'The power of data science ontogeny: Thick data studies on the Indian IT skill tutoring microcosm' in Andreas Hepp, Juliane Jarke and Leif Kramp (eds) New Perspectives in Critical Data Studies: The ambivalences of data power. Palgrave Macmillan.

15. 2023 (forthcoming, with Venkatesh Boddu) 'Placating Kin: Rituals and Infertility', The Oriental Anthropologist.

16. Ravi Kiran, I., Naik, S., Mitra, K., Towards Faster Operational Optimization of Cascaded MSMPR Crystallizers using Multi-objective Support Vector Regression, Ind. Engg. Chem. Res. 2022, 61, 11518−11533.

17. Krishnan, K. J., Mitra, K., A Modified Kohonen Map Algorithm for Clustering Time Series Data, Expert Systems With Applications, 2022, 201, 117249.

18. Soumitri M. S., Pujari, K. N., Naik, S., Mitra, K., Evolutionary Neural Architecture Search for Surrogate models to Enable Optimization of Industrial Continuous Crystallization Process, Powder Technology, 2022, 405, 117527.

19. Ravi Kiran, I., Mitra, K., Optimal Surrogate Building Using SVR for an Industrial Grinding Process, Materials and Manufacturing Processes, 2022, **https://doi.org/10.1080/10426914.2022.2039699**.

20. Manoj, A., Miriyala, S. S., Mitra, K., Multi-objective Bayesian Optimization for Computationally Expensive Reaction Network Models," 2022 Eighth Indian Control Conference (ICC), Chennai, India, 2022, pp. 428-433, doi: 10.1109/ICC56513.2022.10093513.

21. Lakshmi S. C., Miriyala, S. S., Mitra, K., C., Statistical Inference and Analysis for Efficient Modeling of Environmental Pollution using Deep Neural Networks, 2022 Eighth Indian Control Conference (ICC), Chennai, India, 2022, pp. 385-390, doi: 10.1109/ICC56513.2022.10093411., Eighth IEEE Indian Control Conference, IIT Madras, December 2022.

22. Sharma, S., Giri, L., Mitra, K., Multi-objective Optimization and control under Uncertainty for performance improvement of a Baculovirus Expression Vector System, 2022 Eighth Indian Control Conference (ICC), Chennai, India, 2022, pp. 416-421, doi: 10.1109/ICC56513.2022.10093623.

23. Pantula, D. P., Miriyala, S. S., Mitra, K., A Deep Unsupervised Learning Algorithm for Clustering of Wind Frequency Maps, 2022 Eighth Indian Control Conference (ICC), Chennai, India, 2022, pp. 361-366, doi: 10.1109/ICC56513.2022.10093581.

24. Ravi kiran I., Naik, S., Mitra, K., Machine Learning Based Multi-Objective Surrogate Optimization of MSMPR Process, 2022 Eighth Indian Control Conference (ICC), Chennai, India, 2022, pp. 176-181, doi: 10.1109/ICC56513.2022.10093453.

25. Ravi kiran I., Mitra, K., System Identification and Process Modelling of Dynamic Systems Using Machine Learning," 2022 26th International Conference on System Theory, Control and Computing (ICSTCC), Sinaia, Romania, 2022, pp. 564-569, doi: 10.1109/ICSTCC55426.2022.9931831.

26. Ravi kiran I., Mitra, K., Artificial Intelligence Assisted Optimization Under Uncertainty for Robust Solutions, 2022 26th International Conference on System Theory, Control and Computing (ICSTCC), 2022, pp. 458-463.

27. Ravi kiran I., Mitra, K., Data Based Time Series Modelling of Industrial Grinding Circuits, International Conference on Advances in Data-driven Computing and Intelligent Systems (ADCIS 2022), Goa, INDIA, September 2022.

28. Gare, S., Chel, S., Pantula, P. D., Saxena, A., Mitra, K., Sarkar, R., Giri, L., Analytics Pipeline for Visualization of Single Cell RNA Sequencing Data from Brochoaveolar Fluid in COVID-19 Patients: Assessment of Neuro-fuzzy C-means and HDBSCAN, 2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 2022, pp. 1634-1637.

29. Yeditha, P. K., Ganapathiraju, A., Nandikanti, S. S. S., & Rathinasamy, M. (2023). Development of Monthly Scale Precipitation Forecasting Model for Indian Subcontinent Using Wavelet Based Deep Learning Approach.

30. Jarajapu, D. C., Rathinasamy, M., Agarwal, A., & Bronstert, A. (2022). Design flood estimation using extreme Gradient Boosting-based on Bayesian optimization. Journal of Hydrology, 613, 128341.

31. Yaswanth, K., Kona, M., Andra, S. K., & Rathinasamy, M. (2022). Understanding the impact of changes in land-use land-cover and rainfall patterns on soil erosion rates using the RUSLE model and GIS techniques: A study on the Nagavali River basin. Journal of Water and Climate Change, 13(7), 2648-2670.

32. Setti, S., Yumnam, K., Rathinasamy, M., & Agarwal, A. (2022). Assessment of satellite precipitation products at different time scales over a cyclone prone coastal river basin in India. Journal of Water and Climate Change

33. Yeditha, P. K., Pant, T., Rathinasamy, M., & Agarwal, A. (2022). Multi-scale investigation on streamflow temporal variability and its connection to global climate indices for unregulated rivers in India. Journal of Water and Climate Change, 13(2), 735-757.

34. Fathima, J., & Chatterjee, P. (2022). A techno-economic assessment of nutrient recovery from wastewater using microalgae: scenario in India collected from published literature. Water Science and Technology, 86(6), 1325 – 1341. **https://doi.org/10.2166/wst.2022.260**

35. Hämäläinen, A., Kokko, M., Chatterjee, P., Kinnunen, V., & Rintala, J. (2022). The effects of digestate pyrolysis liquid on the thermophilic anaerobic digestion of sewage sludge — Perspective for a centralized biogas plant using thermal hydrolysis pretreatment. Waste Management, 147, 73–82. https://doi.org/https://doi.org/10.1016/j.wasman.2022.05.013

36. Chandrashekar, Chatterjee, P., and Pawar, D. S. 2022. Estimation of CO2 and CO Emissions from Auto-Rickshaws in Indian Heterogeneous Traffic. Transportation Research Part D: Transport and Environment.104, 103202.

37. Mohammed, A., Regonda, S. K., & Kopparthi, N. R. (2022). Climatological features of high temporal resolution rainfall over the Hyderabad city, India. Urban Climate, 42, 101118.

38. Ponukumati, P., Mohammed, A., & Regonda, S. (2023). Insights on Satellite-Based IMERG Precipitation Estimates at Multiple Space and Time Scales for a Developing Urban Region in India. Journal of Hydrometeorology, 24(6), 977-996.

39. Gedam, S., Pallam, H., Kambhammettu, B. V. N. P., Anupoju, V., & Regonda, S. K. (2023). Investigating the Accuracies in Short-Term Weather Forecasts and Its Impact on Irrigation Practices. Journal of Water Resources Planning and Management, 149(2), 04022079.

40 Chakraborty, S., Ji, Shiva. (2022). A Sustainable Approach for the Urban Sprawl of Kolkata (Circa 1690–2020). In: Chakrabarti, D., Karmakar, S., Salve, U.R. (eds) Ergonomics for Design and Innovation.

41. HWWE 2017. Lecture Notes in Networks and Systems, vol 391. Springer, Cham. https://doi.org/10.1007/978-3-030-94277-9_100

42. Upadhyaya, S., Kirstetter, P. E., Kuligowski, R. J. & Searls, M. (2022). Towards Improved Precipitation Estimation with the GOES-16 Advanced Baseline Imager: Algorithm and Evaluation. Quarterly Journal of the Royal Meteorological Society.https://doi.org/10.1002/qj.4368.

43. Lemma, E., Upadhyaya, S., & Ramsankaran, R. (2022). Meteorological drought monitoring across the main river basins of Ethiopia using satellite rainfall product. Environmental Systems Research, 11(1), 1-15. https://doi.org/10.1186/s40068-022-00251-x

Funded Research Projects:

1. Hari Priya, Co-Investigator, 'Odisha Migration Study', funded by IRRI, December 2022-November 2023 (196,000 USD).

2. Kishalay Mitra, A combined experimental and theoretical approach towards rational design of supported metal catalysts for the reductive depolymerization of corncob lignin to produce bulk aromatic chemicals; Department of Science Technology, Government of India (40.18 L).

3. Kishalay Mitra, Development of an on-board spray controller model for UAVs using AI for precision agricultural application; Department of Science Technology, Government of India (40.18 L).

4. Kishalay Mitra, Development of AI based Model for Coke Quality Prediction and Coal Blend Optimization. Tata Steel (33 L).

5. Kishalay Mitra, The Experimental Investigation and Numerical Modeling of Heat Absorption Efficacy of Additive Enhanced Endothermic Rocket Fuels; DRDO (230 L).

6. Kishalay Mitra, Robust Wind Energy Conversion System – When Deep Learning Meets Sustainable Energy Utilization; Department of Science Technology, Government of India - National Supercomputing Mission (42 L).

7. Kishalay Mitra, Wind farm layout optimization under uncertainty using wind speed forecasting through probabilistic models and comparison with machine learning algorithms; SPARC, Ministry of Education, Government of India (48 L) (IITH – University of Exeter Collaborations).

8. Maheswaran R, Anomalous Moisture Transport for Hydrological Extremes in a Changing Climate (AMOTHEC) Sponsoring Agency: DST-FCT (Indo-Portugal Bilateral Scheme) Period: 2022-25 (IIT H share (34 L)).

