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

Pic & cover: Dr Shiva Ji

ANNUAL REPORT 2023-24

Inventing and Innovating in Technology for Humanity (IITH)

15th Foundation Day

15th Foundation Day at IIT Hyderabad held on 14.04.2023 with the message, "India needs to strengthen skills along with the knowledge to be a global player" by **the Chief guest Dr Krishna Ella, (recipient of Padma Bhushan), Founder & Chairman, Bharat Biotech.**

The occasion became more momentous with the announcement of the Faculty Teaching Excellence, Faculty Research Excellence, Staff Excellence & Student Academic & Research Excellence Awards, along with felicitation of FIF-2023 & Endowment Awards winners. More than 160 achievers have been honoured by the dignitaries for their untiring & persistent contribution to the institution's growth

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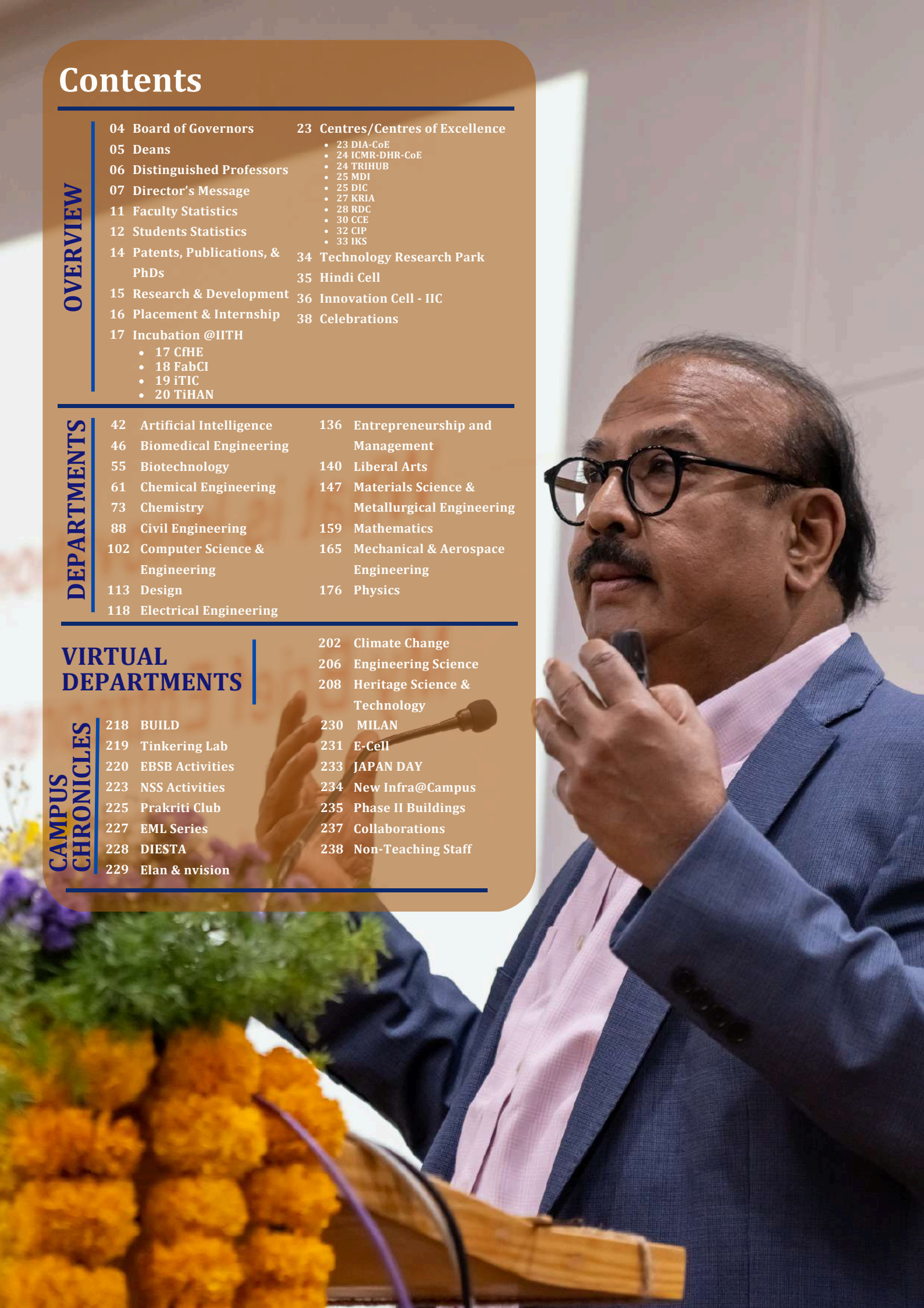
VIRTUAL DEPARTMENTS

CAMPUS CHRONICLES



Board of Governors

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

Member (Central Govt nominee)
Smt Saumya Gupta, (IAS)
Joint Secretary to GoI
Dept. of Higher Education
Ministry of Education

Ex-Officio Member
Prof B S Murty
Director
IIT Hyderabad

Member (State Govt nominee)
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
Shri V Venkat Rao
Registrar
IIT Hyderabad

Our Deans

Prof Bharat Bhooshan Panigrahi
Dean (Academic)

Prof Ranjith Ramadurai
Dean (Administration)

Dr Mudrika Khandelwal
Dean (Alumni & Corporate Relations)

Prof Kanchana V
Dean (Faculty)

Prof Tarun Kanti Panda
Dean (International Relations)

Prof Surya kumar S
Dean (Innovation, Translation & Startups)

Prof K V L Subramaniam
Dean (Planning)

Prof Chandrashekhar Sharma
Dean (Sponsored Research & Consultancy)

Prof Venkatasubbaiah K
Dean (Students)

Prof Debraj Bhattacharyya
Associate Dean (Planning)

Our Distinguished Professors

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

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

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

Prof James Francis Antaki
Professor
Cornell Engineering

Dr Mallikarjun Tatipamula
Chief Technology Officer
Ericsson Silicon Valley

Prof Nobuhiro Tsuji
Graduate School of Engineering
Kyoto University

Prof Nemkumar Banthia
Professor
University of British Columbia

Dr Omkaram Nalamasu
CTO and Senior Vice President
Applied Materials

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

Prof Rohini M Godbole
Professor
IISc Bangalore

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

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

Dr Saraswat V K
Member of NITI Ayog & Scientific Adviser to Defense Minister

Prof Seeram Ramakrishna
Mechanical Engineering
National University of Singapore

Dr Vidyasagar M FRS
SERB - National Science Chair
India

Director's Message

Dear Friends,

As we submit the Annual Report for 2023-24, I am excited to reflect on the remarkable achievements and progress at the Indian Institute of Technology Hyderabad (IITH) over the past year. The dedication of our exceptional faculty, outstanding staff, and brilliant students has been instrumental in our success. I extend my heartfelt gratitude to each member of our community for their unwavering commitment and hard work.

Together, we have fostered an environment of innovation and excellence, enabling significant advancements in research, academic programs, and community engagement. Let us continue to build on this momentum as we look forward to another year of growth and achievement.

IITH's Attainments:

IITH has maintained its overall NIRF ranking of 14. For the eighth consecutive year, IITH is ranked among the top 10 technical institutes in India (Rank 8), the best among second-generation IITs. In addition, IITH received a rank of 3 in NIRF Innovation. In QS World Ranking-2024, IITH is placed at 691-700. In placements, IITH saw over 500 offers, including 43 international and 87 Pre-Placement offers. 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.

Academics @IITH:

IITH is dedicated to pushing the boundaries of education while providing our students with the freedom and flexibility they need to thrive. Our diverse range of academic initiatives empowers learners to explore new frontiers, engage in cutting-edge research, and embrace interdisciplinary approaches. This commitment not only enhances their educational experience but also prepares them to tackle real-world challenges with creativity and innovation. We are proud to support our students in their journey of exploration and discovery. IITH is pioneering the introduction of new academic courses aligned with current trends. In 2023-24, IITH introduced a PhD & an MTech in Sustainable Engineering by the Greenko School of Sustainability. The Department of Heritage Science and Technology (HST) now offers a PhD program that bridges science and technology with our rich heritage. Additionally, a wide range of new programs have been this year, including an MTech in Quantum & Solid-State Devices, an MDes in Product Design, and an MDes in Interaction Design. IITH is delighted that AICTE has adopted the curriculum of IITH for the BTech in IC Design & Technology (which was introduced at IITH in 2022) and started this program in 125 engineering colleges in 2023.

Through its 27 hybrid classrooms, IITH has, for the first time in the country, tried to break the barriers in learning by launching Open to All Teaching (OAT) through its Centre for Continuing Education (CCE). About 30 courses have been offered in OAT mode in 2023-24, blending traditional in-person teaching with advanced technology, enabling both on-campus and remote students to learn together. CCE continues to provide lifelong learning opportunities, catering to a diverse audience seeking personal and professional development. In 2023-24, CCE has organized 5 International and National conferences, 14 workshops, 6 Certificate programs and coordinated 11 NPTEL courses.

Inspired by Hon'ble Prime Minister, Shri Narendra Modi Ji's advocacy of "Vasudhaiva Kutumbam," which means "the world is one family," we have embraced this ancient principle by offering several programs on virtual platforms & with academic and research exchange programs. These programs aim to upskill and reskill working professionals globally, fostering a seamless exchange of knowledge and ideas among students and faculty.

Leadership in training external students:

With excellent research facilities at IITH, it embarked upon a journey to transform NIT BTech students to focus on technology development and research. In alignment with NEP guidelines, IITH has established MoUs with various NITs and Kathmandu University to bring talented BTech students from these institutions to spend their fourth year at IITH, during which the students not only do courses but also get engaged in research projects at IITH.

IITH has also initiated a new program of imparting Semiconductor training to students throughout the country in 3 phases. Phase 1 involved a 1-week online workshop in which 620 students participated from all corners of India. 65 students out of this phase were shortlisted based on an exam to get a 3-week hands-on training at the clean room of IITH in Phase 2. Phase 3 is an exposure to 45 students to the Semiconductor ecosystem at Purdue University, USA (20 students) and NTHU (25 students), Taiwan. This program will be repeated regularly to send about 200 students for overseas training to create the much-needed trained human resources in this field for the country.

International Research Collaborations:

IITH offers a Joint Doctoral Degree Program with Swinburne University (Australia), Deakin University (Australia), Kathmandu University (Nepal), and National Tsing Hua University (Taiwan). 119 students visited various universities through Student Exchange, Internships, Jointly Supervised PhD and JDP programs. Programs like FIRST, ICCR, and Study in India (SII) facilitate admissions for foreign students at IITH.

Research, Innovations & Entrepreneurship@IITH:

We are committed to providing the best platform for core and auxiliary research, propelling the institute toward excellence in research and technology development. To nurture and propel the research and innovative spirit of our academic and research community, we have established a robust framework of guidelines and infrastructure. As a result, IITH currently boasts over 10,600+ research publications with 160,000+ citations and approximately ₹1250 Cr research funding, with the funding for 2023-24 being Rs. 250 Cr.

R&D Activities:

- DIA-COE is fully functional, and during the year, several new projects worth Rs. 56 Cr have been sanctioned.
- Sophisticated Analytical and Technical Help Institute (SATHI) Centre on In-Situ & Correlative Microscopy Centre with funding from DST and 16 partners, estimated cost Rs. 80+ Cr, the facility is getting ready for inauguration shortly.
- AI Centre of Excellence (MOE), with about Rs. 3 Cr funding, is established at the institute with support from the Ministry of Education and is functional from the institute.
- Model G20 event was conducted wherein almost 60,000 colleges were involved with 4000 entries for 3 stage competitions. 6 Final winners from 6 themes were awarded.
- IITH and Simpliforge Creations installed India's first Pedestrian Bridge using Indigenous 3D Printing Technology. The concept and design were developed and evaluated by Prof. K.V.L. Subramaniam of Civil Eng and his research group.
- Prof S Suriya Prakash's CASTCON Lab at the IITH has developed hybrid GFRP bars and discrete fibre-based reinforcing solutions to improve the performance of concrete members under different loading conditions.
- Under the leadership of Prof. Kiran Kuchi, the 5G ORAN network has been deployed at the University of Texas and Virginia Tech. This is the first time an indigenously developed Indian telecom technology is being tested on US soil.
- IITH is the first academic institution with an autonomous vehicle deployed as a campus shuttle vehicle for the past 11 months, and it has covered more than 5000 km already.
- IITH hosted the second edition of India's largest R&D Innovation Fair by Higher Education Institutes IInvenTiv-2024, inaugurated by Hon'ble Union Education Minister Shri Dharmendra Pradhan. Featured 52 institutes, including IITs, NITs, IIITs, and IISERs, showcasing 120 projects, which attracted over 2000 industry stakeholders. Five-panel discussions were held, and one technology transfer agreement was signed during the event.
- The Design Innovation Centre (DIC) at IITH has organized the 4th All India DIC Meet-2024 at the Convention Centre, IITH, to promote and enhance interdisciplinary design-focused innovation and creative problem-solving through design-based education and projects.
- Launched Summer Undergraduate Research Exposure internships (SURE), and a total of 190 students (102 girls) took the benefit of the program in 2023-24.
- About 50 Institute postdoctoral fellowships have been started at IITH this year to nurture research talent for the benefit of the country.
- A team of researchers from IITH are part of an international team of astronomers from India, Japan, and Europe, have published results from monitoring pulsars, nature's best clocks, using six of the World's most sensitive radio telescopes, including India's largest telescope uGMRT. The results could not have been possible without the NSM (National Supercomputing Mission) facility Param Seva installed at IITH.

IITH has a vibrant Innovation and Entrepreneurial Ecosystem to support startups in different stages. In the last 6 years, it has supported more than 190+ startups which have created 1100+ jobs and Rs. 1250+ Cr of revenue. This year also saw the launch of the IITH-Greenko BUILD program for supporting 75 student winners across the country in their early idea validation journey with financial and mentoring support. To promote startup culture, IITH has approved providing a Diploma to any BTech student who has completed 50% of credits and provides an opportunity for them to come back within the next 5 years to complete the rest of the credits.

Collaborations & Relation Building:

Several MOUs were signed to establish collaborations to work together in various areas of academic and R&D prospects. To name a few such prominent MoUs are with 11 NITs; AIIMs Bibinagar; Qunnox (For AI Innovations); DGQA (Defence sector); Kathmandu University Nepal; Mahalanobis National Crop Forecast Centre (MNCFC), Dept. of Agriculture & FW; CDAC, Thiruvananthapuram; Project Management Unit, Ozone Cell, Ministry of Environment Forest and Climate Change; Space Applications Centre (SAC) ISRO, Ahmedabad; Hyderabad Eye Research Foundation (HERF), LV Prasad Eye Institute (LVPEI), Hyderabad; NTTM, Ministry of Textiles; Nuclear Fuel Complex, DAE; European Organization for Nuclear Research (CERN), etc.

- The collaboration between the IITH and the Japan International Cooperation Agency (JICA) reached new heights through the FRIENSHIP Phase-2 program. In September 2023, we celebrated our unique relationship with Japan through the 6th edition of Japan Day (Career Fair) and the inaugural Japan Week, strengthening our ties with various Japanese universities and organizations.
- Delegations from the University of Magdeburg and other German institutes visited IITH to bolster academic and research collaborations.
- Senior leaders from 15 US universities and IIE members visited IITH to expand academic and research collaborations.
- Initiatives like the joint accelerator under INDUS-X by iTIC Incubator at IITH and H4XLabs aim to equip defence Startups to expand and navigate the US defence markets.
- IITH is the Co-Chair from India for the Indo-US initiative for Critical Emerging Technologies (iCET), collaborating closely with the AAU, which is the Co-Chair for ICET from the USA.
- IITH also chairs the Empowered Committee for Industry & International Collaborations (ECIIC), strengthening the collaboration between Indian academia and industry with the overseas ecosystem.
- IITH organized the Dean (R&D) and Deans (Academics) Conclave of all IITs & NITs, taking the lead to share the best practices.

Awards & Recognitions:

It is a moment of pride to announce that in the Top 2% of world-renowned scientists (Published by Elsevier), 9 IITH faculty were included in career-based ranking while a total of 25 IITH faculty achieved this honour for a single year (2023).

This year, the IITH faculty received several high-value fellowships and prestigious awards. Dr. Mudrika Khandelwal (MSME) was named an INSA Associate Fellow in 2023, while Prof. Vineet Balasubramanian (CSE) was elected as an INSA Associate Fellow for 2024. Prof Mahendrakumar Madhavan (CV) became a Fellow of the Institution of Civil Engineers. Prof. Sai Santosh Kumar Raavi (PHY) was honoured as a Fellow of the Royal Society of Chemistry (FRSC). Dr Prakash Chandra Mondal (LA) was named a Fellow of the Royal Society of Arts (RSA) London.

In addition, notable awards were received by Dr. Rupesh Ganpatrao Wandhare (EE) with the "SERB Technology Translation Award," Dr Aravind Kumar Rengan (BME) with the prestigious G D Naidu Award 2023, and Prof Sushmee Badulika (EE) with the Prof Kasturi Lal Chopra Memorial Distinguished Lecture Award 2023. Prof Kanchana (PHY) earned a Bronze Medal from the Society of Materials Chemistry (2023), Dr Shourya Dutta Gupta (MSME) was named an INAE Young Associate (2023), and Dr Vandana Sharma (PHY) received the "Young Scientist Award" at The National Physicist Conclave 2024. Dr Althuri Avanthi (BT) was awarded the Outstanding Women Researcher in Biofuels Award from the International Foundation, Chennai, and Dr Lopamudra Giri was recognized by the Royal Academy of Engineering, UK, in 2024.

Alumni:

IITH alumni make significant contributions in various fields and give back to the institute. They hold faculty positions in prestigious institutes like IITs, NITs, and IIMs, shaping future generations and advancing education and research. IITH has a foundation in the US, facilitating alumni contributions. The institute celebrated the yearlong Crystal Year, the Decennial Celebration for Graduates of 2013, and the Annual Alumni Day 2023. IITH announced the 4th Alumni Awards to encourage entrepreneurship and inaugurated its first legacy project with support from the 2012 pioneer batch.

Campus Infrastructure:

The IITH campus spans 600 acres, designed to eventually accommodate 20,000 students, with a built-up area of 2.1 million square meters. In February 2024, the Honourable Prime Minister, Shri Narendra Modi, dedicated the transformative Campus Development Project, including modern buildings like the International Guest House, Convention Centre, Technology Incubation Park, and more, collectively valued at Rs 1600 Cr. The campus master plan focuses on sustainability, energy efficiency, and a green urban framework with 60% greenery.

Phase-II construction activities supported by JICA have been completed, with Phase III underway to accommodate additional student hostels and faculty housing using precast technology, expected to finish within six months. The campus is sustainable, featuring a comprehensive wastewater and solid waste management system, banning single-use plastic, and growing over 20,000 trees in the past three years.

All buildings meet the GRIHA Green Buildings rating 4, with energy-efficient features like exposed concrete, radiant cooling technology, performance double-glazed units for windows, occupancy sensors, and sufficient daylight. IITH's campus exemplifies educational excellence and sustainability, signalling exciting times ahead.

The BTBM building at IITH received the award for Concrete Excellence by the American Concrete Institute (ACI) at the global level. Additionally, IITH was honoured with the British Safety Council's International Safety Award at the global level for its Phase-II campus construction.

Cheerful Moments @IITH:

IITH has vibrantly celebrated the Elan & ηVision-2024, E-Summit 2K24, Milan - the annual event of IITH between the hostels, Diesta – the annual interdepartmental events, with overwhelming enthusiasm.

The IITH team displayed its best play in the Inter IIT Aquatics & Sports Meet-2023, with an impressive tally of 19 medals, stood in the 8th position in sports and stood as 2nd Runners Up Champion in Aquatics. IITH Staff Team has clinched the runner-up championship in women's athletics with a total of 4 medals in the Inter IIT Staff Sports Meet-2023. IITH students participated in the Inter IIT Tech Meet held at IIT Madras & Inter IIT Cultural Meet held at IIT Kharagpur to showcase their talent and skills.

Sunshine, the Counselling Cell of IITH, initiated exuberant celebrations for Happiness Day, aiming to receive and spread joy on the International Day of Happiness.

I express my heartfelt gratitude to the Faculty, Staff, students and every one of you for your sincere dedication and hard work. It is through our relentless pursuit of excellence and unwavering commitment to growth that we continue to make strides towards success.

The passion and dedication of the IITH community are the driving forces behind these impressive achievements. Our environment fosters innovation, supports continuous improvement, and helps us attain top rankings. We are committed to creating an ecosystem that nurtures our students to become global leaders, contributing to a "Viksit Bharat."

Warm Regards

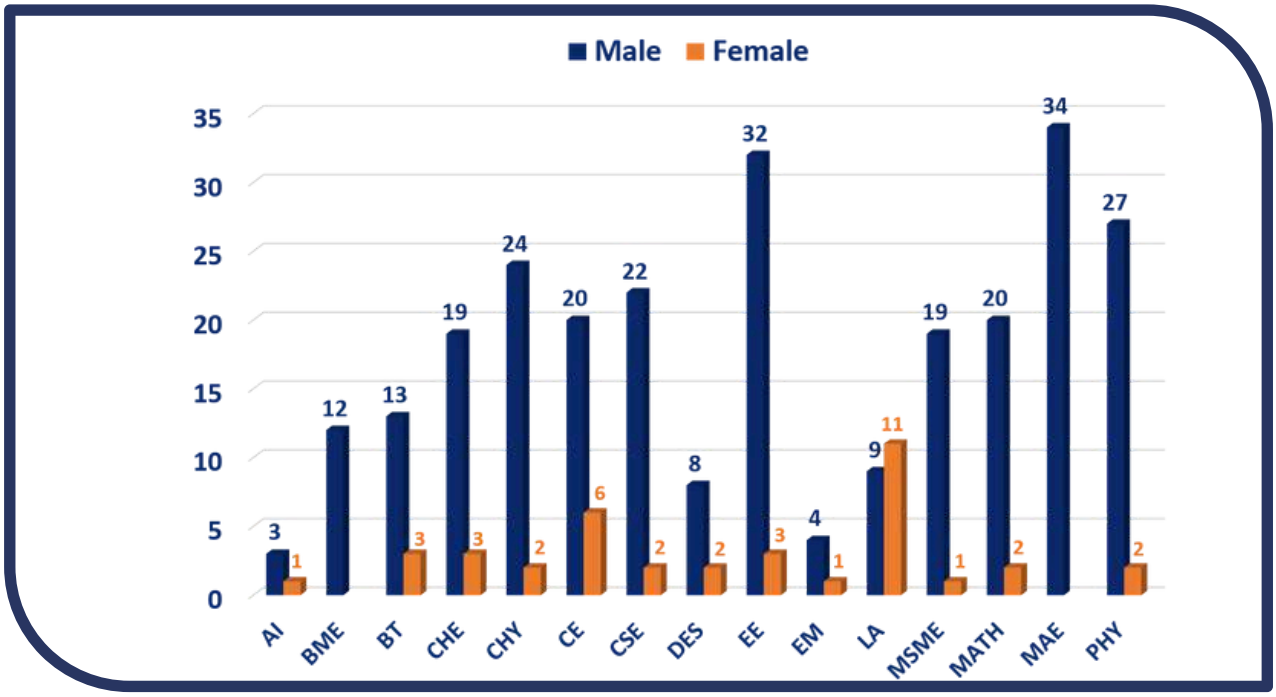
B S Murty

Director

Faculty Statistics

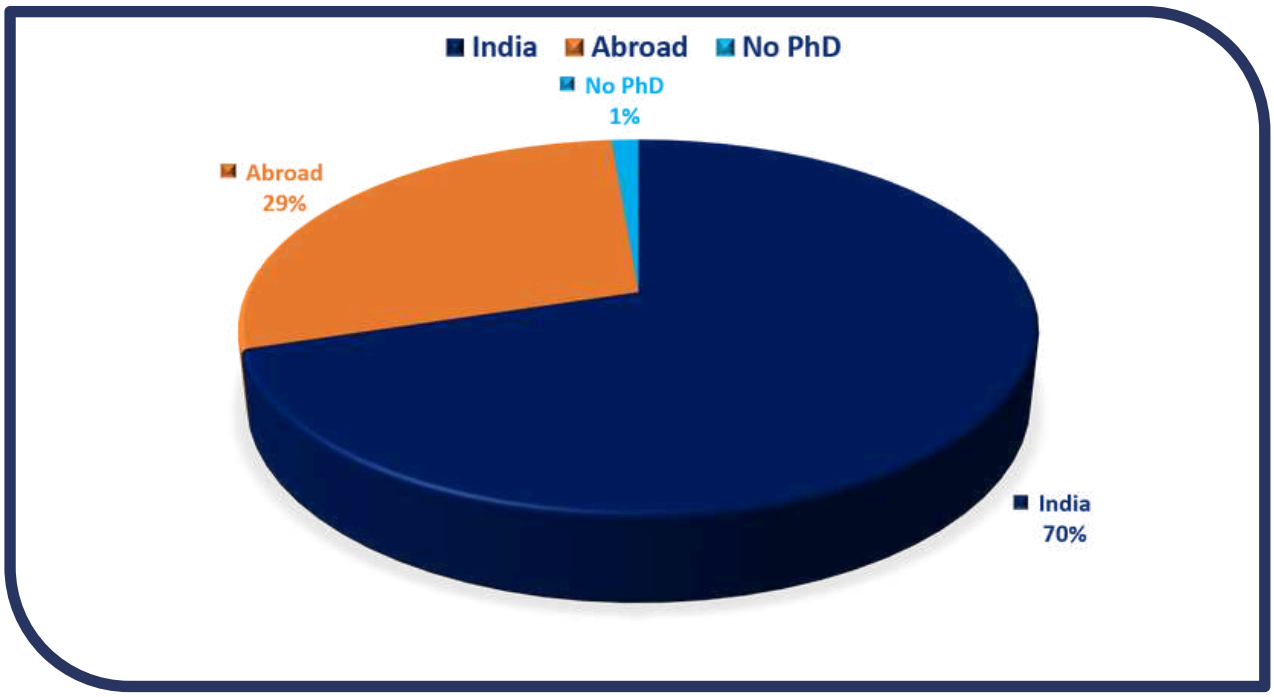
Department-wise

As on 31 March 2024, IITH is having 305 faculty members on-roll. ~13% of the total faculty are women.