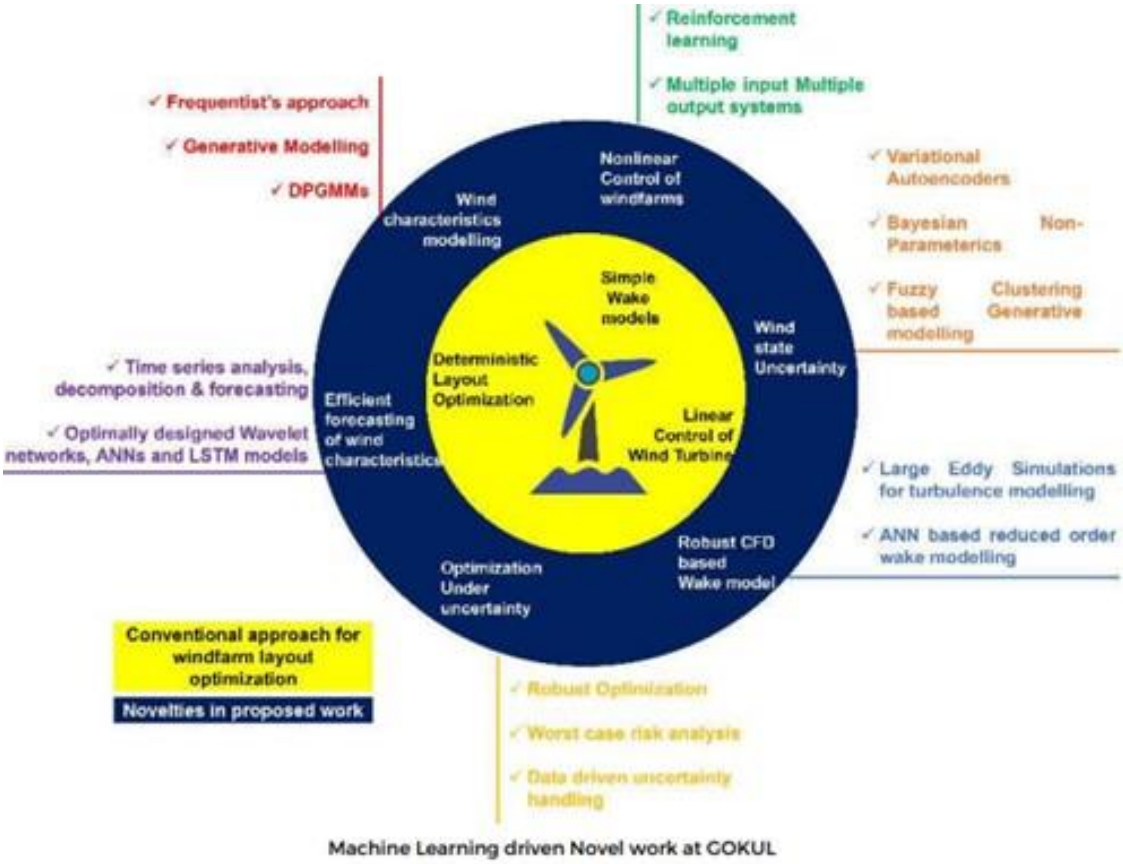
9. Maheswaran R, Understanding the impact of climate change on groundwater resources for Ganga River Basin using Physics based models and AI/ML models Sponsoring Agency: DST - IC IMPACTs (Indo Canada Bilateral Scheme) Period: 2023-25 (Indian Component (54 L)).

10. Dr Shiva Ji, Creating Digital Immersive Heritage Experience, Risk Assessment and Vernacular Architecture Analysis of Five Historically Significant Temple Marvels of Kashi/ DST/MoE - Govt of India (90L).

Research highlights:

1. **Novel AI/ML method based formulations are found to show new directions in most of these applications surpassing the performance of the existing techniques**

   Global Optimization and Knowledge Unearthing Lab (GOKUL) is engaged in research at the interface of artificial intelligence / machine learning (AI/ML) and their applications on several aspects of climate change. Starting from optimizing performance of several renewable energy generators (wind, biomass gassification) and storage (battery management system), the group is involved in funded research for several other climate and sustainability relevant topics such as finding suitable catalyst for several alternative fuels to maximize yield, maximization of efficiency in drone based precision agriculture, satellite imagery based crop classification, prediction of environmental parameters to combat gre9enhouse effects etc. Novel AI/ML method based formulations are found to show new directions in most of these applications surpassing the performance of the existing techniques.



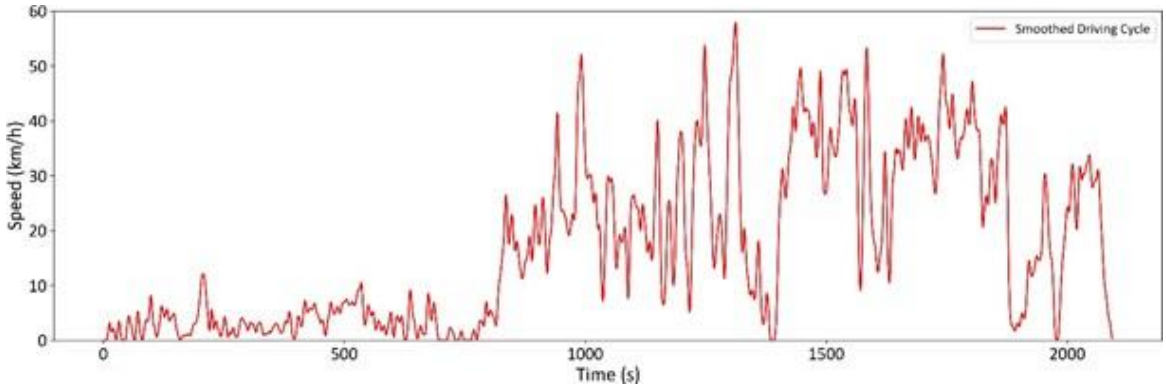
Machine Learning driven Novel work at GOKUL

2. **Quantitative precipitation estimation (QPE) using Geostationary satellite observations (GEO)**

   Quantitative precipitation estimation (QPE) using Geostationary satellite observations (GEO) is critical for detecting rapidly developing rainfall events, specifically over regions with sparse or non-existent ground observation networks. The key advantage of GEO observations against other satellites is their high temporal resolution; however, this advantage is underexplored for QPE. The key finding from the study is that incorporating temporal information in QPEs using AI/ML techniques showed that the model is better able to identify rapidly evolving cloud systems that produce heavy rainfall (as against more uniform stratiform precipitation). Another study discusses the significance of more spectral information coming from new generation GEO satellites for QPE studies when compared with previous generation GEO observations. The study highlighted the significance of integrating information from Numerical Weather Prediction (NWP) Models with satellite observations for improving precipitation detection and quantification.

3. Developing a representative electric car driving cycle for energy consumption estimation in Indian road conditions

This research work presents a comprehensive methodology for constructing a representative driving cycle (DC) for electric vehicles (EVs) in Hyderabad, India. The proposed approach combines random selection and k-means clustering to identify distinct driving patterns and traffic scenarios. The vehicle kinematics data used in this study is collected through the on-board method using an Electric Cab Application operating in the city, ensuring comprehensive coverage of the city's central locations. The final Hyderabad Electric Car Driving Cycle (H-ECDC) contains a 2092 s speed time series with an average speed of 17.56 km/h. The k-means clustering algorithm classified the driving data into four clusters: low, moderate, high congestion, and smooth traffic conditions. Evaluating the driving parameters between the entire dataset and the final DC reveals a mean relative error (MRE) of 6.7% and Root Mean Square Error (RMSE) of 0.98, demonstrating the significance of the constructed DC as a representative model. To assess the accuracy of the developed DC, the energy consumption and driving range of an EV model representing the test vehicle is simulated using ADVISOR. The average energy consumption and driving range of the test vehicle under H-ECDC are 15.79 kWh/100 km and 166.53 km, respectively. Finally, the simulation test results are compared with standard and other city-specific driving cycles, demonstrating substantial differences. This necessitates the development of city-specific driving cycles to accurately estimate energy consumption, driving range, and equivalent emissions.



4. Identification, Characterization, and Forecasting of High Precipitation Events and their Characterization using Physics-Informed Deep Learning Techniques for the Indian Subcontinent

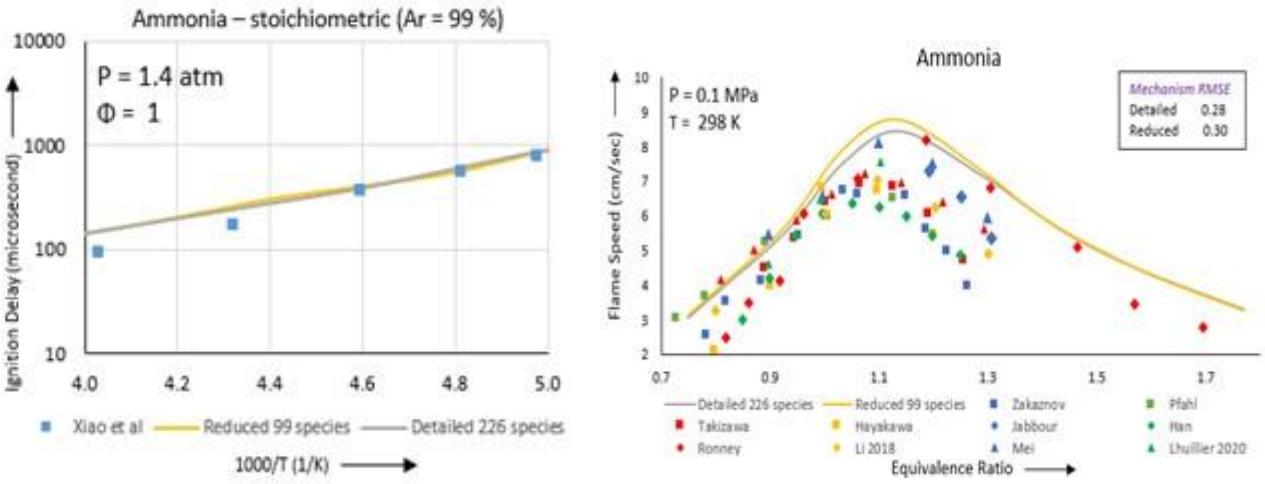
In recent years, recurring high precipitation events (HPE) showcase high spatiotemporal variability, causing large-scale socioeconomic damages. Thus, their accurate forecasting is a critical mission of most global weather services. The primary focus of our work is to detect, characterize, and forecast high precipitation events (HPE) in the Indian region using the capabilities of state-of-the-art artificial intelligence methods. The study was initialized by collecting historical climate datasets to identify HPE using thresholding techniques. This involves developing an innovative approach integrating physics-based and deep-learning models to identify these events effectively. The current work also aims to gain insights into the nature of HPEs and their underlying climatic drivers while creating a new methodology to classify extreme precipitation events based on physical mechanisms. This includes a compilation of HPE events for various application purposes. Of the different HPE triggering mechanisms, this study focuses on Atmospheric river-associated events. Therefore, segregating the AR-associated events and understanding their impacts on Indian precipitation patterns for monsoon and non-monsoon periods is one of the key goals of the current research. Additionally, our study aims to uncover and comprehend the connections between global climate oscillations and AR-associated events to determine the factors that amplify their influence.

Furthermore, the project seeks to use deep learning methods to predict future high precipitation events and extreme occurrences associated with atmospheric rivers and assess their reliability compared to established climate models. As a practical outcome, a web application will be designed to document extreme events, providing insights into historical occurrences and risk assessments while offering a valuable resource for researchers, policymakers, and disaster response teams.

5. Combustion Kinetic Model Development and CFD Modelling of CI Engine Combustion for Ammonia – Hydrogen – Methane – Diesel blend fuels

Decarbonisation of the automotive and energy sectors is of utmost importance to tackle the urgent and global problem of climate change. Compression-Ignition (CI) engines using diesel fuel are commonly used in heavy-duty automotive engines and auxiliary power generators which directly contribute to the global green-house gas emissions. Ammonia (NH3) as a fuel is being considered as a potential solution in this regard because its oxidation will result in only water vapour and nitrogen. Ammonia is one of the most commonly available chemicals in the world and active research is being pursued to produce ammonia from greener sources of hydrogen. It has a good volumetric hydrogen density and can be stored safely. However, there are a few drawbacks associated with the combustion of ammonia like low flammability,

potential high emissions of nitrogen oxides and low heat of combustion compared to hydrocarbon fuels. Despite these challenges, innovative burner system design has made it possible to successfully operate ammonia-fuelled micro-gas turbines in the recent years, thus demonstrating the commercial viability of ammonia as a fuel source. Ammonia can also be considered as a fuel in IC engine systems. The current research aims to tackle some of the outstanding challenges in ammonia combustion through a combination of chemical kinetic mechanism development and CFD modelling of combustion in compression-ignition engines.