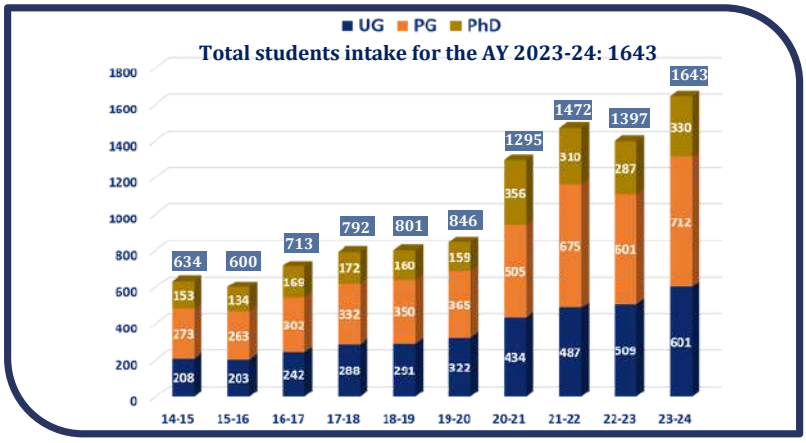


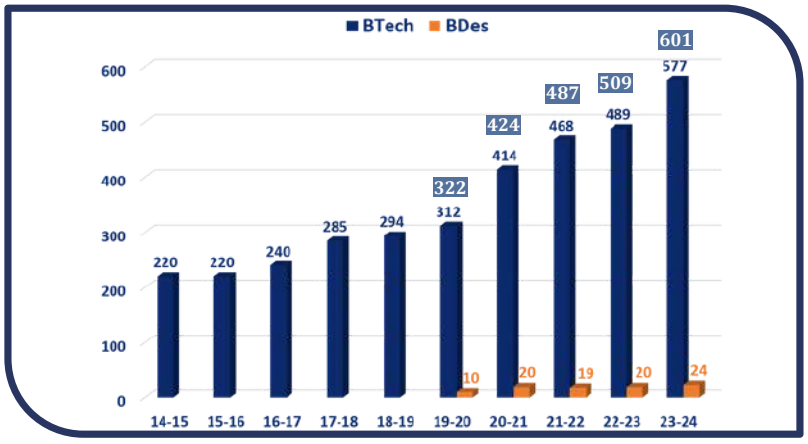
Place of PhD

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



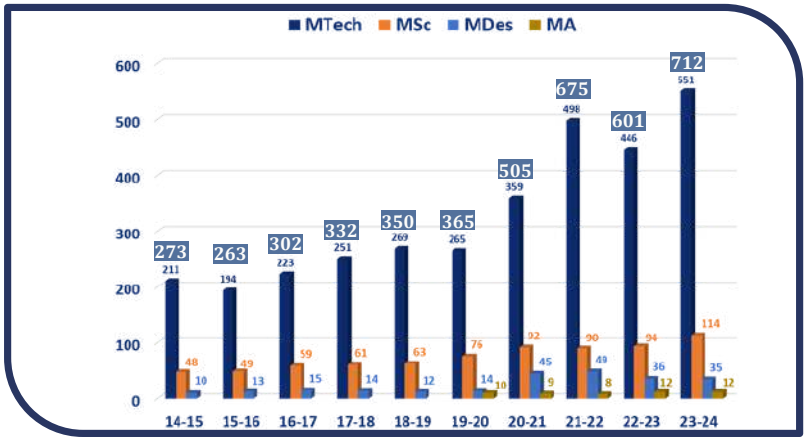
Student Statistics

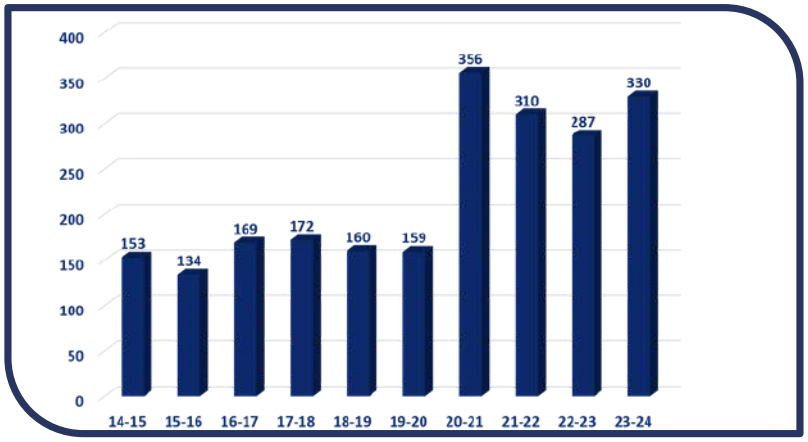




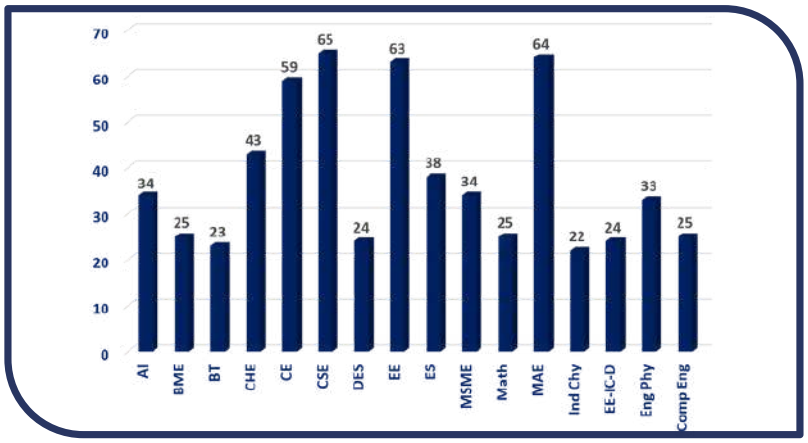
Yearly Intake of UG (BTech & BDes) Students

Yearly Intake of PG (MTech, MSc, MDes, & MA) Students



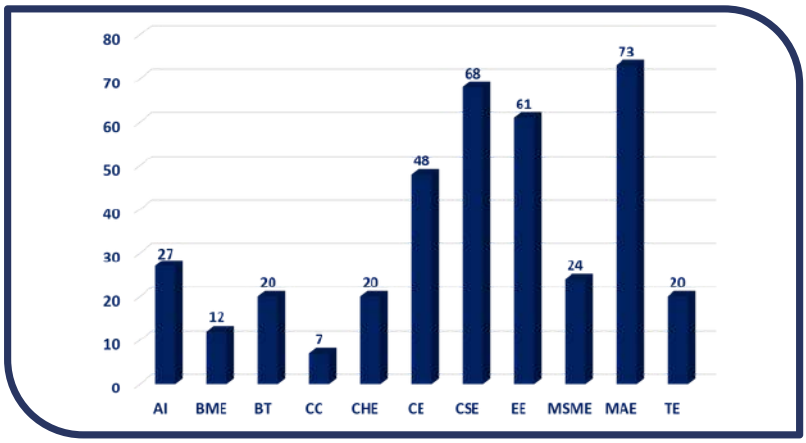


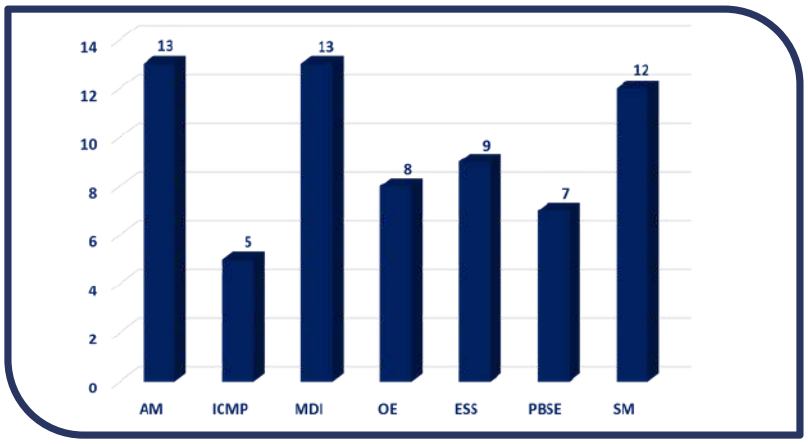
Yearly Intake of PhD Students



Department-wise Distribution of Undergraduate Students (BTech+BDes) for the AY 2023-2024

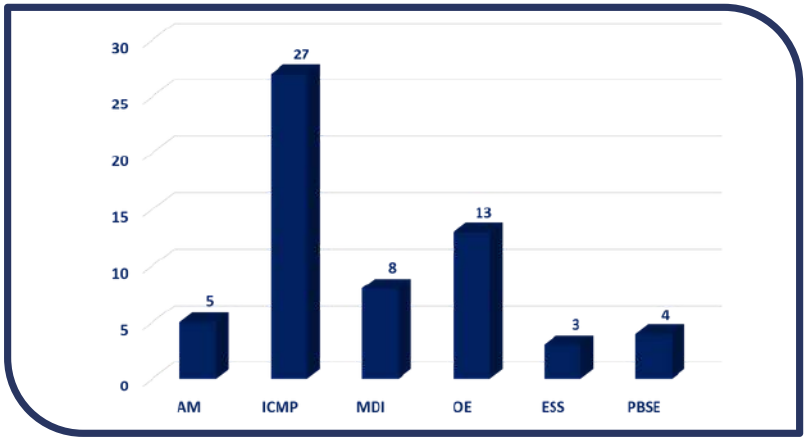
Department-wise Distribution of MTech Students for the AY 2023-2024



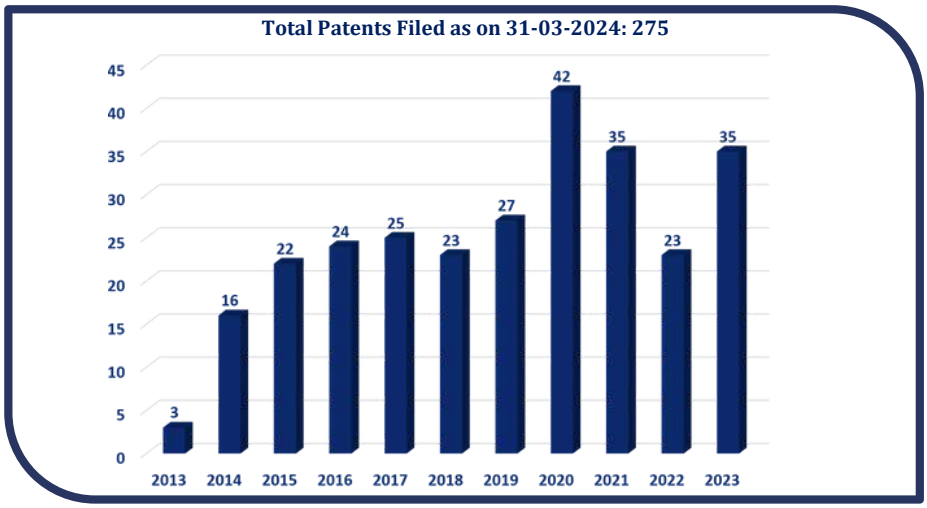


Department-wise Distribution of MTech (Interdisciplinary) Students for the AY 2023-24

Department-wise Distribution of MTech (Online) Students for the AY 2023-24

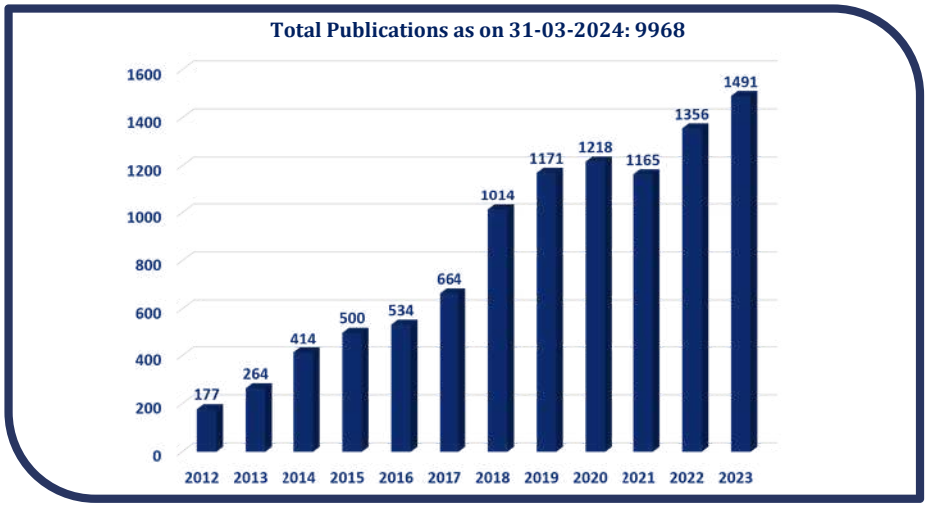


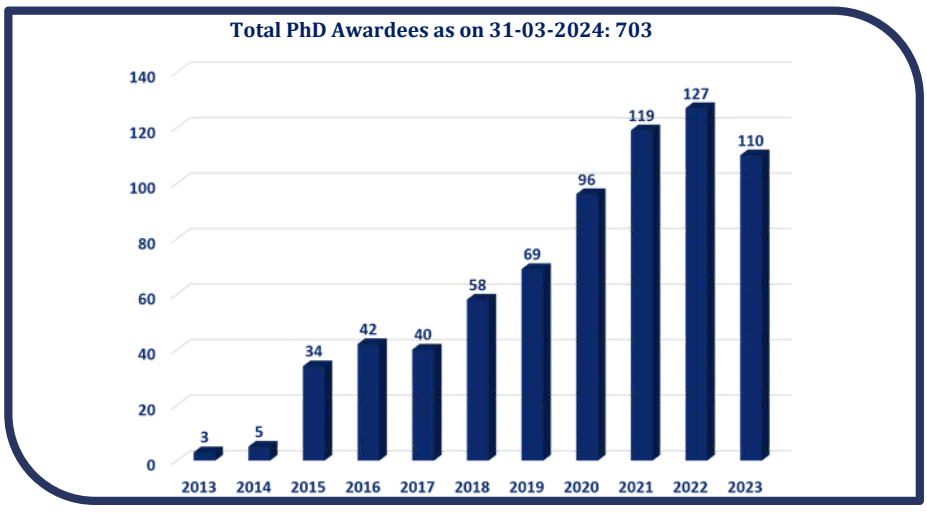
Patents, Publications, & PhD Awarded



Year-wise Distribution of Patents filed

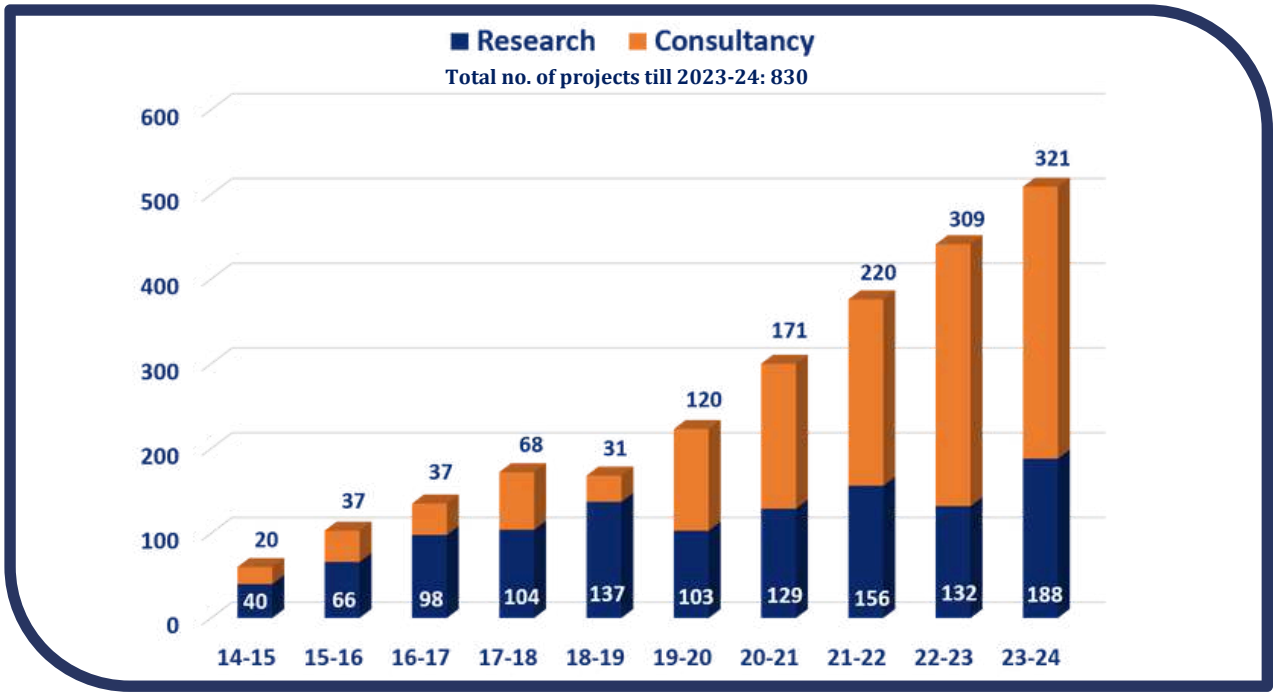
Year-wise Distribution of Publications



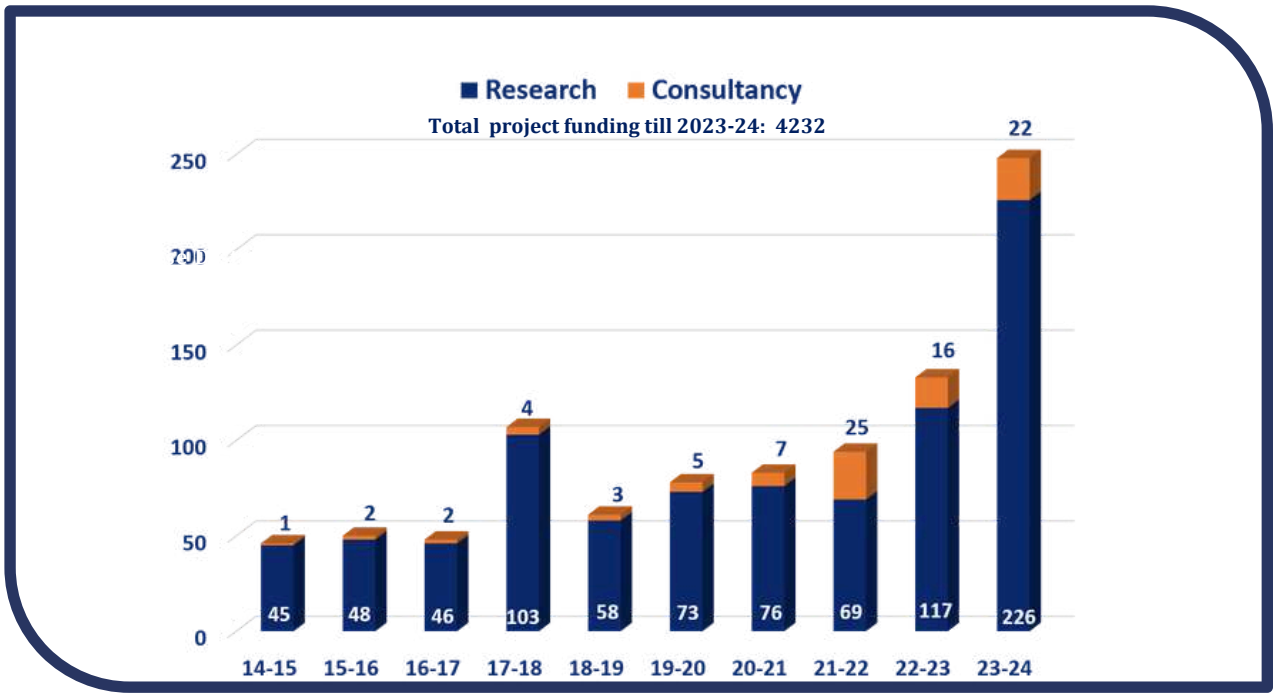


Year-wise Distribution of PhD Awarded

Research & Development



Year-wise distribution of Number of Projects



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

Placement & Internships

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

Placements

The campus placement drive at IIT Hyderabad aimed to attract distinguished companies, facilitate employment for graduating students, foster Industry relationships, and gather feedback for process enhancement. Companies had the opportunity to hire from a diverse pool of students from various domains, including engineering, sciences, design and management.

The Placement Drive 2024 at IIT Hyderabad, which commenced on December 1, 2023, was conducted in both offline and online modes. Despite the challenges such as Market competition and rigid scrutiny in certain industries, the drive yielded noteworthy outcomes in placement offers. In particular, despite the recession, several core industries and automobile industries proactively participated and recruited a good number of students. This year's Placements highlight positive trends both in terms of the diversity of recruiters as well as the quality of profiles offered.

Key Highlights for the year 2023-2024

- Number of Companies Registered: **320**
- Total number of students: **922**
- Number of Students Registered for Placement: **845**
- Total offers Issued: **530**
- Number of Companies hired: **148**
- Highest Package: **₹ 90.00 Lakhs**
- Average Package: **₹ 22.45 Lakhs**
- Number of International offers: **43**

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
- Purdue University
- University of Illinois
- University of Pennsylvania
- University of Texas
- ISI
- IISc Bangalore
- IIT Delhi
- IIT Madras
- IIM Ahmedabad
- IIT Bombay
- Karlsruhe Institute of Technology
- University of Minnesota Twin Cities
- University of Munster
- University of Southern California

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.

IIT Hyderabad witnessed a significant increase in the number of National and International internship offers for the AY 2023-24. A total of 254 offers were received from 93 companies, out of which 10 are international from 05 Japanese Companies. The participating companies are from diversified sectors such as IT, Financial Services, E-Commerce, Manufacturing, Construction, Healthcare Services, Auto Retails, R&D, etc.

Highlights for the year 2023-24:

- Number of companies registered: **190**
- Companies hired: **93**
- Total Internship Offers: **254**
- Summer Internship offers: **163**
- Semester-long Internship offers: **73**
- Highest monthly stipend: **₹ 2 Lakhs**
- Average monthly stipend: **₹ 77,000/-**
- Internship offers of 2023-24 converted to PPOs: 66

Top Hirers for the year 2022-23:

Incubation Centres

CfHE - Centre for Healthcare Entrepreneurship

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

C*f*HE is a Section 8 company established at IIT Hyderabad with Section 12 A, 80G and CSR Registrations. C*f*HE is also a recognized Technology Business Incubator (TBI) approved by DST and a BIONEST through BIRAC, DBT, Government of India. C*f*HE strives to bring affordable solutions that meet the country's healthcare needs. C*f*HE 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 2022 batch:

The "Grand Pitch" for the Foundation for Center for Healthcare Entrepreneurship's sixth batch of fellows was conducted on 2nd September, 2023.

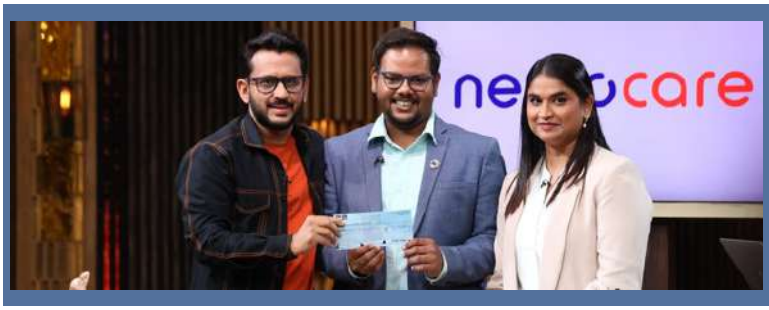
- M/s 3D Sushrut Pvt Ltd, founded by Yash Rathod, visualize CT scans and X-rays in an efficient manner.
- M/s Nilima Rehab Pvt Ltd Innovated Multi-Axial, Real-time dynamic strengthening apparatus to improve upper limb of rehabilitation.
- M/s Footryx Healthcare Pvt Ltd, Smart Footwear to predict the risk of foot ulcer in diabetic foot syndrome.
- M/s Cyzen Labs Pvt Ltd, CPR device with adaptive nonlinear chest compression ventilation.
- M/s Ultra Motive Technologies Pvt Ltd Smart robotic for gait rehabilitation.
- M/s Betaone Pvt Ltd is an invasive device for screening, monitoring and diagnosis of pulmonary conditions
- M/s Azi Health-Tech Pvt Ltd, an intelligent IOT-enabled variable cuffless BP monitoring with AI predictive model for IDH.

Founder Hub:

Founders Hub Summit 2024 at C*f*HE!

Thrilled to share the incredible insights and valuable suggestions that unfolded at the Founders Hub Summit, organized by C*f*HE. The event brought together distinguished dignitaries, industry leaders, and visionary minds to provide invaluable guidance to our startup.

The summit witnessed a series of one-to-one pitch sessions, where our promising startups like Nemo Care, BeAble Health, Heamac Healthcare Pvt Ltd, Aerobiosys Innovations Private Limited, Chemioptics, Osteoforge had the privilege of presenting their innovative ideas and business models. The feedback and suggestions provided by these eminent personalities were nothing short of transformative.



Founders of Nemo.Care, Mr Manoj Sanker, Pratyusha Pareddy and Shark Aman Gupta received a great encouragement for embarking on this life-saving journey of impacting millions of newborns across the world! Shark Tank India gave the opportunity to showcase their groundbreaking work and received 1Cr funding.

Achievements:

- M/s Heamac Health Pvt Ltd at UP Health Tech Summit 2023. Honored to have esteemed guests like Shri Yogendra Uphadhyay Shri Mayankeshwar Sharan Singh, Shri Suresh Kumar Khanna @ UP Govt .
- M/s *Jivika Healthcare* Pvt Ltd received the "The Visionary Leader Of The Year" Award at the 18th Employer Branding Award 2023-24 held at The Gateway Pune!
- M/s Beable Health Care Pvt Ltd Highlighting key visits from notable figures in healthcare and technology, including the visit from Dr. Califf, Commissioner of the US FDA.
- M/s Nemocare Wellness Pvt Ltd, Featured on Sony Shark Tank India Season 3 and secured 1Cr funding on the Tank from Shark Aman Gupta of Boat
- (II) Recognised as top Startups in the Medical devices (Late Stage) category at IKMC 2023

Heamac Healthcare emerged as Winner of the TiE Hyderabad's 7th Grad Business Idea Tournament 2023

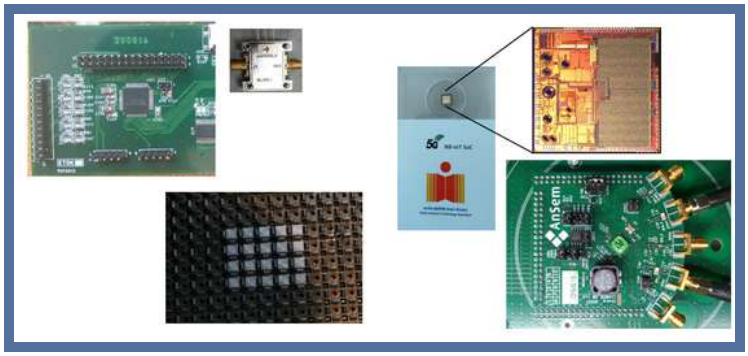
CfHE has been awarded the "Best Bioincubation Centre" among 75 Bio-NESTs participants at Global Bio-India 2023.

FabCI - Fabless Chip Design Incubator

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

"The Fabless Chip Design Incubator (FabCI) is a flagship program being executed with the support of the Ministry of Electronics and Information Technology (MEITY) and focuses on creating an ecosystem wherein these primary activities get executed for any startup in the area of chip design. The primary motivation for this unique incubator program is to provide a one-stop solution for start-ups focusing on the area of chip design. We want to help incubate multiple "Make-in- India' chip design companies. We aspire to build an ecosystem wherein the incubates are not only provided with the relevant infrastructure hardware and software but also are handheld through the path of success with the help of mentors who are pioneers in this field The grand vision is to leverage the design expertise that exists in India to create Indian IP and to make a mark in chip design internationally.

FabCI is a unique incubation centre envisioned and implemented by the IITH with the able support of the Ministry of Electronics and Information Technology (MEITY). The goal of this centre is to act as a one-stop solution for incubates intending to work in the area of chip design. Starting a company in the Integrated Circuit design field is an enormous task as the hardware-software and the relevant infrastructure for the same requires a huge amount of capital investment.



Also, developing a business model in this highly competitive domain is a non-trivial task. Mentorship by experts in both technical and business domains would hasten the process of transition from a startup to a revenue-generating company. Since its inception in 2018, FabCI has supported around 50 start ups. Several of its start ups have successfully prototyped their ideas and are in the marketing stage.

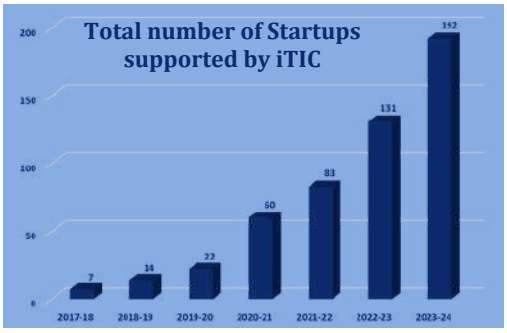
i-TIC - Technology Incubation Centre

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

The year 2023-24 marks iTIC's new phase, focused on expanding impact and achieving tangible outcomes. With a strong foundation built in previous years through structured programs, a skilled team, world-class facilities, and a solid policy framework, iTIC is now primed for growth. The 2022-23 scale-up phase set the stage for this shift, moving from planning to execution. Now, iTIC is ready to drive real-world business success, accelerating innovation and entrepreneurship.