Comparison of predicted ignition delay times and flame speeds of ammonia with experimental data

6. Climate Responsiveness and Built Heritage: The Case of Hyderabad City -

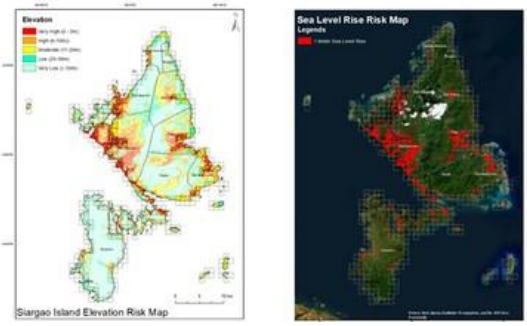
Cultural heritage resources, because of their long history of success, hold the key to solving some of today's most pressing issues, including combating global warming. The present study attempts to understand if built heritage of a city can be a resource to develop a climate responsive built environment in the urban areas through an understanding of physical and behavioural responses to the prevailing climate. The study would also try to understand how the historical built environments have transformed over time, the drivers of transformation, and the impact on their response to the climate and people's needs. The built heritage of Hyderabad city may be ideal case studies for this. The study would attempt to answer the following research questions. Can cultural heritage be a resource for development of a climate responsive built environment?

A1. How have traditional architectural principles in Hyderabad historically accounted for climate patterns in the region?
A2. What socio-cultural practices have accompanied the design and use of heritage structures in the city?
B1. How have patterns of urbanization in Hyderabad impacted the built heritage and the urban built environment?
B2. What effect does this have on the climate responsiveness of the urban built environment?
C. How can built heritage be a resource for the development of a climate responsive built environment?

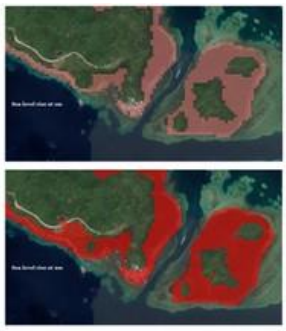
The proposed research may provide a chance that the built heritage in the city can present lessons which can be used to improve the climate responsiveness of such existing structures both in Hyderabad and other parts of the country as well as possibly for the future built environment as well. Through the preservation of cultural heritage, the city may have an infrastructure, which is resilient, people-centric, energy efficient, and sustainable.

7. Vulnerability of Coastal Communities in Protected Islands to Climate Change and Anthropogenic Impacts -

The study aims to assess the changes in coastal habitats over time and determine climatic and anthropogenic impacts on coastal vulnerability and describe the level of communication and local climate governance in Siargao. (1) Coastal vulnerability changes will be determined using the Remote Sensing and Geographic Information System (RS&GIS), incorporating coastal habitat changes in the projection of vulnerability. (2) Bioaccumulation of pollutants, such as heavy metals, will also be assessed to describe human impacts on the island; and (3) a local communication study on climate change awareness and perception will be rolled out, to complement the (4) local climate and environmental policy review on its effectiveness and alignment to the international recommendations. From the outcome of the study, vulnerability maps, communication studies, and policy recommendations will be endorsed to the local government.



Elevation risk and sea-level rise risk mapping



Localized sea-level rise inundation mapping

8. Assessing the Impacts of Anthropogenic Activities on Extreme Events within the Human-Natural Hydrological System -

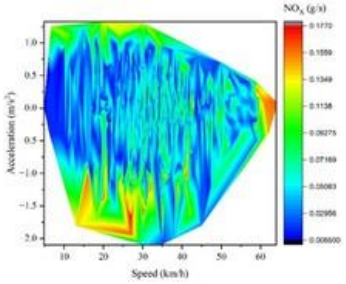
Global climate change and human activities have considerably impacted water resources including the energy budget, and hydrological cycle. Of the two drivers, the former has gained momentum and considerable research progress has been made in understanding the impact of climate change. However, the impact of human activities has not received much attention in the recent past. The water extraction from surface and groundwater resources have increased tenfold over the last few decades. Urbanization and agriculture affect the quantity and quality of the water, regulation of river flow affects the ecological balance and surface water groundwater interactions, and water use, specifically, irrigation can affect the land-atmosphere feedbacks and rainfall. In this era of anthropocene, hydrological system is no longer a natural system rather it must be treated as a human-natural coupled system.

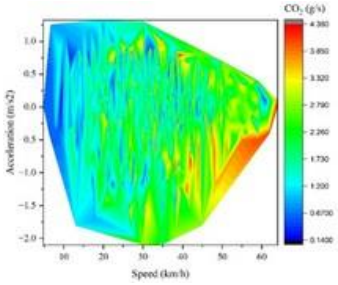
Most of the studies reported above address the direct impact of the human impact on considering the human influence as an external force. However, many times, the impact of anthropogenic activities would have indirect implications. For example, extensive usage of groundwater for irrigation might also affect the runoff and evapotranspiration components not just the groundwater levels. These effects which are generally indirect and are called' feedbacks of the human activity in the hydrological processes. Apart from these human interventions also infiltrate within the hydrologic system and reflect in terms of floods, and droughts.

With this background, this research aims to develop a complete framework for understanding the direct and indirect impact of human intervention on hydrological cycle.

9. NOX and CO2 emission comparison between diesel and petrol passenger cars on Indian roads -

Nitrogen oxides (NOX) and Carbon dioxides (CO2) emissions are the main issues with modern passenger cars as emission rules tighten, especially when driving in heterogeneous Indian traffic conditions. This study used a portable emission measuring system (PEMS) to compare the CO2 and NOX emissions of diesel and petrol passenger cars that met Bharat Stage IV (BS IV) emission regulations while driving on the same routes. Emission rates and emission factors for CO2 and NOX gaseous pollutants were compared for both vehicle types. PEMS provides accurate and representative data compared to laboratory-based testing, enabling researchers to evaluate real-world vehicular emissions, which may differ significantly from laboratory tests. The results show that the average NOX emission rates for the diesel vehicle for all the speed bins are higher than that of the petrol vehicle, and average CO2 emission rates for the petrol vehicle are higher than the diesel vehicle. Also, NOX emission rates for both vehicle types depend on vehicular speed. In the current study, the average CO2 emission factor for diesel and petrol passenger cars is 197.97 g/km and 556.22 g/km, respectively. The average NOX emission factor for the diesel passenger car is 4.34 g/km, and for the petrol passenger car, it is 0.83 g/km. BS-IV diesel car showed a 5.23 times higher average NOX emission factor than BS-IV petrol car, and BS-IV petrol car demonstrated 2.8 times higher CO2 emissions than BS IV diesel car. In addition, the average EFs for both pollutants were influenced by vehicular speed. This study offers an insightful look at emissions from diesel and petrol passenger automobiles at a time when public transportation and electric mobility are becoming essential.





Department of Engineering Science

"Engineering Science @ IITH" is a broad and interdisciplinary field that combines principles from various branches of science, mathematics, and engineering to solve complex engineering problems and develop innovative technologies. It typically encompasses a wide range of engineering disciplines and can vary depending on the specific specialisation of students' choice. The Department

Key aspects/Achievements in 2022-23 of engineering science include:

1. Mathematics and Applied Sciences: Engineering science often involves a strong foundation in mathematics, physics, chemistry, and other applied sciences. This knowledge forms the basis for understanding and analysing engineering problems.
2. Interdisciplinary Approach: Engineering science programs often encourage students to integrate knowledge from multiple engineering disciplines to solve complex problems. It may involve aspects of electrical, mechanical, civil, chemical, and other engineering fields.
3. Research and Innovation: The engineering science program emphasizes research and innovation, encouraging students to explore new technologies and solutions to real-world challenges.
4. Advanced Topics: Depending on the level and focus of the program, engineering science courses may cover advanced topics such as materials science, thermodynamics, fluid dynamics, and more.
5. Hands-On Experience: Engineering science programs include laboratory work and practical experience to apply theoretical knowledge to real-world situations.
6. Problem-Solving: Problem-solving skills are a fundamental aspect of engineering science. Students are trained to analyse complex problems, design solutions, and implement them effectively.
7. Computational Tools: Given the increasing role of computer technology in engineering, students in engineering science programs often develop strong computational and programming skills.
8. Ethics and Sustainability: Consideration of ethical, environmental, and sustainability factors is also integrated into engineering science programs, as engineers are often tasked with making responsible and sustainable decisions.

Please note that the specific curriculum and focus of engineering science programs can vary between specialisations. Some programs may have a more general approach, while others may specialize in particular areas.

For more information, please visit: https://es.iith.ac.in/

Faculty

Head of the Department

Bhuvanesh Ramakrishna
(Associate professor-Physics)
Profile page:
https://iith.ac.in/phy/bhuvan/

Abhinav Kumar
Electrical Engineering
Profile page:
https://iith.ac.in/ee/abhinavkumar/

Aravind Kumar Rengan
Biomedical Engineering
Profile page:
https://iith.ac.in/bme/aravind/

Digvijay S Pawar
Civil Engineering
Profile page:
https://iith.ac.in/ce/dspawar/

Kaushik Nayak
Electrical Engineering ***Profile page:***
https://iith.ac.in/ee/knayak/

Manish Singh
Computer Science & Engineering
Profile page:
https://iith.ac.in/cse/msingh/

Munwar B Basha
Civil Engineering
Profile page:
https://iith.ac.in/ce/basha/

Praveen Meduri
Chemical Engineering
Profile page:
https://iith.ac.in/che/meduripraveen/

Assistant Professor

Aiyappan S
Electrical Engineering
Profile page:

https://iith.ac.in/ee/abhinavkumar/

Anurup Datta
Mechanical & Aerospace Engineering
Profile page:
https://iith.ac.in/msme/mchandrasekhar/

Chandrasekhar Murapaka
Materials Science & Metallurgical Engineering
Profile page:
https://iith.ac.in/msme/mchandrasekhar/

Himanshu Joshi
BioTechnology
Profile page:
https://iith.ac.in/bt/hjoshi/

Karteek Sreenivasaiah
Computer Science & Engineering
Profile page:
https://iith.ac.in/cse/karteek/

Neeraj Kumar
Liberal Arts
Profile page:
https://iith.ac.in/la/neeraj.kumar/

Prakhar Gupta
Mechanical & Aerospace Engineering
Profile page:
https://iith.ac.in/mae/prakharg/

Venkata Rao Kotagiri
Chemistry
Profile page:
https://iith.ac.in/chy/kvrao/

Department of Heritage Science and Technology

In the fiscal year 2022-23, the Department of Heritage Science & Technology at IIT Hyderabad witnessed significant milestones and initiatives. The launch of the Online MTech program for working professionals in Heritage Science and Technology marked a pioneering effort, with 13 students joining the inaugural batch in August 2022. The department further expanded its academic offerings with the introduction of the PhD program in Heritage Science and Technology in January 2023, attracting two students to its first batch.

A key highlight was the Mahayogini Rajyalakshmi Devi (MRD) Heritage Research fellowship launch on November 2, 2022, in collaboration with the Sri Visweswara Yoga Research Institute. This initiative aims to foster robust research in frontier areas of Heritage assets, offering selected scholars an enhanced fellowship and funding for international conference travel.

The Online MTech Contact Program in December 2022 brought the first batch together for stimulating offline sessions, providing valuable insights into coursework and future project ideas through state-of-the-art lab tours and demonstrations.

The department also showcased its interdisciplinary approach with the HST Musical Evening on March 18, 2023, supported by the Department of Science & Technology under the Science Heritage Research Initiative. Noteworthy lectures and demonstrations by industry experts and adjunct faculty, coupled with soulful performances from IIT Hyderabad professors, made the evening a memorable exploration of the intersection of technology and music in India's heritage. The commitment to excellence in research and education remains paramount as the department strives to create a benchmark in the field of Heritage Science and Technology.

For more information, please visit: **https://www.hst.iith.ac.in/**

Faculty

Head of the Department

Mohan Raghavan
(Associate Professor-Biomedical Engineering)
Profile page:
https://iith.ac.in/bme/mohanr/

Professor

Prabusankar G.
Chemistry
Profile page:
https://iith.ac.in/chy/prabu/

Associate Professor

Aravind Kumar Rengan
Biomedical Engineering
Profile page:
https://iith.ac.in/bme/aravind/

Manish Singh
Biomedical Engineering
Profile page:
https://iith.ac.in/cse/msingh/

Surendra Nadh Somala
Civil Engineering
Profile page:
https://iith.ac.in/ce/surendra/

Assistant Professor

Kousik Sarathy Sridharan
Biomedical Engineering
Profile page:
https://iith.ac.in/bme/kousiksarathy/

Ramakrishna Upadrasta
Computer Science & Engineering
Profile page:
https://iith.ac.in/cse/ramakrishna/

Shiva Ji
Design
Profile page:
https://iith.ac.in/des/shivaji/

Suhail Rizvi Mohd
Biomedical Engineering
Profile page:
https://iith.ac.in/bme/suhailr/

Adjunct Professor

Gopikrishna Despande
Professor, *Electrical and Computer Engineering, Auburn University, Alabama*
Profile page:
https://eng.auburn.edu/directory/gzd0005

Rama Jayasunder
Professor, *NMR, AIIMS, New Delhi*
Profile page:
https://www.researchgate.net/profile/Rama-Jayasundar

Subrahmanyam Korada
Professor Emeritus, University of Hyderabad
Profile page:
https://en.wikipedia.org/wiki/Korada_Subrahmanyam

Vasant Shivram Shinde
CSIR Bhatnagar Fellow, CCMB
Founding Director General, National Maritime Heritage Complex, Lothal
Profile page:
https://deccancollegepune.ac.in/Resume_PDF/Archaeology_Other_Staff_Shinde.pdf

Vishwanath M V
Assistant Professor,
Kameshwar Singh Darbhanga Sanskrit University
Profile page:
https://www.linkedin.com/in/dr-m-v-vishwanath-270bb759/?originalSubdomain=in

Adjunct Faculty

A G Ramakrishnan
Professor, Department of Electrical Engineering, IISC.
Profile page:
http://mile.ee.iisc.ac.in/AGR/index.htm

Ajay Srinivasamurthy
Applied Science Manager, Amazon
Profile page:
https://www.ajaysrinivasamurthy.in/

Amba Kulkarni
Professor,
Department of Sanskrit Studies
Profile page:

https://sanskrit.uohyd.ac.in/faculty/amba/

K S Kannan
SRSJM Chair Professor, IIT Madras
Profile page:
https://hss.iitm.ac.in/team-members/k-s-kannan/

Ravi Balasubramanian
Associate Professor, Oregon State University, USA
Profile page:
https://engineering.oregonstate.edu/people/ravi-balasubramanian

Highlights:

Launch of the online M.Tech program for working professionals in Heritage Science and Technology - August ,2022

13 students joined the first batch of M.Tech in HST

MRD fellowship launch for PhD in HST - IITH & SVYRI 2nd Nov'22

- IT Hyderabad - Department of Heritage Science and Technology and Sri Visweswara Yoga Research Institute (SVYRI) announce Mahayogini Rajyalakshmi Devi (MRD) Heritage Research fellowships for PhD in HST
- Meritorious students with strong credentials in various disciplines will be selected through a rigorous process
- MRD scholars will draw an enhanced fellowship (Rs. 75,000/ month) and funding for travel to an international conference
- Robust, empirically quantifiable research in the frontier areas of Heritage assets will create strong commercial interest in Indic resources such as Ayurveda, Yoga, etc. It is important to perform research of the highest quality and publish in well-regarded fora, and IITH will strive to create a benchmark in the area of Heritage Research.

Launch of the PhD program in Heritage Science and Technology - Jan 2023

2 students joined the first batch of HST

Online M.Tech Contact Program 10th-11th Dec'22

- The first batch of the Online M.Tech Program came together for the End Semester Contact Program - with brainstorming sessions related to coursework and future project ideas, state-of-the-art lab tours and demonstrations. The two-day offline interactive sessions proved to be stimulating and offered valuable insights to the students.

HST Musical Evening - "Technology getting Musical" 18th Mar'23

- The Department of Heritage Science and Technology, IIT Hyderabad, hosted an enthralling HST Musical Evening inaugurated by Dr. Srivari Chandrasekhar, Secretary, Department of Science & Technology, Govt of India and graced by Shri. Akhilesh Jha, Chief Controller of Accounts, DST.
- This event was to showcase the best practices and explore the prospects of using technology in the field of music. The department and the event are supported by DST under its programme- Science Heritage Research Initiative (SHRI).

- "MADE-IN-INDIA music synthesizers since 1979" lecture demonstration by Mr. G. Raj Narayan and Mrs. Radhika Rajnarayan of Radel electronics was an experience to relish forever. 'Radel' brand electronic Tanpura, Tabla, and now their Veena and Harmonium addition to their musical instrument range over five decades is an excellent example of constructive technology addition to the tangible and intangible heritage of India.
- Another lecture demonstration on Music info Research was by Dr Ajay Srinivasmurthy, from Amazon Alexa - also adjunct faculty of HST. The prototypes developed by him are going to help us use our digital music libraries more than the usual practices of creating playlists based on artists, genres and other column titles.
- The last technical session was by the famous music director Shri Ramesh Vinayakam on his 'Gamaka Box'. He made everyone present in the auditorium sing the most difficult taans by following the signs of his 'Gamaka Box'.
- Apart from the technical sessions, the evening was filled by wonderful classical performances from the professors of IITH. A superlative vocal performance by Dr Satyavrata Samavedi, supported by Dr Mahesh Ganesan on Kanjeera, and the devotional kritis of Carnatic music by Prof Sivaramakrishna Vanjari was a soulful treat

Inventing & Innovating in Technology for Humanity

CAMPUS CHRONICLES

BUILD Project

BUILD program is a Bold and Unique Ideas Leading to Development. Its objective is to Promote creativity and innovation among students. With a duration of 6 months and Funding of up to 1 Lakhs. Outcome – is to create a Product/prototype (hardware or software or app) and it is open to all students of IITH, BTech/BDes/MTech/MDes/MSc/PhD. The call for proposals is done twice a year.

A few BUILD Projects for the Financial Year 2022-2023:

Tinkerer's Lab

It was a proud year for the lab as we completed five years of existence this tenure. The year was a golden year for the lab as it continued to expand itself beyond its previous milestones and went on to create its name and fame across all the IITs with Tinkerers' Lab as we increased the number of projects looking forward to incubation and revived events at an extraordinary scale. Another factor that distinguished us and made us role models for other Tinkerers' Labs was the way we rearranged ourselves in domains and departments of specific technical supremacy and went ahead to give the students in Tinkerers' Lab a better set of guidance. We also changed our timings from 6 PM - 1 AM to being a 24/7 lab, a place where the spirit of Tinkering never sleeps.

Speaking of events this year, the lab made itself profound amongst the student base by organizing events that the people could look forward to attending and enjoying. Starting with the highlight of the year, Tinkerers' Lab was a prime collaborator with Kludge this year for CyberCon, which saw a footfall from over 700 people within the college only and had long-lasting impacts on the student-led work on Information Security in IITH. Tinkerers' Lab also conducted Tinkering 101 Chapter 1 and Chapter 2, where we taught students of our college about TinkerCAD and ESP32, respectively and the sessions were very well received by the student crowd. Speaking of that, Tinkerers' Lab also organized its annual Tinkering Night, where many people came, forgetting about their sleep, to work overnight to solve a problem statement given to them.

Another thing that Tinkerers' Lab is proud of this year is the development of it into a hub like structure for student activities.

Tinkerers' Lab hosted people working on their Inter IIT Problems to give them a unified shelter to work at, it acted as a hub for the Sci-Tech Council to come and work on their projects and the lab also major events like MILAN and ELAN AND NVISION knock the doors to make the stages for their technical events.

Speaking of projects, the lab saw a major boom in the number of projects worked on in the lab. Some of the most sparkling projects taken on by the lab were the following.

- **Energy Harvesting Rails - Prandipan Sahoo**
- **Unified Security System - Abhay Kumar**
- **Fall Detection System - Aadil Salim**
- **Cost-effective Syringe Pump - Arsh Arora**
- **Electromagnetic Breaking - Gaurav Sati**
- **Caterpillar Robot - Robotix**
- **Chess Bot - Elektronika**
- **Inter IIT Problem Statements - Team IITH**
- **Robotix-TL Projects - IITH Students**

Finally, it would be safe to say that the number of people who knocked on the TL door for projects didn't go unanswered this year, and the lab had a very positive year and looks forward to an even better year ahead under the aegis of our ever supporting FiC's Dr Sushmee Badhulika and Dr Vishwanath Chinthapentha, along with our highly supportive parent organization, Makers Bhavan Foundation.

If in case any query may arise, kindly reach out to the undersigned.
Sincerely,
Arsh Arora, Events and PRO Secretary, Tinkerers' Lab
Ph.no.: +91 79992 24011

Ek Bharat Shrestha Bharat

Bathukamma & Dandiya Celebrations

The Ek Bharat Shreshtha Bharat (EBSB) club of IITH organized a Bathukamma/ Dandiya night event. Flowers were bought and given to the participants by EBSB. The flower pyramids were soon decorated and arranged by people. They were then positioned in the center of a circle, and people started to dance around it.

Later that night, Dandiya began. The event was graced by our honorable director, Prof B S Murty. All attending members had a great time dancing and having fun.

Dia, Rangoli Making Competitions & Sky Lanterns

On the eve of Diwali Students enjoyed painting the diyas which they were given to decorate with stones. Students actively participated in this competition. They demonstrated their ingenuity by painting earthen Diyas with colors. Next day to create a festive atmosphere on the campus, participants constructed imaginative and colorful Rangolis. When it came time to celebrate Diwali, crowds gathered on the mess lawns. The sky was ablaze with stars and lanterns, and the scene was breathtaking. Everyone cheered as they released the sky lanterns into the sky.