Incubation:

iTIC has reached a milestone this year by supporting 192 startups, showcasing significant growth over the years. Notably, this progress reflects a well-balanced focus on both hardware and software domains. Around 33% of these startups are hardware-centric, 32% are software-based, and approximately 35% operate as a hybrid of both.



Program	Status		As on 31st March, 2024
Pre-Incubation	Ongoing	21	
	Graduated	40	
Incubation	Ongoing	13	
	Graduated	21	
Advanced Incubation	Ongoing	01	
	Graduated	01	
Acceleration	Ongoing	00	
	Graduated	32	
iDEX	Ongoing	43	
	Graduated	01	
ABCD	Ongoing	09	
	Graduated	10	
Total Engagement		192	

NICE (with NMDC),
TiHAN-iTIC (with TiHAN),
NIDHI Prayas (of DST),
Tide 2.0 (of Meity),
BUILD (with Greenko) ,
ABCD (with CDM & iDEX DIO)and
iDEX (with MoD)
remain the prominent schemes for germination, pre-incubation and incubation support.

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.

Intellectual Property(IP) masterclass

Weekly one-on-one mentoring sessions with startups were conducted by an expert, focusing on how to protect their intellectual property (IP). Additionally, the sessions provided strategic guidance on leveraging IP assets to enhance business growth and competitiveness.

BUILD Bootcamp

Seventy-five winners from the BUILD program were invited to participate in two bootcamps at IITH and three partner incubators. These boot camps focused on teaching entrepreneurship, innovation, and business canvas development.

Office Hours

A monthly reporting session where startups at iTIC present the challenges they are facing to experienced mentors, who then provide guidance on how to resolve them.

ABCD Cohort

The Acclimatization Boot Camp for Defense Startups (ABCD) by iTIC at IIT Hyderabad, in collaboration with iDEX-DIO, helped civilian startups adapt their technologies for defense applications at College of Defense Management, Secunderabad.

Mentor/Expert sessions

A total of 45+ 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

BUILD Launch Event: A flagship event in partnership with Greenko, designed to scout and support 75 student-preneurs, helping them launch their startups and enter the startup ecosystem. The event also provides valuable networking opportunities, connecting participants with industry experts, mentors, and potential investors to accelerate their entrepreneurial journey.

ABCD startup intro with CDM: iTIC, in collaboration with the College of Defence Management, launched a tailored event where selected startups could interact with and choose their mentors from the military forces.

Indo-US CrossLinX Accelerator: Empowering Indian defense startups for global expansion, this initiative bridged innovation between iDEX and the US DoD.Valuable insights shared by the speakers and the delegates.

iTIC BNV Demo Day: Conducted a virtual event that fostered connections between 5 iTIC start-ups and investors from India and Japan. A pivotal platform for global investor interactions, the event marked the onset of promising relationships and collaborations.

The Green Tech & Mobility Mixer: Presented by FITT IIT Delhi in collaboration with iTIC Incubator. This event offered participants the opportunity to connect with industry leaders, explore grants and financial aid options, and engage with innovative solutions in mobility and green technology.

Other Relevant Events:

iTIC Foundation Day: The annual celebration took place at the TIP Building lawns on Oct 31, 2023, providing a platform for our startup founders, board members, and mentors to come together and network.

FUTURITHM Launch Event: FTCCI and iTIC Incubator at IIT Hyderabad signed an MoU to launch a partnership aimed at bridging the gap between industry and academia. This collaboration, starting with the Futurithm 2024 event, will foster visionary discussions, innovations, and bring together thinkers, problem solvers, and industry leaders to develop, showcase, and implement cutting-edge solutions.

iDEX virtual roadshow: The Virtual iDEX Roadshow, hosted by iTIC, provided an opportunity to learn how iDEX supports startups and MSMEs in the Defence and Aerospace sectors. Attendees can explore 22 challenges in DISC 11 with grants of up to 1.5 Crores, and ADITI 1.0, which features 17 challenges with grants of up to Rs. 25 Crores.

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 Activities at TiHAN

DST Secretary visited TiHAN IIT Hyderabad on 21st March 2024

Department of Science and Technology (DST) Secretary Prof Abhay Karandikar, along with the NMICPS officials, visited the TiHAN at IIT Hyderabad. DST secretary interacted with faculty, students, and research staff of TiHAN IITH along with R&D collaborators and startups in this technology vertical and gave insightful suggestions to make India a global leader in this area of autonomous navigation. Dr Ekta Kapoor, Dr JBV Reddy, Dr Chandra Shekhar Sharma, and Dr B M Baveja also interacted during the visit.

TiHAN R&D Activities

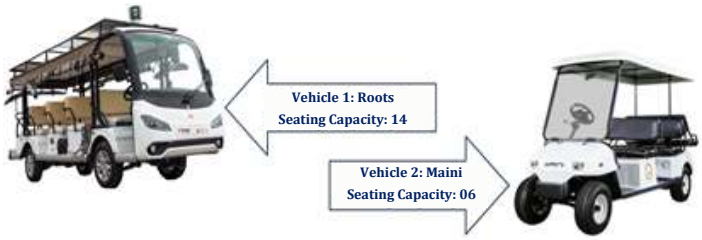
TiAND - Multimodal Sensor Data – Indian Traffic Dataset

The Autonomous Navigation stack, a key development, integrates Perception, Planning, and Navigation to enhance the performance and reliability of our systems. The process begins with Perception, utilizing a suite of advanced sensors, including cameras, radars, LiDAR, and GNSS, to achieve a level of perception that meets or exceeds human capabilities.

By leveraging the complementary strengths of these sensors - cameras for object identification, radars for detecting object attributes in low visibility, LiDAR for depth estimation, and GNSS for vehicle dynamics—we ensure higher levels of safety and reliability across all weather conditions. The data from these sensors are synchronized using RT-MAPS (dSpace), providing a robust foundation for the development and validation of Deep Learning (DL) algorithms. These DL-based algorithms are continuously deployed in real-time for planning and navigation, significantly advancing the autonomous system's capabilities.

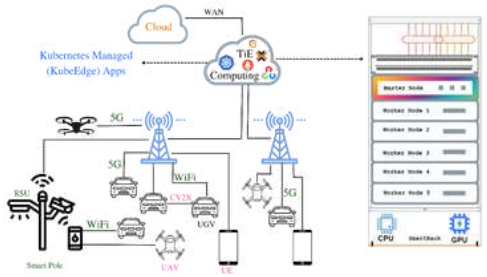
Autonomous Campus for Shuttle Development

The autonomous campus shuttle deployed on campus is equipped with advanced technologies, including GNSS, cameras, LiDAR, and a steering angle sensor, along with automatic parking capabilities. The shuttle is integrated with 5G/WiFi connectivity and Multi-access Edge Computing (MEC) connectivity. As part of its development, various parking scenarios were simulated, and the connectivity between the shuttle's in-vehicle processor and the network was tested using ROS middleware. The project also involved developing an end-to-end network architecture framework, creating a parking algorithm, and conducting field tests to assess signal reception.



Additionally, protocols for MEC connectivity with the in-vehicle processor/controller were identified, and a proof of concept (PoC) was conducted to validate shuttle vehicle connectivity with WiFi and 5G. A mobile app was also developed, integrated with the vehicle, and subjected to rigorous validation of test cases to ensure reliable operation.

Edge Cloud and 5G Setup at TiHAN Testbed



Two industrial-grade Teltonika 5G routers have been deployed to establish 5G connectivity for Edge-Based Autonomous Navigation.

As part of our ongoing efforts, we are planning to implement zero-tier communication using Point-to-Point Virtual Private Network Tunneling Protocol (P2PVPN) for efficient data offloading between the edge server and the vehicle. Currently, feature enhancements, including infotainment updates, are being implemented through the edge.

The latest version of our web application now includes an internet speed test feature, enhancing its functionality and the updated web application is displayed on the vehicle interface. Meanwhile, the team is actively working on improving the In-Vehicle Infotainment (IVI) system and developing an app-based interface from the existing web application.

Two industrial-grade Teltonika 5G routers have been deployed to establish 5G connectivity for Edge-Based Autonomous Navigation. As part of our ongoing efforts, we are planning to implement zero-tier communication using Point-to-Point Virtual Private Network Tunneling Protocol (P2PVPN) for efficient data offloading between the edge server and the vehicle. Currently, feature enhancements, including infotainment updates, are being implemented through the edge. The latest version of our web application now includes an internet speed test feature, enhancing its functionality and the updated web application is displayed on the vehicle interface. Meanwhile, the team is actively working on improving the In-Vehicle Infotainment (IVI) system and developing an app-based interface from the existing web application.

Our current research activities focus on Drive-By-Wire (DBW) and Autonomous Navigation, and where enhancements are being carried out in DBW capabilities with a human-friendly GUI and voice commands, increasing safety features in the vehicle, and the use of low-cost sensors to create an affordable solution without compromising safety for autonomous vehicles is explored.

Autonomous Navigation of UAVs in GPS-denied Environments

The new Micro UAV is engineered specifically for indoor navigation, offering high-speed performance and advanced camera-based obstacle avoidance. Guiding and controlling these autonomous UAVs through indoor environments involves overcoming significant challenges, including collision avoidance, accurate localization, mapping, and path planning. These challenges are critical barriers to achieving reliable and autonomous indoor navigation.

The system's enhanced capabilities address these issues, focusing on improving accuracy and reliability. In GPS-denied environments, where traditional navigation systems are ineffective, this Micro UAV excels by utilizing advanced sensors and algorithms to navigate complex indoor spaces

Research and Development, Human Resource & Skill Development

TiHAN has launched the TiHAN-IITH Autonomous Navigation Dataset (TIAND) Dataset for Download. (https://tihan.iith.ac.in/tiand-datasets/)

- Data Collection Vehicles: Aerial, Terrestrial and Underwater.
- Datasets offered: Agriculture, Indian roads, Underwater.

The dataset from Hyderabad, India, integrates structured and unstructured traffic data from four cameras, six radars, a Lidar, and GPS/IMU technologies, providing a comprehensive multimodal perspective for enhancing object detection algorithms. The following summarizes the human resources supported by TiHAN for the autonomous navigation technology ecosystem in India.

- Graduate Fellowships (Interns) – 126
- Post Graduate Fellowships (MTech) - 33
- Doctoral Fellowships (Ph.D.) – 15
- Faculty Fellowships – 09
- Chair Professors – 1
- Post Doc- 21 (7 - Collaborators)
- Workshops, Trainings, Symposiums: 29 Workshops on UGVs and UAVs (2187 Participants)

TiHAN has established Memorandums of Understanding (MoUs) with the Incubator for Social Enterprises and Entrepreneurs for Development (ISEED) at IRMA, signed on 1st September 2023, and with AIC STPINEXT Initiatives, signed on 7th November 2023. These MoUs are aimed at fostering startup initiatives and accelerating product development programs.

TiHAN Spokes: Upto FY 2023-2024, our research and development footprint has been at 275 locations within India.

Startups: TiHAN is funding 35 startups under different schemes such as EiR, Prayas, and Incubation Programs.

TiHAN Achievements

- TiHAN is recognized as a Scientific and Industrial Research Organization (SIRO) by the Department of Scientific and Industrial Research.
- TiHAN has successfully trained 2187 participants through 29 seminars and workshops.
- Successfully completed the Advanced Drone Innovation (ADI) Certification Course.
- Successfully completed 5,000 kilometres of driverless autonomous shuttle operations at the IIT Hyderabad campus.
- Autonomous campus shuttle (ACS) was featured in the Japanese TV program Asa-Ichi of NHK, which examined the various aspects of autonomous driving technology.
- Filed 15 patents in FY 2023-2024.
- TiHAN takes a flight into the world of governance with an exclusive demonstration of Drone Technology at Lal Bahadur Shastri National Academy of Administration, Mussoorie.

Testbed for Autonomous Navigation (Aerial/Terrestrial)

A first-of-its-kind state-of-the-art Testbed for Autonomous Navigation (Aerial/Terrestrial) is being developed at TiHAN IIT Hyderabad. The Facilities include Proving Grounds, Test tracks, Mechanical integration facilities like Hangers, Ground control stations, Anti-drone detection systems, State of the art Simulation tools (SIL, MIL, HIL, VIL), Test tracks/circuits, Road Infra – Smart Poles, Intersections, Environment Emulators like Rainfall Simulators, V2X Communications, Drone Runways & Landing area, Control Test centers.

Centres/Centres of Excellence

DIA-CoE

The journey of DRDO collaboration with IITH started in 2020 with a DRDO Research cell which has been transformed into a DRDO Industry Academia Centre of Excellence (DIA-CoE). It became operational on 01-04-2023 at the 3rd Floor, TRP building, IITH. In addition to 11 legacy projects, new projects were identified for various verticals in 2023-2024.

One legacy project Large Area Additive Manufacturing (LAAM) for realizing large-sized engines under AMP vertical was inaugurated on 16th April 2023. Sanction of Six New Projects to the tune of 45 Crores under Additive Manufacturing vertical is obtained.

LAAM Machine

Further new projects were identified under UHTM, Nano-Ornithopter and Seeker & Homing technologies vertical. TEC & RAB were conducted for 5 UHTM, 4 Nano-Ornithopter, and 3 Seeker & Homing Technologies proposals. Regular interactions and technology review meetings were held to identify new research areas under AI, Adaptive imaging and Image processing. Space systems for DRDO Labs.

Among legacy projects, 1 project is successful & closed, 3 projects have shown progressive results and are near closure, and 7 projects are under progress. 20 Papers were published, and 2 patents were filed.