The EBSB club of IITH organized a kite-flying event to celebrate the festival. It was held in an open space near the mess. Students turned up in huge numbers for the event, and more than 300 kites were flown.
On the eve of Makar Sankranti the EBSB club built a bonfire for the IITH community; Our honorable director Prof B S Murty ignited the bonfire. As The drummers began their performance, everyone began dancing the Bhangra to the beats

Kite Flying, Bonfire & Bhangra Celebrations

Solar Observation & Sports Sessions

On Makar Sankranti, as the sun god Surya is worshiped, it is also necessary to look at the sun directly so that our respects can be paid. In collaboration with Cepheid, the Astronomy and Astrophysics club of IITH, EBSB organized a solar observation event.
Sports are a vital part of Makar Sankranti celebrations. People who celebrate Makar Sankranti play sports like kho-kho and jallikattu. To bring the student community together, EBSB organized sports events as a part of the Makar Sankranti festival.

Holi Celebrations

This year, the EBSB club successfully and enthusiastically coordinated the Holi activities. People put aside their differences and rejoiced in life's simple pleasures during this time.

The college administration takes strict measures to ensure students adhere to safety precautions while participating in festivals. The use of natural colors and staying away from water balloon throwing, which might result in injury, are urged to the students.

NSS Activities

During the period of May 2022 - March 2023, NSS IIT Hyderabad (NSS IITH) proactively conducted 55 events trying to inculcate a sense of service to the community and oneself at IITH. A total of 600+ volunteers participated in various activities organized by NSS IITH. Under the able leadership and guidance of the faculty in-charge, NSS IITH pledged to devote its best efforts to the betterment of society. NSS IITH has around 600+ registered students for the academic year of 2022-23, and the count keeps on increasing. Here are a few activities undertaken during the period of May 2022 - March 2023.

Orphanage Visit

The NSS team visited "Shishu Mangal Orphanage Home for Girls and Boys" located at Nalagandla, which had around 40 children and donated them a few boxes of clothes we received from a donation drive.

Udaan is a regular event that NSS conducts to share knowledge with the students of nearby villages. It is an event which is conducted on every possible Sundays.

Udaan

Weed Removal Drive

The event is organized on the premises of the IITH campus by the NSS Team in collaboration with the Plant Cell of IITH to remove weeds like Parthenium & Subabul.

Fitness Walkathon

World Heart Day, 29th September 2022, The walkathon was conducted to signify the importance of cardiac health in modern times. Event saw an overwhelming participation by 172 students.

Vidyadaan is an attempt to share knowledge with children of government schools. Volunteers are divided into a group of 3 to 4 & taught students from classes 1st-9th. A total of 40 NSS volunteers engaged in teaching around 250+ students.

Vidyadaan

Blood Donation Camp

On Independence day, many faculty, & staff members, along with director Prof B S Murthy and previous NSS Faculty In-Charge Dr Prem Paul, donated their blood. 137 units collected out of 150 registrations.

Donation Campaigns

NSS IITH conducted Book & Cloth Donation Drives where students donate books & clothes that could be of better use somewhere else. The donations are made to orphanages and old age homes near IITH.

Swachh Bharat is an event which is organized inside the premises of the IITH campus by the NSS Team to maintain a clean, healthy and beautiful campus. Swachh Bharat is conducted twice every month.

Swachh Bharat

Weed Removal Drive

The event is organized in the premises of the IITH campus by the NSS Team in collaboration with the Plant Cell of IITH to remove the weeds like Parthenium & Subabul.

Ambedkar Jayanti

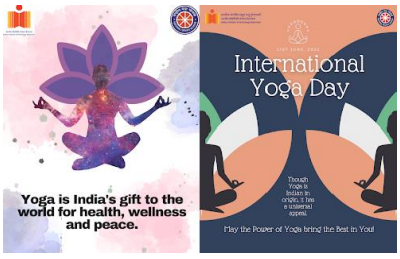
On the occasion of Ambedkar Jayanti (14th April), the NSS Team, IITH conducted the Essay Writing and Drawing Competitions to the students of IITH.

On the occasion of World Health Day (7th April), the NSS Team, IITH conducted the Essay Writing and Drawing Competitions to the students of IITH.

World Health Day

World Autism Awareness Day

On the occasion of World Autism Awareness Day (2nd April), the NSS Team, IITH conducted Article Writing, Case Study, Poster Making Competitions to IITH Students.

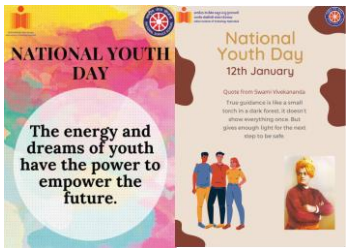


International Yoga Day

On the occasion of International Yoga Day (21st June 2022), the NSS Team, IITH conducted Poster making, Essay writing, Infographics, and Video making with the theme "Importance of Yoga in the present times".

On the occasion of Vigilance Awareness Week 2022 (31st October to 6th November), the NSS Team, IITH conducted online events: Poster Making, Comic Making, and Essay Writing.

Vigilance Awareness Week



National Youth Day

On the occasion of National Youth Day (Jan 12, 2023), birth anniversary of Swami Vivekananda, NSS Team, IITH conducted online events, Essay Writing, Poster Making, Case Study, to generate awareness of importance & impact of Youth in our country.

Prakriti Club

Prakriti Club, a nature club at IIT Hyderabad, is here to increase student interest in nature-related issues, as well as to encourage technological engagement in saving nature and progressing sustainable development. We have nature enthusiast members from different branches who contributed with almost no structural hindrance. Objectives of Prakriti include raising awareness about issues related to the environment among the campus residents. With our club's multidisciplinary nature, we are able to develop unique solutions to prominent challenges in nature.

Events Conducted:

On every natural occasion, our club sponsored several nature-related events, which bridged the gap created by the contemporary world between nature and students. We started with the Van Mahotsav Saptah (Tree Festival Week) with a Plantation Challenge to combat various environmental challenges such as deforestation, erosion, and global warming and enhance the beauty and harmony of the ecosystem. Numerous artistic activities, such as the Nature Art Competition, Essay Writing Competitions, and Leaf Painting and Carving Contests with the theme of the 75th Independence Day, Article Writing Contests on Natural resources of India pre and post-Independence were conducted to encourage pupils to explore the natural world in creative ways.

Prakriti held many ideathon contests (MILAN 2022) to stimulate students to think about ways to tackle environmental challenges. Techy events such as soil moisture sensor making and the creation of a Dynamic App to store flora and fauna information in collaboration with Lambda IITH were held following a tour of the Waste Treatment Facilities on Campus for the 2022 BTech 2022 batch.

Club Activities:

Started publishing Prakriti's Weekly Nature Feed from August 16, 2022, on the official Instagram page to inform students about environmental news.

Projects:

We are involved in several environmental projects, such as the River Plastic Strainer project, which works to clean rivers for a better tomorrow, and the Smart Plug project to ensure energy efficiency and eliminate energy waste in homes. In addition, we have forthcoming projects of App Development.

EML Series

The Extra Mural Lectures team at IIT Hyderabad work to bring decorated personalities from eclectic domains on one platform to talk about various subjects like art, social work, economics, psychology, sports, science, etc, and inspire our IIT Hyderabad fraternity with insights that they could induce in their lives.

Extra Mural Lectures

A talk on "The Free Software Movement and GNU" by Dr Richard Stallman Founder of Free Software Foundation, United States

A talk on "Tackling the Diabetes Epidemic: Some Success Stories from India" by Dr Viswanathan Mohan, Chairman and Chief of Diabetology, Dr Mohan's Diabetes Specialities Centre

A talk on "Notes on Technology, Entrepreneurship, and the Future" by Dr Ajai Chowdhry, Co-founder of HCL, Padma Bhushan Awardee, and Former Chairman of BoG IITH

A talk on "Excitements of Space and its Relevance to the Nation" by Dr B N Suresh, ISRO Scientist & Padma Shri & Padma Bhushan Awardee

DIESTA

Introduced in 2021, Diesta is an annual Interdepartmental sports & cultural fest of IIT Hyderabad. All the departments are divided into 7-10 teams. All the teams put their best foot forward to take away the ultimate trophy, the glory of being the best of them all. The gust of euphoria that DIESTA brought with itself is unparalleled.

The opportunity gave students the much-needed exposure to introduce themselves to the entire IITH. People thoroughly enjoyed the other dance, music, and literary performances. The euphoria that DIESTA had filled the people with was still alive. Those memories are etched in our hearts forever.

ELAN & ηVision

Elan & ηVision is the annual techno-cultural fest of IIT Hyderabad and among the most prominent college fests in South India. Since its inception, it has touched thousands, leaving behind beautiful memories in the hearts of everyone involved with us.

Elan & ηVision 2023 with the theme of "Secrets of Valenrow" has been one of the biggest extravaganzas of the year, enveloping the ultimate entertaining and enthralling experience held from 17th February to 19th February 2023. The event was completely filled with several artists, gracing the fest with their enthralling performances.

The 14th edition of this 3-day grandeur celebrates the notion of mystic powers and magic and promises to leave you enchanted with the theme, "Secrets of Valenrow".

The social cause theme for this year is 'Ikshana - Save Animals'. Because of human greed, animals have become a target of abuse. One of the major concerns of today's modern world, we aim to give the issue a much-needed limelight and attraction. Animals also have the full right to live on earth as much as human beings have. We believe that every creation of mother nature should be treated with love, respect, and compassion.

MILAN 2022

The events of MILAN 2022 commenced on the 9th of September. The Cultural and Sci-tech Events started as planned. But due to unprecedented weather conditions, the outdoor sports events needed postponement.

The opening ceremony of MILAN 2022 was held on September 10th in the presence of our beloved HCU, Dr Saravanan Balusamy. The opening ceremony included the release of the MILAN promo video, Launch, demonstration of our official website, and an energetic performance by the Shuffle Crew.

It was followed by a torch rally to the football ground. We would also like to thank SBI, Pure EV, ICICI Bank, HDFC, Isthara, Shakti's Kitchen, R Gouras, and Red Bull, who sponsored our event and helped us make MILAN 2022 a great success.

Sports Events

The sports events consisted of 16 events. Many of the events like badminton, table tennis, and squash started as planned and received participation from all the blocks and e-sports consisted of Valorant, CSGO, fall guys, and Clash royale.

Cultural Events

The cultural events were exciting and crowded. From the energetic performances by the students in the dance and singing competitions to the calculated involvement in dumb charades and codenames to the fantastic fashion show performances, the cultural events were a complete success.

Science & Technology Events

This edition of MILAN witnessed some new & different SciTech events like Robo soccer, RC car racing, water rocketry, etc. The events were fascinating to watch and fun to participate in. Kautilya hostel block became the overall champion in SciTech events.

Pronites

As we know, there is no perfect end without an ashy night; the MILAN team has organized a fun- filled stand-up set by Vivek Muralidharan, followed by a DJ night by DJ Scintillate from Prism which acted as a stressbuster to the entire student community after a tiring week.

E-Summit

E-Summit aims to bring early entrepreneurs, students, corporates, venture capitalists, and start-ups with burgeoning ideas from all over the country to one platform. E-Cell, IIT Hyderabad's annual flagship event E-Summit 23-'An Arduous Carrefour', organized on the 20th to 22nd of January, 2023, was a phenomenal success! It featured prominent entrepreneurs and corporate professionals from across India. The topics of prime importance today, ranging from massive layoffs and digital payments to technological innovations, were debated and discussed from various perspectives.

This year's list of Keynote speakers includes:

1. **Rama Iyer- Head Innovation at GMR group**
2. **Dr Shanta Thoutam- Chief Innovation Officer, Govt. of Telangana.**
3. **GV Krishna Gopal - Group Chief Executive Officer at Access Livelihoods Group.**
4. **BVR Mohan Reddy- Founder Chairman & Board Member- Cyient I Author - Engineered in India**
5. **Dr Ravi Shankar Polishetty- Presenting Docture - Poly, the world's only Non-Invasive OMICS tracker and digital doctor Assistant.**
6. **Sandip Poddar- Startups mentor of STPI-SWIFT program at IIM Calcutta Innovation Park and T-Angels Program of T-Hub.**
7. **Udaya Dintyala- Exec. Director - ITO at AT&T Global Business Services India.**
8. **Avishek Gupta- Managing Director and CEO (Caspian Debt).**

This year's list of Topics for Panel Discussions includes:

1. **Transformation of India's digital payment landscape**
2. **The Employer-Employee Paradox: Concurrency of Layoffs and Hiring**
3. **Technological Innovations: The driving factors and Impact**

E-Cell, IIT-Hyderabad strives to meet the aspirations of its theme-'Think, Build, Inspire'. E-Summit gave an exemplary push to the entrepreneurial wisdom of the students. It provided a common platform for social, tech, and fin-tech entrepreneurs to put forth their views on the looming recession and ways to grow stronger. The organizers expressed profound gratitude towards the sponsors, speakers, panelists, and moderators for their time and efforts in making the event a wonderful one.

Japan Day

Japan External Trade Organization (JETRO) and IIT Hyderabad (IITH) co-hosted the fifth edition of the job fair "JAPAN DAY" on September 24, 2022. The event was held inperson mode after two years of online events. It was overwhelming to host 10 Japanese companies in the in-person mode for the 1st time post-pandemic. The companies comprising startups, SMEs, and large corporates, participated in promoting their businesses/cutting-edge technologies to attract students from IITH.

JETRO, in association with IITH, has been conducting "JAPAN DAY" at IITH since 2018; 10 Japanese companies, mostly large corporations, joined the event in 2018. Subsequently, 5 Japanese companies, mainly startups, joined in 2019. In 2020, the first-ever online "JAPAN DAY", we got an overwhelming response, and the number of companies increased to 20.

More than half were startups aiming to recruit top Indian talents to develop their technologies and products to compete in the global market. The numbers were promising in 2021, with 13 companies participating during the peak of the pandemic.

The following ten firms participated in the 5th edition of Japan Day 2022:

1. **I'm beside you Inc. (Startup): Software, AI, Mental Health, Education**
2. **AWL, Inc. (Startup): Software**
3. **Asahi Kasei Corporation (Corporation): Manufacturing - Chemicals**
4. **Asilla, Inc. (Startup): AI, Computer Vision**
5. **Takasago Electric, Inc. (SME): Design, Manufacturing and sale of precision parts**
6. **DENSO International India PVT. LTD. (Corporation): Automobile**
7. **Progummy Inc. (Startup): EdTEch**
8. **Mercari, Inc. (Corporation): e-commerce**
9. **Fujitsu Limited (Corporation): communication systems, manufacturing, & sale of information processing systems and electronic devices, & provision of related services**
10. **DeNA (Corporation): Game, entertainment, live streaming**

New Infra @Campus

BVR Mohan Reddy School of Innovation & Entrepreneurship

Shri Dharmendra Pradhan, Hon Minister of Education, laid the foundation stone for BVR Mohan Reddy School of Innovation & Entrepreneurship.

TIP has a total built-up area of 14313 sqm, consisting of 11 blocks with a G+5 structure, is ready to support the incubation activity at IITH

Technology Incubation Park

Research Centre Complex building

RCC is a five-storied (G+4) building with an attractive oval shape with a total plinth area is 12,325 Sqm.

5G Test Bed

5G Testbed has been inaugurated by Prof B S Murty, Director, IITH at IIT Hyderabad Campus.

IITH Married Students Hostel has been inaugurated.
A glimpse of the ceremony: https://youtu.be/DK_6B_gwybs

Married Student Hostel

ICICI E-LOBBY

ICICI e-lobby has been augurated at IITH Campus

Testbed for Autonomous Navigation

Hon'ble Minister of State for Science & Technology & Earth Sciences, Dr Jitendra Singh, inaugurated 1st Testbed for Autonomous Navigation at IITH

Hybrid Classroom has been inaugurated at IITH by Astra Microwave Pvt. Ltd.

Hybrid Classroom

Chemistry Department Building

The Chemistry Department Building has been inaugurated by Distinguished Professor Goverdhan Mehta at IITH.

NCC

IITH welcomed NCC into its fold, inaugurated by our beloved Director, Prof B S Murty.

IITH is delighted to have "Little Munchkins", a New Day Care, inaugurated by our beloved Director Prof B S Murty.

Little Munchkins

Open Air Theatre

Students at IITH exuberantly embraced the entry into New Year 2023 with fun-filled Culturals and DJ night in the new OAT.

Advanced Darksky Observatory

Celebrating National Science Day, IITH established an 'Advanced Darksky Observatory' inaugurated by Dr K Radhakrishnan, Honorary Distinguished Advisor in the Department of Space and Former Chairman of ISRO.

IITH established a Ground-breaking Raindrop Research Facility (RRF) inaugurated by Dr VK Saraswat (Hon'ble Member, NITI Aayog, Government of India)

Raindrop Research Facility

Electron Microscope

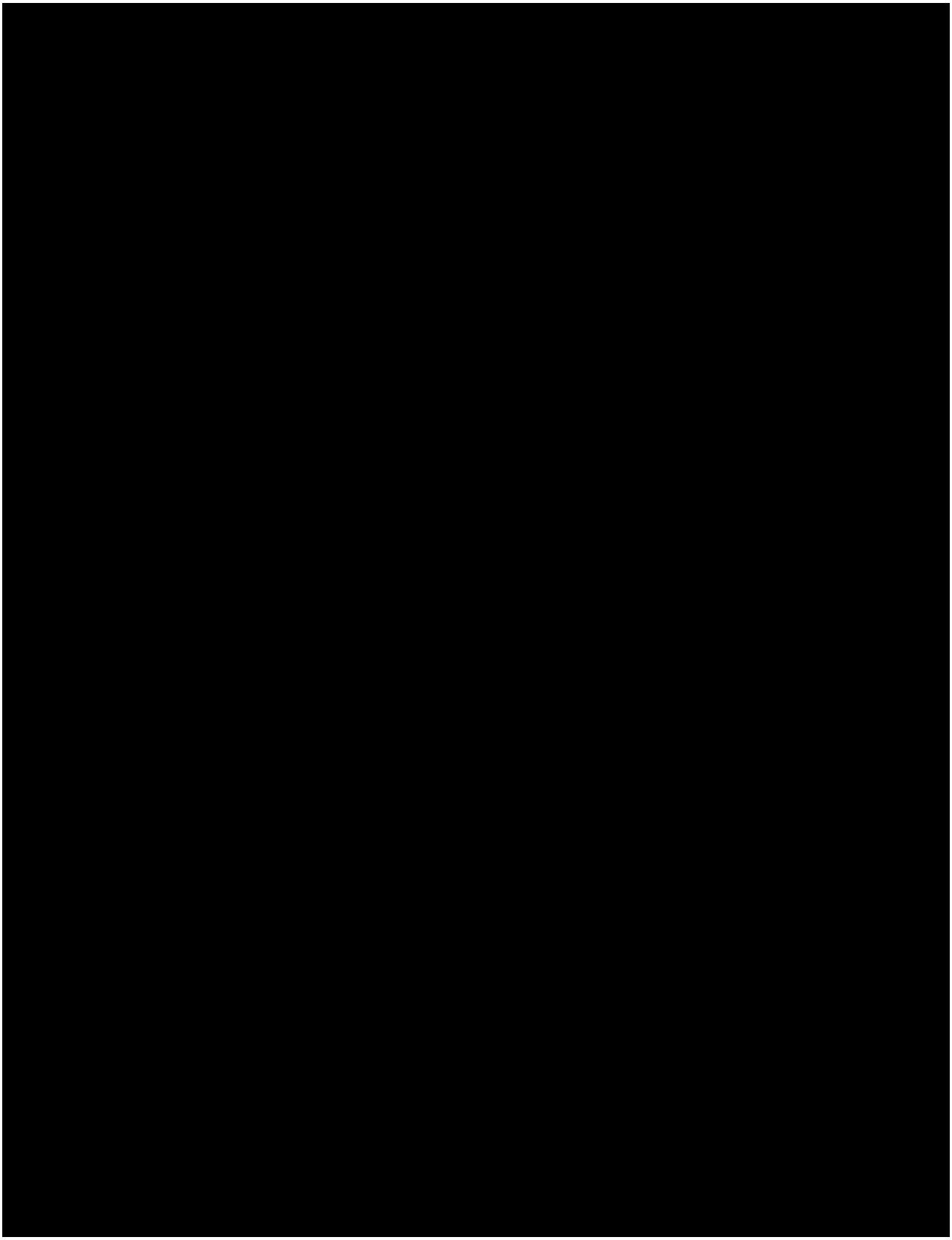
Inauguration of demonstration-purpose Scanning Electron Microscope by Thermo Fischer in the Department of MSME