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 Gopinath	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 Panigrahi	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.	Prof Amirtham Rajagopal	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 pal	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	Dr 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
3D Printing of Copper Conical Shape Charge Liners and lattice structures: Feasibility, Consistency and Production Scaling	Dr Syed Nizamuddin Khaderi		TBRL
Simulation Capabilities for Additive Manufacturing Processes	Dr Muvvala Gopinath		DRDL
Optimization of Electron Beam AM process of Ti-6Al-4V to minimize the anisotropy in, high temperature mechanical properties, creep, fatigue and fatigue crack growth and demonstrate printing of real-time component with optimized process parameters	Dr Rajesh Korla		DMRL
Electron beam powder-bed fusion of nickel-base superalloys CM247LC and BZL12Y	Prof G D Janaki Ram		GTRE

ICMR-DHR-CoE

The Indian Institute of Technology Hyderabad (IIT Hyderabad) has partnered with the ICMR-DHR Centre of Excellence (CoE) to foster MedTech innovations. This CoE is a collaborative initiative between the Indian Council of Medical Research (ICMR) and the Department of Health Research (DHR). The primary objective of these centres is to develop products and technologies aligned with the needs of the National Health Mission, Ayushman Bharat, and various public health programs run by the government, with the aim of their potential implementation, as reported by IANS.

Ongoing Projects:

- Compact and portable low-cost microscope for digital Cytology applications
- Image-guided Boiling Histotripsy Device for Treating Neuroblastoma
- Customized 3D-printed PCL-silk scaffolds for implants

Companies Supported:

- M/s Heamac Health Pvt Ltd -nLite360 Intelligent Phototherapy device that provides customized treatment to Dynamic Jaundice conditions
- M/s Beable Health Pvt Ltd-Game based Upper Limb Rehabilitation Device for Neuroplasticity
- M/s Kvayat Medical Pvt Ltd-DiaPatch with ActiFlush Technology: The world's first smart flushable Diaper
- 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)

TRIHUB - Transportation Research and Innovation Hub

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

A nation's socio-economic development heavily relies on the strength and efficiency of its transportation network. Highways, in particular, serve as a crucial backbone for growth and unity, especially in developing countries like India.

To address the pressing issues of highway infrastructure in India, the National Highways Authority of India (NHAI) has teamed up with the Indian Institute of Technology Hyderabad to launch the 'Transportation Research and Innovation Hub (TRIHUB)'. This initiative is at the forefront of pioneering research aimed at creating innovative, cost-effective solutions for highway construction. Among the cutting-edge technologies being explored are geosynthetics, recycled materials, and fiber-reinforced concrete, all designed to improve structural integrity, longevity, and promote sustainable practices within a circular economy.

NHAI is actively encouraging the practical application of these advancements to evaluate their performance in real- world traffic conditions. Remarkably, some innovations—like the use of geosynthetics in highways—have already received approval from the Indian Roads Congress (IRC) for immediate field application. The research team at IIT Hyderabad is working hand in hand with IRC committees and NHAI to develop comprehensive guidelines and standards for these forward-thinking technologies.

One of the standout projects focuses on mitigating reflection cracking in the asphalt layers of flexible pavements. By incorporating a polyester or glass fiber grid as an interlayer, the potential for reflection cracking can be significantly reduced. Illustrations demonstrate how this method helps redirect cracks laterally rather than vertically under stress, enhancing the durability of the pavement.

The IIT Hyderabad research team has also prepared a detailed State-of-the-Art Report on 'Bituminous Interlayer Grids and Composites,' outlining the effectiveness of these interlayer grids, their properties, and the recommended construction and design standards. This report, which has been endorsed by the Council of Indian Roads Congress (IRC), will soon be made available to transportation agencies, paving the way for the adoption of these advanced technologies in Indian highways.

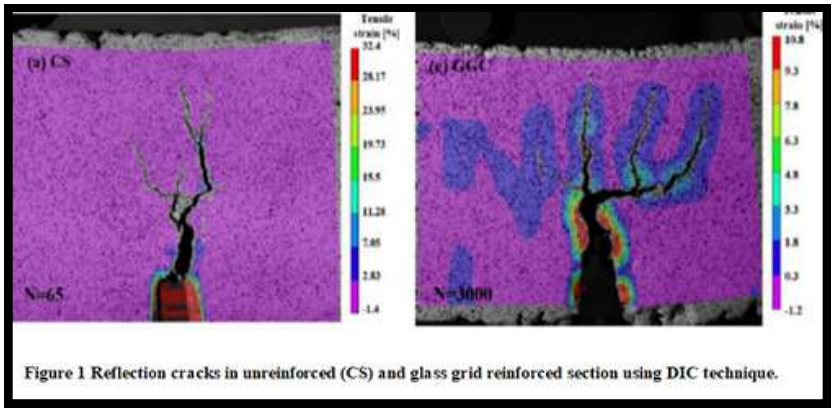


Figure 1 Reflection cracks in unreinforced (CS) and glass grid reinforced section using DIC technique.

Medical Device Innovations

IIT Hyderabad, along with the Center for Healthcare Entrepreneurship (CfHE) and Asian Institute of Gastroenterology (AIG) Hyderabad, is introducing a course specifically considering the need for innovative medical devices for patients and the need for Indian industry orientation to medical devices. The Program, MTech in Medical Device Innovation (MDI), is intended for candidates, who passionately feel for finding innovative solutions for the problems faced by the current health industry. The enrolled students will be trained to find problem statements in the health industry; discuss the solutions among engineers, doctors and designers, and come up with a solution to fulfill the degree requirements.

The Program: This is a multifaceted experience that ranges from grassroots innovation to product development, business planning, and entrepreneurship. The program will be instructed in a structured and design-oriented manner with the help of experienced faculty, staff, industry experts, serial entrepreneurs, and the academic community.

Duration: 2 years with 50 credits

As part of their project credits, the teams made from the students would undergo a complete design life cycle comprising of:

- Clinical immersions to identify problems,
- Validate the needs,
- Brainstorm on ways to address the needs
- Build technology prototypes
- Build business and IP management
- Deliver working proof of concept prototypes of their ideas

Project Titles:

- Automatic segmentation and 3D Printing of Patient Specific Craniomaxillofacial Bio-degradable Implants using deep learning techniques
- Therapeutic Compression Device for Lymphatic Filariasis(Elephantiasis).
- Intraoral imaging with advanced image processing for accurate and early detection of dental caries
- Development of a Cold Plasma-Based Device for Effective Disinfection of Dentinal Tubules in Endodontic Treatment
- Early osteoporosis detection in pre-menopausal females

DIC- Design Innovation Centre

Webpage: https://dic.iith.ac.in/
HUB: DIC IIT Hyderabad - Nodal of all DICs
Principal Investigator: Prof Deepak John Mathew
Spokes: IIIT Sri City, IIIT Hyderabad, IIITDM Kancheepuram

Overview: The Design Innovation Centre (DIC) at IIT Hyderabad is actively engaged in driving innovation through a unique blend of design and technology. By partnering with various institutions, DIC promotes mutually beneficial innovation activities, focusing on creating an ecosystem that transitions projects seamlessly from research to development. It emphasizes a holistic, interdisciplinary approach to design that spans diverse domains like cultural heritage, architecture, digital humanities, design education pedagogies etc.

As one of the 20 established Design Innovation Centres (HUB), DIC at IIT Hyderabad is committed to building a dynamic ecosystem that fosters collaboration between designers and engineers within academia to address real-world challenges. This collaborative environment allows for the integration of creative, entrepreneurial approaches and innovative solutions. DIC IIT Hyderabad also emphasizes quality design education, prioritizing sustainability and hands-on learning.

The Design Innovation Centre (DIC) at IIT Hyderabad has officially moved to its permanent location, inaugurated by Shri K. Sanjay Murthy, Secretary of Higher Education in the Ministry of Education, Government of India, as the Chief Guest. The ceremony also featured the esteemed presence of Smt. Neeta Prasad, Joint Secretary of P & ICC, Ministry of Education, along with Prof. B.S. Murty, Director of IIT Hyderabad, and Shri B.V.R. Mohan Reddy, Chairman of the Board of Governors at IIT Hyderabad.

The Centre's mission extends to several emerging areas such as Digital Preservation and Conservation of National Heritage, AVCG-XR sector and Mixed Reality interventions, Participatory and Collaborative Design, Professional Ethics and Sustainability, Product Systems and Services, Design and Education, Wellness, and Crowd-Sourced Design. It aims to impart valuable insights by focusing on practical experience in the field, encouraging learners to engage beyond theoretical knowledge and apply their skills in real-world contexts.

Key Events and Milestones:

Fourth All India DIC Meet 2024:This year's most notable event was the Fourth All India DIC Meet 2024, organized at IIT Hyderabad on 2nd May to 3rd May 2024. The event was inaugurated by Shri K. Sanjay Murthy, Secretary, Higher Education, Ministry of Education, Government of India, and witnessed the esteemed presence of esteemed guests including Smt. Neeta Prasad, Joint Secretary, P & ICC, Ministry of Education, Government of India, Shri B.V.R. Mohan Reddy, Chairman, Board of

Governor IIT Hyderabad, Prof B S Murty, Director, IIT Hyderabad, along with other ministry delegates. As the largest DIC meet ever held, the event brought together over 70+ CFTIs, CFIs and other prestigious institutes who showcased their innovations and design ideas. With a footfall of around 1000+ people over two days, the event provided a platform for the exchange of knowledge, collaboration, and showcasing the impactful work being done at DICs nationwide.

Recognition as the Nodal Higher Education Institution (HEI):

On May 10, 2024, DIC IIT Hyderabad was recognized as the Nodal DIC, HEI to ensure program synergy and facilitate the concerted growth of all DICs. This recognition and crown was given by the Ministry of Education, Government of India. In this Nodal capacity, DIC IIT Hyderabad formulated a comprehensive action plan focusing on strategic initiatives, collaborative efforts, and growth across all DICs. The plan includes the formation of an Advisory Committee for Industry and Academia to ensure alignment between academic research and industry needs. This committee will facilitate partnerships, foster innovation, and serve as a critical link between academic pursuits and practical, real-world applications.

Strategic Initiatives

1. **Internal Cross-Disciplinary Collaborations:** The action plan promotes cross-disciplinary collaborations among DICs to leverage unique areas of expertise. This approach encourages shared learning and resource exchange, allowing DICs to synergize and work on complex projects that require multidisciplinary efforts. Shared resources such as technology, knowledge, and expertise are vital to fostering comprehensive and innovative solutions.
2. **Biannual Visits for Monitoring and Evaluation:**
   To ensure accountability and success in ongoing projects, biannual visits by a Nodal Committee, supported by the Ministry of Education, have been instituted. These visits aim to monitor the progress of various DICs and offer guidance on improvements, ensuring alignment with long-term goals.
3. **Annual DIC Meetings and Global Exhibitions:** An Annual Meeting of all DICs is being organized to bring together stakeholders, students, and industry professionals. These meetings facilitate the exchange of ideas and showcase innovations within the DIC ecosystem. Furthermore, global exhibitions alongside the meetings are planned to display breakthrough innovations and attract international collaboration and partnerships, positioning DICs as leaders in design and technology.

Ongoing Projects and Innovations

1. **Virtual Recreation and Digital Preservation of India's Cultural Heritage:**
   DIC IIT Hyderabad has made significant progress in digitally preserving India's tangible and intangible cultural heritage. This includes ongoing projects at the Ramappa Temple and Warangal Fort.
2. **Future Inventors Fair 2024:**To foster the spirit of creativity and innovation among younger generations, the Future Inventors Fair 2024 was organized at IIT Hyderabad. This initiative targeted students from classes 8 and 9 across Telangana, providing them with a platform to showcase their design creativity, technical skills, and innovative solutions. The fair witnessed a large turnout, emphasizing the role of design thinking in early education.
3. **Design and Implementation of a Solar Vegetable Dryer for Local Market:** The development of a solar vegetable dryer aims to improve food preservation by efficiently removing moisture from fruits and vegetables. The project focuses on enhancing the efficiency of the dryer using renewable energy, reducing carbon footprints, and providing a low-maintenance solution for small-scale farmers.
4. **Affordable Solar Cooker Development for Daily Laborers:** In a bid to address the needs of Indian workers and laborers, DIC IIT Hyderabad is designing and developing a cost-effective solar cooker. The project aims to provide a user-friendly and environmentally sustainable cooking solution, enabling laborers to prepare fresh and hot meals at their workplace.
5. The Design Innovation Centre (DIC) at IIT Hyderabad has recently published two comprehensive books **"Inventive Oasis"** documenting all projects undertaken by various DICs. These publications aim to serve as a valuable resource showcasing the innovation, creativity, and collaborative efforts of all DICs. Additionally, DIC will be applying for ISBNs to officially catalog these books, ensuring their wide dissemination and recognition.
6. DIC IIT Hyderabad has taken the lead in designing and curating a quarterly newsletter that highlights the best projects from all DICs. This initiative aims to foster collaboration by showcasing the diverse expertise and innovative solutions developed at different DICs. DIC will be applying for RNI Number to officially catalog these newsletter, ensuring their wide dissemination and recognition.

Collaborations and Strategic Growth

1. Collaborations with NDIN and MMTTP: In collaboration with the National Digital Innovation Network (NDIN) at IISc, DIC IIT Hyderabad is actively developing a structured action plan for design learning sessions and DIC data development using NDIN dashboards. Furthermore, the ongoing partnership with the MMTTP Program has led to the development of OAT Classrooms, which serve as platforms for hybrid learning experiences combining both in-person and online education.
2. Expansion of Design Education: As part of the expansion strategy, DIC IIT Hyderabad is collecting and refining design courses introduced by various DICs. This data is being uploaded to platforms like NDIN and SWAYAM to make high-quality design education widely accessible. Additionally, trained faculty members from DICs are acting as mentors and collaborators for other institutions, promoting design education across India.
3. Democratizing Design Innovation: The expansion strategy involves extending design education beyond Central Funded Technical Institutes (CFTIs) to other engineering and technical institutes. The aim is to democratize access to design thinking and innovation through platforms like MMTTP, Ekalpa, ODS, and the IKS. This initiative is being implemented through a structured roadmap divided into phases focusing on outreach, curriculum enhancement, scaling, integration, research, and policy advocacy.