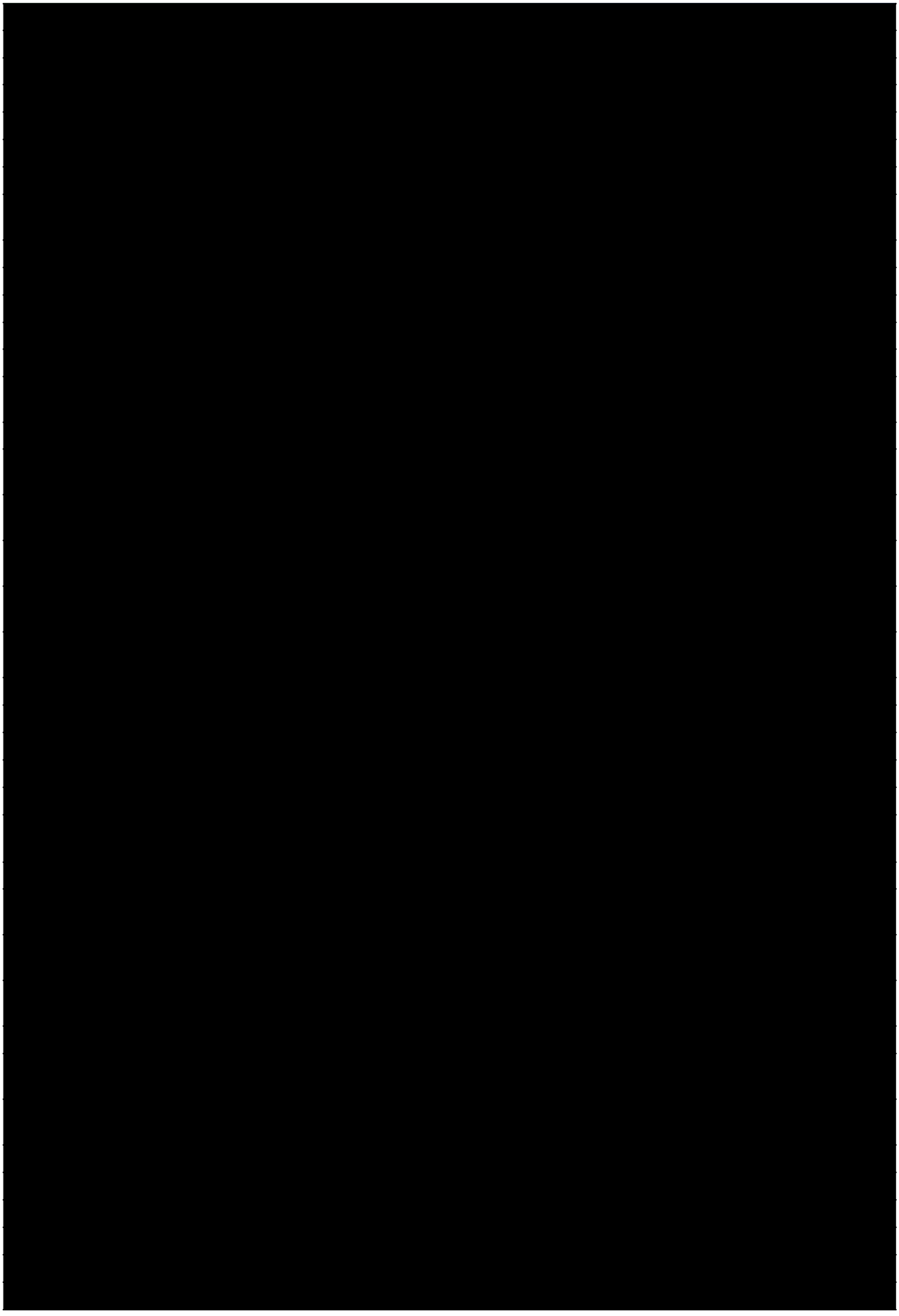
Collaborations

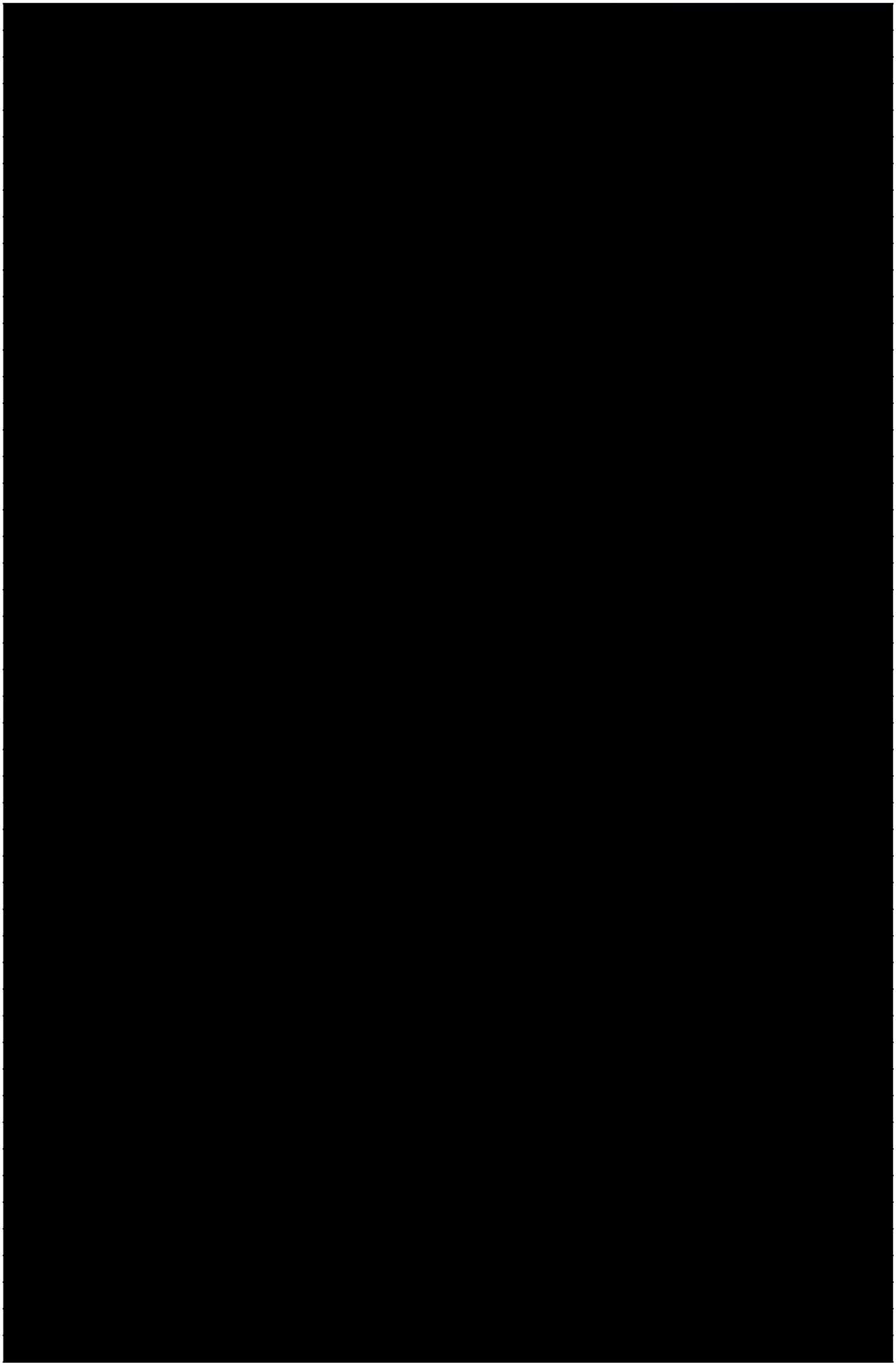
Our collaborative partnerships with industry and other institutions have strengthened, resulting in impactful interdisciplinary research projects; IITH inked pacts with NIT Sikkim; NIT Nagaland; NIT Agartala; and CSIR NEIST Assam; Commissionerate of Collegiate Education, Govt of Telangana; Kathmandu University; CMOS - College of Medical Sciences; IIIT Hyderabad; ICAT; Cyient; WiSig; EFLU.

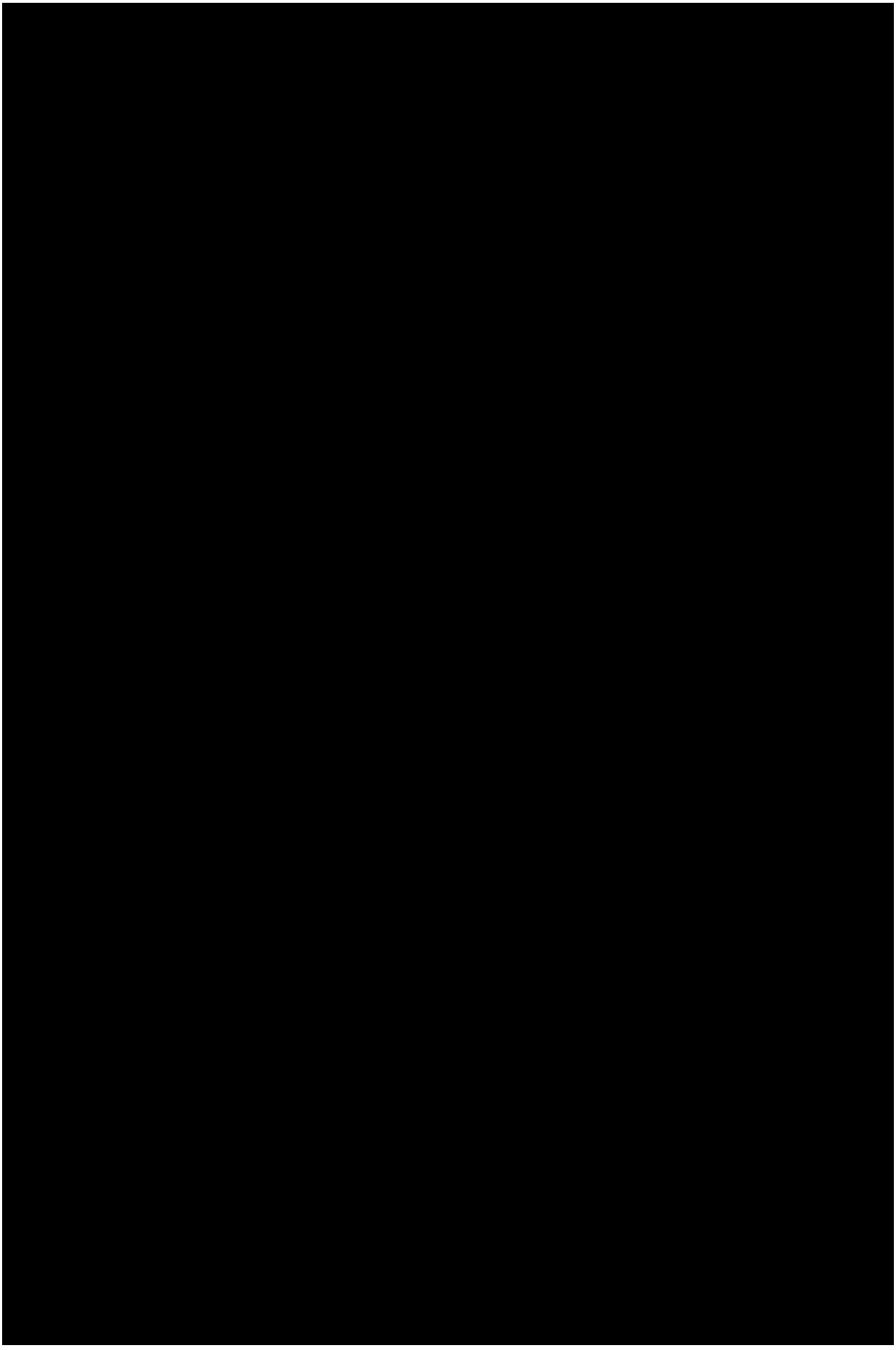
IITH inked MoU with DRDO for the DRDO-Industry-Academia (DIA) Center of Excellence; Suzuki Motor Corporation; Sri Visweswara Yoga Research Institute (SVYRI); Tata Consultancy Services; Hexagon; National Centre for Additive Manufacturing (NCAM); Auckland University of Technology; Indian Navy/ WESEE to establish a Co-Developmental Technology Innovation Centre (CTIC); Greenko to set up a School of Climate Change & Sustainability; NHAI; Beyond Next Ventures India Pvt Ltd (BNVI).