Achievements:
This year, DIC IIT Hyderabad successfully achieved the following milestones this year:

- Patents Filed: 3
- Design Courses Introduced: 8
- Publication, Papers, Journals: 17
- Students Benefited: Over 895 students through online and offline modes
- Collaborations Established: 5 partnerships with government and private entities

Future Directions:
DIC IIT Hyderabad continues to work towards creating a standardized format for data collection on all notable projects from DICs nationwide. These projects are being evaluated by experts and showcased at national events such as iinventiv, promoting innovation and excellence in design. Furthermore, starting in June 2024, a system for monthly progress reporting has been implemented across all DICs to maintain accountability and track development.

In Summary: The Design Innovation Centre at IIT Hyderabad has had a year of impactful achievements and strategic growth. With the successful organization of the All India DIC Meet 2024, recognition as a Nodal HEI, ongoing innovative projects, strategic collaborations, and new program launches, DIC IIT Hyderabad has cemented its position as a leading hub for design innovation and education. The Centre remains committed to expanding its outreach, refining its initiatives, and driving innovation across India's design ecosystem.

Centre for Research and Innovation in AI (क्रिया)

Webpage: https://ai.iith.ac.in/research/ai-research-centre.html

The Department of Artificial Intelligence (AI) at IIT Hyderabad, established in 2019, was India's first initiative of its kind (at least among the IITs) and likely the third globally, following the Massachusetts Institute of Technology and Carnegie Mellon University. Historically, AI has been studied within departments such as computer science or electrical engineering. However, the creation of a dedicated AI department at IIT Hyderabad allows for the integration of knowledge from multiple disciplines.

By drawing on these diverse perspectives, the department offers a unified academic program. IIT Hyderabad's Bachelor of Technology in Artificial Intelligence has influenced the development of similar programs nationwide, and the department has provided guidance to other institutions in designing their AI curricula.

According to Professor Vineeth N. Balasubramanian, from the Department of Computer Science and Engineering and affiliated with the AI Department, the presence of the AI Department enables students from other disciplines to pursue a minor in AI alongside their major. This is crucial, as AI's relevance spans a broad range of domains—from structural engineering to drug discovery.

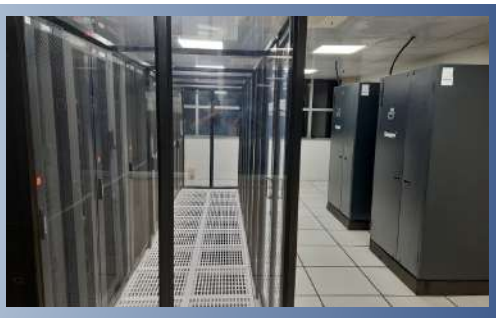
The department currently enrols over 250 students, with an almost equal distribution between undergraduate and postgraduate programs. It boasts a faculty of 30 members, including five core faculty members and affiliated faculty from computer science, electrical engineering, mathematics, and mechanical engineering. Additionally, the department offers a PhD program, enabling candidates with foundational knowledge in various fields and strong mathematical backgrounds to engage in advanced AI research.

The department's research covers a wide array of fields, including foundational AI algorithms, computer vision, natural language processing (NLP), speech understanding, social media analysis, robotics, signal processing, high-dimensional data analysis, distributed AI, AI compilers, and embedded AI. Research also explores interdisciplinary applications, such as AI and the Internet of Things (IoT), AI and blockchains, AI and wireless networks, and AI in design. The department runs projects funded by prominent government agencies (DST, SERB, MEITY, DRDO) and industry leaders (Google, Microsoft, Adobe, Honeywell, Sony, Qualcomm, Accenture). Faculty members have worked on AI-driven solutions in areas like sustainable development, healthcare, smart transport, security, agriculture, disaster management, fraud analytics, e-commerce, astronomy, and aerospace.

Supported by Honeywell and the Japan International Cooperation Agency (JICA), the department hosts a state-of-the-art Centre for Research and Innovation in AI (क्रिया). The computing capability of the department consists of 25+ high end GPU servers, including NVIDIA DGX-1 and DGX-2 servers. These resources support a wide range of AI research projects. Also in partnership with NVIDIA, it established India's first NVIDIA AI Technology Centre (NVAITC) in July 2020, significantly enhancing AI research with high-performance computing resources.

Recently, in collaboration with Intel, the department launched the Intel AI PC Experience Center, one of only two such centers in India (the other is at IISc Bangalore), allowing students to experiment with AI without requiring high-end GPU servers, thus making AI accessible to a broader group of learners.

The department encourages interdisciplinary collaboration on large-scale projects. A notable example is the AISWARYAM initiative for sustainable city management, led by Professor Vineeth N. Balasubramanian, which involved contributions from more than 20 faculty members across the institute. The faculty members and students of the AI department contribute and collaborate very closely with the Technology Innovation Hub in Autonomous Navigation (TiHAN), another large scale project led by Prof. Rajalakshmi from the Electrical Engineering department and also affiliated with the AI department. Additionally, faculty members such as Professors Maunendra and Mohan Raghavan are involved in the BharatGen project, which leverages generative AI technology to enhance public service delivery and citizen engagement on a national level. The other notable collaborative projects include SANKALP (healthcare) and M2SMART (air pollution). The department remains focused on impactful research, with students and faculty regularly publishing in leading AI and machine learning conferences and journals such as ICML, ACL, CVPR, AIJ, JMLR, WACV, NeurIPS, AAAI, IJCAI, AAMAS, ECAI, ICLR, and various IEEE Transactions.



RDC - Rural Development Centre

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

During the academic year 2023-24, the Rural Development Center (RDC) at IIT Hyderabad undertook significant efforts to bring impactful changes within nearby villages. The RDC engaged directly in addressing various challenges and opportunities on the ground, spearheaded by Prof Ramesh, RDC Chair, and Dr Prasad S Onkar, Dept of Design. In collaboration with the Department of Design, the Suzuki Innovation Center and Prayas, a student club at the IITH, the RDC is involved in education, skill development and empowerment themes. The activities consist of educational relevant activities conducted in Zilla Parishad High Schools (ZPHS) and in an orphanage in Sangareddy (the district where the IIT Hyderabad is in), the enhancement of rural supply chains, and skill development programs that are tailored to the needs of rural youth across multiple disciplines.

Active participation in the villages with the core strength of the IITH, education, is the basisfor the idea of teaching in the government schools by the IITH community. Inspired by the proposal of Professor B S Murty, director of the IITH, for the

first time, IITH faculty members, staff, and students, including BTech, Masters and Phd, conducted in-person classes on a weekly basis at five ZPHS schools: Mamidipally, Kandi, Cheryal, Rudraram, and Yeddumailaram. These teaching activities continued until January, focusing on core subjects such as Mathematics, Physics, Chemistry, and Biology. Additionally, short-term classes for the National Merit Scholarship (NMS) were held on the IITH campus.

Unlike previous years, when classes were conducted online, this year saw a shift to daily in-person sessions at the schools, each lasting an hour. This approach led to improved results in the final board examinations. Further, the headmasters of thschools also provided positive feedback. Additionally, a student club, Prayas, conducted education-relevant programs in an orphanage every Sunday. The activities include drawing, games, and simple teaching activities with a goal to inculcate the interest and curiosity nature in the students.

The Rural Supply Chain project, in collaboration with the Suzuki Innovation Center, was initiated across several villages with the installation of vending machines. This project aims to reduce the travel time that villagers spend to purchase essential daily consumables providing these goods at a more competitive price.

A key objective of the initiative is to empower women, helping to reduce social stigmas and create more inclusive opportunities. Women were given the responsibility of maintaining the machines including machine operation and invoice generation.

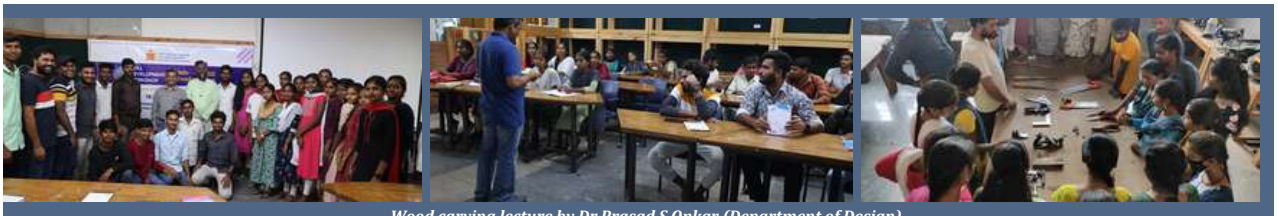
The project has been particularly insightful with the successful installation of vending machines in villages, Kandi Thanda, Tunikila Thanda, Gollagudem Thanda, Dasugadda Thanda, Antharam, Bhujirampet and Mohammednagar. Installation of the vending machines in each place offered valuable lessons in understanding the specific needs and challenges of rural supply chains. The project involved extensive fieldwork to ensure the vending machines were strategically placed and effectively met the needs of the local populations.

Additionally, in collaboration with the Department of Design, a kiosk was developed to enhance the user experience and make the vending process more accessible to the villagers. This holistic approach not only aims to improve access to essential goods but also strives to empower women and foster positive social change within these communities.

The skill development program, led by Dr Prasad S Onkar, Head of the Department of Design, was a pioneering initiative launched by the RDC. The program was officially inaugurated by the Director of IITH, Prof B S Murthy. This unique initiative marked the first time that RDC hosted an on-campus, fully-equipped, and fully residential skill development program. The training covered various domains, including wood carving, photography, graphic design, and bookbinding.

This certified program offered participants hands-on experience and ensured that each participant received a certificate upon completion. The wood carving session, held over two weeks, saw the participation of 23 individuals, including intermediate and degree students. Similarly, the photography and graphic design session, also conducted over two weeks, involved 22 participants of both genders.

At the conclusion of each session, participants showcased their creativity by producing innovative products, which were displayed during a special event held on the final day. This program not only provided valuable skills but also offered participants the opportunity to develop and present their unique creations, fostering both creativity and confidence.



Wood carving lecture by Dr Prasad S Onkar (Department of Design).

Book binding session by Dr Prasad Onkar

Vending Machine installed at Kandi Thanda with the consumable goods.

Kiosk interaction at Thuniki thanda village

Prayas team conducting classes at the JNV school Rangareddy

Prayas team interacting with the orphanage children at Sangareddy

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 to 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.
- To organize faculty development programs for faculty of various technical institutes in the country.
- To conduct certificate courses in collaboration with industry and academia to provide specialized expertise/skill development in diverse fields.

Programs and Facilities:

- Open To all Teaching (OAT)
- NPTEL
- International/ National Conferences
- Workshops, Symposiums, Training Programs
- Certificate Programs

Convention Centre Facilities:

- Auditoriums
- Seminar Rooms
- Conference Rooms
- VIP Lounges

Comprehensive Support Services:

- Technical Expertise
- Event Coordination

Programs List: 2023-2024

Open To all Teaching (OAT):

- Animal Models in Medical Research
- Stem Cell Biology and Regenerative Medicine
- Clean Steel Making: Theory, Practice and Modeling
- Computational Thermodynamics and Kinetics of Materials
- Fundamentals of GIS and Remote Sensing
- High Entropy Materials
- Psychopathology and mental health
- Thin film Technology
- Micro- and Nano-fabrication
- Distributed Computing

Certificate Programs:

- Certificate course on Advanced DNN innovation (ADI) Beginning Astronomy v3: Start a data-driven
- Artificial Intelligence and Emerging Technologies
- Masters Programme in Visual Design
- Hands-on lab training (HLT) in Biotechnology /Bioinformatics

NPTEL Courses:

- Thermodynamics and Kinetics of Materials
- Advanced Reinforced Concrete Design
- Sustainable Energy Technology
- Introduction to Quantum Field Theory
- Advanced Particle Physics
- Introduction to Statistics
- IC Design for Wireless Systems

- **Workshops/Symposiums/Conferences:**
- Hyderabad Soft Matter Day 2023
- Yoga Tech Conclave 2023
- Complexity and Nonlinear Dynamics in STEM
- HOWTOCFD (Hands-on Training on Computational Fluid Dynamics) Fundamental And Applied Skills for Futuristics Vehicles
- CIMPA School on Finite Geometry and Coding Theory
- Fifth Indian National Ground Water Conference (INGWC-2023)
- International Bioprocessing India Conference 2023
- ACM Summer School on Algorithmic Techniques in Computational Biology

- Mind-Body-Space: Tangible Computing in Extended Reality
- Hands-on Workshop on Statistical Tools and Modeling In Biophysics Main-group Molecules to Materials- III
- Quantum Matter Heterostructures-2023
- Embracing ESG through Responsible Leadership workshop
- Critical interrogations of the digital urban in India A pedagogic approach
- Condition assessment, rehabilitation, and retrofitting of structures (CARRS)
- AI &ECONOMICS
- Workshopon Semiconductor Materials and Devices
- International Conference of Algebraic Geometry, Cladding
- MAE Department Day
- HYSCI 2024
- Seminar on Tall Buildings
- Workshop on Artificial Intelligence & Information Security in IoT and Smart Vehicles
- Climate Change Department Day

A few snaps from the Events

CIP - Center for Interdisciplinary Program

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

Center for Interdisciplinary Programs (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 Centers 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 & Joint PhD programs.