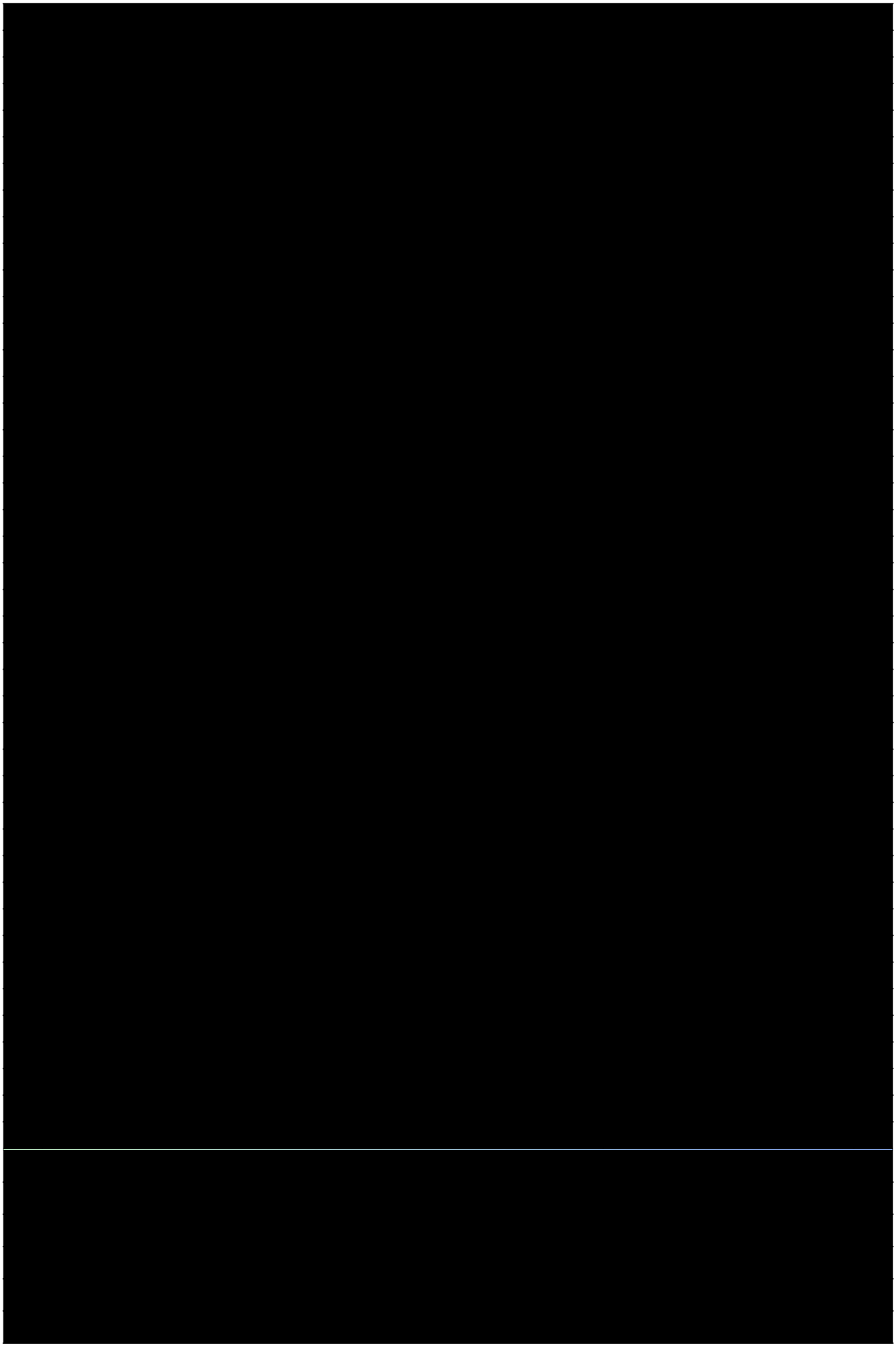
Non-Teaching Staff (FY 2022-2023)

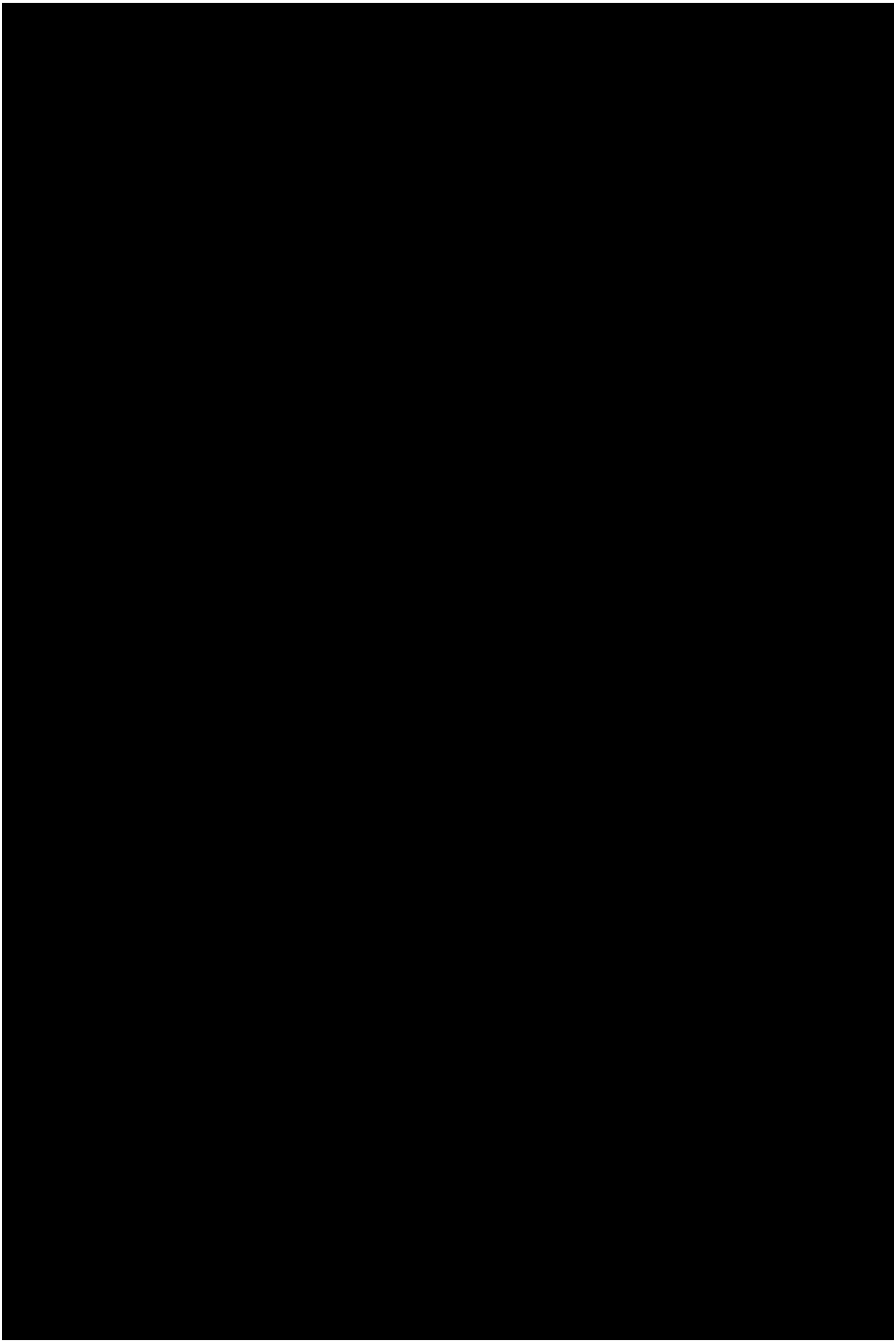


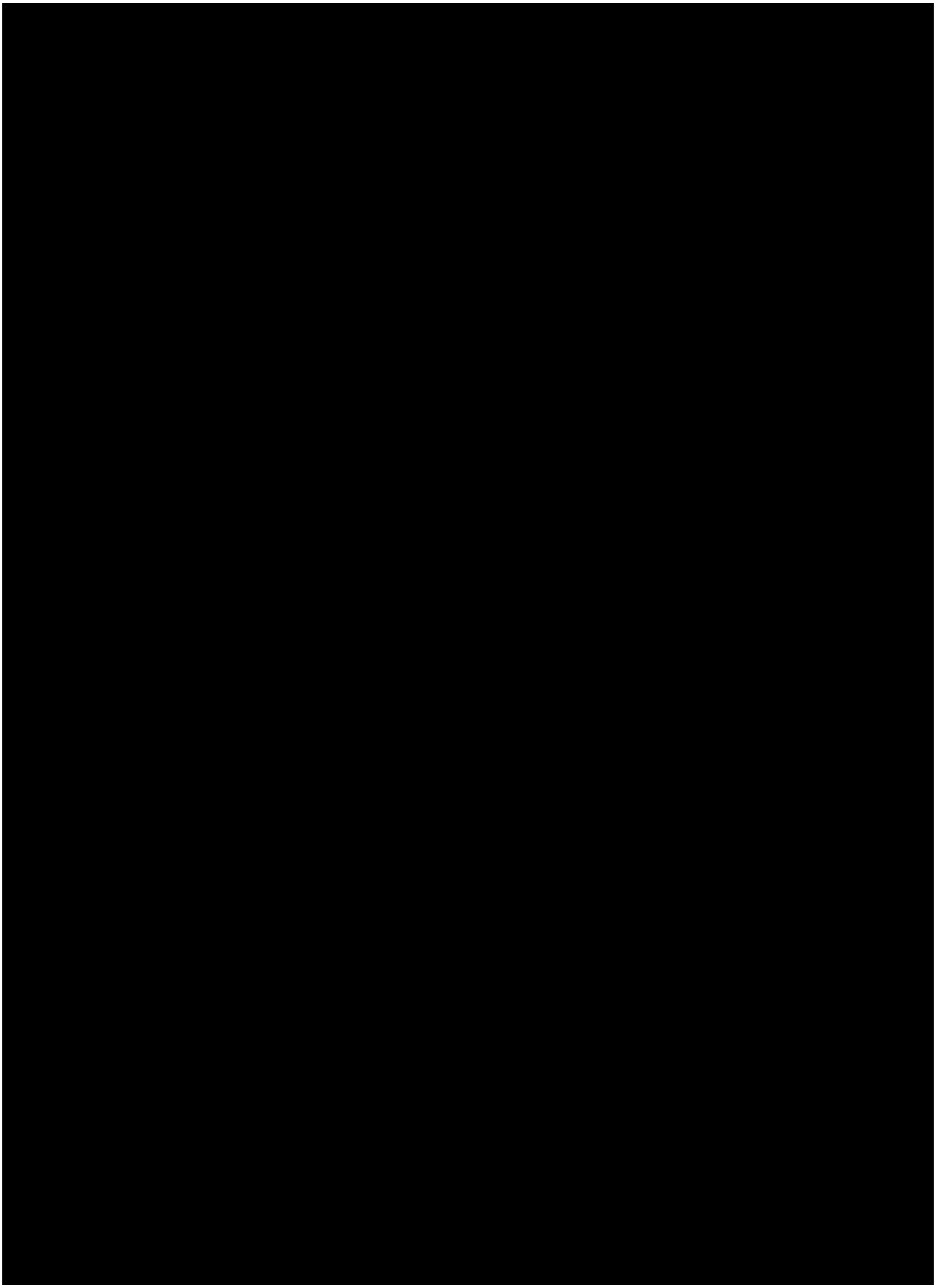












a 6acm ceaog8 a-t> C()oC() otlla110
it l'< Jll:I iltl)fl1ct} C:'< lt'41C:
Indian Institute of Technology Hyderabad

Kandi, Sangareddy, Telangana - 502284
Email: pro@iith.ac.in | Phone : (040) 2301 6099
www.iith.ac.in

Cover design by Dr Shiva Ji, Digital Heritage Lab
Creation and Publication: Public Relations Office, IIT Hyderabad