Details of ID MTech programs started in the Academic Year 2023-2024

Lightweighting Engineering

Objectives of the program

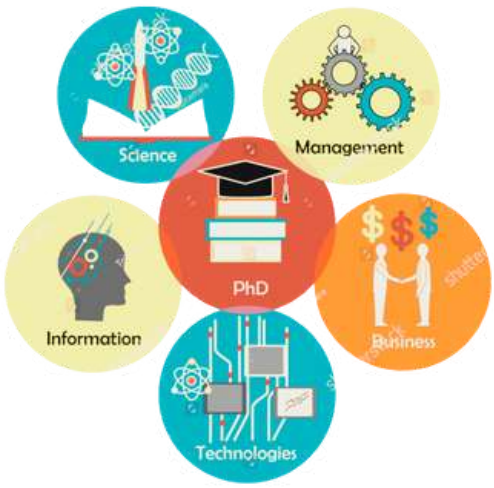
- The primary objective of this interdisciplinary MTech program is to develop a new generation of engineers and scientists with knowledge and skills in advanced technologies and trained in lightweighting engineering from the conceptualization stage to component realization.
- The program focuses on the design, analysis, and development of lightweighting structures and materials while maintaining or improving mechanical performance, durability, and safety.
- Develop proficiency in modern design and simulation tools used in the analysis and optimization of lightweighting structures.
- Integrate knowledge from different engineering disciplines to solve complex problems related to lightweight design and manufacturing.
- Explore advanced manufacturing processes, including additive manufacturing, precision machining, and material processing techniques specific to lightweight engineering.
- Provide insights into the practical applications of lightweighting engineering in various industries, including automotive, aerospace, civil infrastructure, and renewable energy

Highlights:

Mr Sandal Kotawala, who recently graduated from Ophthalmic Engineering, is leading a potential start-up. They operate in the realm of medical technology and have developed various innovative and low-cost solutions to aid in the early detection of diseases such as glaucoma.

Interdisciplinary & Joint PhD Program:

The Center 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 & will be guided by one supervisor from each Institute.



Indian Knowledge Systems

The Indian Knowledge Systems (IKS) Cell of IITH has been established to nurture an awareness of the traditional Indian Knowledge Systems (shaastras) in the IITH community. The prime focus of IKS@IITH is in discovering the knowledge in the traditional Indian Systems and disseminating them. The IKS@IITH operates within the purview of the Heritage Science and Technology (HST) Department of IITH.

During the academic year 2023-2024, the following activities/disseminations were undertaken.

Activities:

- Samskrita Dinotsava - Shravana Poornima 2023 31st-Aug-2023
- Quizzes: विवक्षा 1.0, Parampara Quiz, Rishi Quiz, etc.
- Prof. Dr. Debi Prasad Mishra (IITK) on "Ancient Indian Technology", 29th-Feb-2024
- Talk by Prof. Gérard Huet (INRIA, Paris) on “Functional programming for Sanskrit processing”, 1st-Mar-2024

Non-Formal Sanskrit Education (NFSE) Sanskrit Courses:

In collaboration with Central Sanskrit University, IITH offers Certificate and Diploma Courses in Sanskrit Language. These courses are offered in offline mode with the CSU instructors stationed at IITH. The CSU instructor for these courses is Shri Dr. Avijit Ghosh.

The CSU courses are run together by the Dept. of Heritage Science and Technology (HST) and the IKS Cell. The Certificate course started in October 2022 and has completed its first batch. The second batch is running now. Till date, around 160+ students benefited from taking the NFSE courses from IITH. Of which 40 were from IITH fraternity. (This includes students/faculty/staff/families of IITH.)

In the academic year 2023-2024, the Certificate course was taken by 56 students and the Diploma course was taken by 28 students.



Samskrita Bharati (SB) Sanskrit Courses:

In collaboration with Samskrita Bharati, IITH offers five 1-credit senate approved Sanskrit courses to students of IITH. These courses are designed so that the basic student becomes an expert reader of texts in Sanskrit. Undergraduate and Graduate students take these courses to satisfy their LA/CA credit requirements. Until date around 400+ IITH students have benefited from these courses.

The SB courses are run together by the Dept. of Heritage Science and Technology (HST) and the IKS Cell. These courses are offered in online mode by instructors delegated by Samskrita Bharati, Telangana. The instructors for these courses are Acharya Shri Turlapati Sivaramakrishna, Shri Acharya Paka Gopalakrishna and Acharya Dr. Sarita Ancha.

Courses offered : CA1048, CA1070, CA1080, CA1090, CA1100

The courses offered in the academic year 2023-2024 by Samskrita : CA1048 (2 times), CA1070, CA1080, CA1090

https://iks.iith.ac.in/courses-offered-by-samskrit-bharati

TRP - Technology Research Park

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

Technology Research Park (TRP), aims to provide infrastructure and facilities for industry partners to co-locate Research and Development (R&D) centers at the IITH campus. Funded by the Ministry of Education, Govt. of India (erstwhile Ministry of Human Resource Development) to tune of Rs. 75 Crores towards capital expenses, this 1.5 Lakhs square feet building features state-of the-art facilities on par with global standards.

The total space available in TRP is 58,020 Sq ft. A total of 26 Companies and Corporates are located occupying 37,935 Sq ft, which is 65% of the total available space.

TRP Outside

TRP Inside

TRP Office

During the Financial Year 2023 – 24, IITH Technology Research Park has provided space to 6 different private companies that are engaged in different verticals namely,

- Drone Technology
- Artificial Intelligence
- Critical Minerals

In total, as of 31st March 2024 TRP hosts 18 entities. Among them are companies that have set up their R&D labs and are working in areas ranging from

- Software
- Drone Technology
- Biomed / Biotech
- Artificial Intelligence
- Satellite Related Technologies
- Fabless Chip Designing
- RF
- VLSI
- Critical Minerals
- Pharmaceutical-related research activities.

Out of these 18, 13 are private companies and TRP is host to the Indian Navy's R&D arm (WESEE), DRDO's DIA CoE, CoEs of IIT Hyderabad working in Financial Technologies, and 6G domains. TRP also hosts Suzuki Motor Corporation's, Suzuki Innovation Center (SIC) which envisages engaging with startups and the IITH fraternity to develop new technologies. All occupants of TRP are collaborating with the IITH fraternity towards the development of products that are working towards the "Make in India" & and "Atmanirbhar Bharat" goals of the Government of India.

A Co-developmental Technology Innovation Centre (CTIC) was inaugurated on May 26, 2023 at Technology Research Park (IITH - TRP) by Vice Admiral Sandeep Naithani, Chief of Materiel, in the presence of Prof B S Murty, Director, IITH, Prof Chandrashekhar Sharma, Dean (Sponsored Research & Consultancy), Officers from WESEE, IIT Faculty and Guests from Industry and startups. The Centre will work in tandem towards Aatma Nirbhar Bharat & Harness in-house Tech Prowess.

Inauguration of Co-developmental Technology Innovation Centre (CTIC) at Technology Research Park, IITH

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. The Hindi cell makes Every possible effort 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 Official Language Hindi in our Institute is sent by the Hindi Cell to the MOE & 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 Notifications, orders, standard drafts, 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. It also ensures bilingual preparation of degree certificates, PhD thesis 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 41 officers and employees were nominated in the said three training programs in the language training session of July 2023.

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 in it. The details of Hindi workshops organized are as follows:-

Date	Invited Guest Faculty	Topics of the workshop
26-06-2023	Dr Ravi Chandra Rao, Asst. Director, HTS, Secunderabad	Official Language Implementation, Noting & Drafting
20-09-2023	Shri Santosh Kumar Asst Director (Technical), HTS Sec	Computer Hindi Typing Skills
22-12-2023	Shri Kamaluddin, Asst Director, HTS, Secunderabad	Official Language Implementation, Noting & Drafting
20-03-2024	Dr Raj Narayan Awasthi, Manager(OL), ECIL	Official Language Implementation, Noting & Drafting

Hindi Pakhwada Celebrations:

On the occasion of Hindi Diwas on 14 September, 2023, Hindi Cell organized “Hindi Pakhwada Celebrations” from 14 to 29th September, 2023 in the Institute. In the inaugural ceremony of this program, Prof R S Sarraju, Pro Vice Chancellor, University of Hyderabad was invited as the chief guest. During this Hindi Pakhwada celebrations, Hindi cell organized many competitions for the faculty, staff and students like essay writing, Dumb charades, official terminology competition, Dictation and Elocution competition. Dr Aneesh Kumar Sharma, Director(Technical), ECIL Hyderabad was the chief guest on the occasion of the closing ceremony of Hindi Pakhwada celebrations on 06-10-2023.

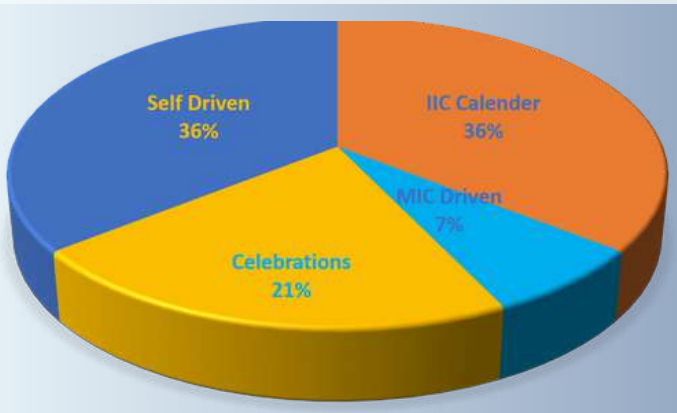
Certificates and mementos were given to all the winners of the competitions organized during the Hindi Pakhwada celebrations. Cultural program is also organized on this occasion. In the end, the vote of thanks was given by Dr Anupam Gupta, Faculty In-charge, Hindi Cell & Member Secretary, OLIC and after the national anthem, the Hindi Week celebrations were successfully concluded.

Innovation Cell

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 2023-2024, IIC at IITH has undertaken 28 activities under various categories, as summarized below.



IIC Activity Statistics at IITH for FY 2023-2024

Highlights:

National Entrepreneurship Day

Session on Problem Solving and Ideation

Motivational Session by Successful Innovators

IITH Tongali Entrepreneurship Program

Workshop on Entrepreneurship and Innovation" as a Career Opportunity

Institution's Innovation Day

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 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, 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 Vice-Chairman. All section heads are members of the committee. Faculty in charge of 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 2023-24, under the chairmanship of the Director of the Institute, meetings of the Official Language Implementation Committee were organized on 9th May 2023, 21st August, 2023, 28th November, 2023 and 18th March, 2024. 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" Hindi quarterly e-magazine was started by the Hindi cell. Which was unveiled on September 14, 2022 During financial year 2023-24, four issues of Pravaat E-Magazine were published in the months of April, July, October 2023 and January 2024. In this magazine, faculty members, students and employees of the institute are sending their research works, articles and poems etc. for publication.

Inspection Program of Parliamentary Committee on Official Language

On 21st February 2024, 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, Shri V Venkat Rao, Faculty in-Charge of Hindi Cell Dr Anupam Gupta, Prof Manish Kumar Niranjan, Dr Himanshu Joshi and 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 Program of Parliamentary Committee on Official Language

Celebrations

IIT Hyderabad on the occasion of International Yoga Day adored its importance by taking part in a life-filled Yoga Camp.

IIT Hyderabad immersed in tricolor to celebrate the 77th Independence Day with pride & pleasure as we take a pledge to honour our roots with the spirit of "Meri Mati, Mera Desh"!

IIT Hyderabad community took the integrity pledge to mark of the Vigilance Awareness Week - 2023.

IIT Hyderabad rejoiced the republic day celebrations from the vibrance of the tricolor to the vivid colors of celebrations of being Republic.

E-CELL, IITH, under the guidance of iTIC incubation cell and IIC, celebrated "Azadi ka Amrit Mahotsava" with eminent speakers

Hindi Cell, IIT Hyderabad commemorated the occasion of the Closing Ceremony of Fort night Hindi celebrations.

IIT Hyderabad celebrated the success of Chandrayaan - 3 with a Mega Live Broadcast at OAT, SNCC, IITH

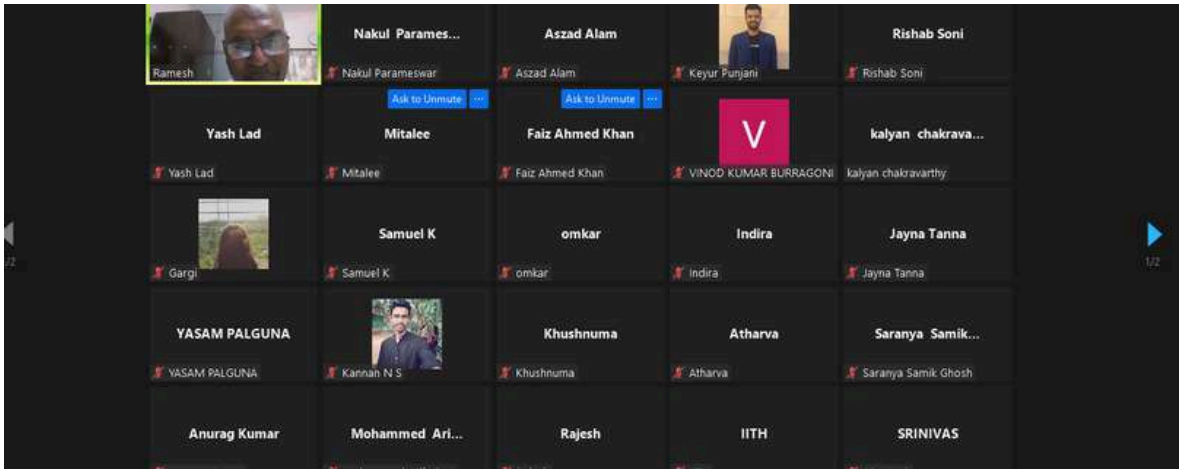
IIT Hyderabad celebrated women's day with a grand release of IWISE (IITH Women In STEAM Empowerment) Compendium.

National Sports Day 2023 at IIT Hyderabad was a grand success with reminisces about the fantastic day of Sports and Camaraderie

VIKSIT BHARAT @2047 Utsav @IITH Launched with Inaugural Address by Hon'ble Prime Minister

National Science Day 2024 on 'Indigenous Technologies for Viksit Bharat' with Prof Mustansir Barma, Former Director, TIFR Mumbai

IITH Celebrated the National Technology Day, with an Online Talk by Mr K Ramesh Vice President (Business Development) at Innomet Advanced Materials Pvt. Ltd., Hyderabad



Inventing & Innovating in Technology for Humanity

DEPARTMENTS

Department of Artificial Intelligence

Established in 2019, the Department of Artificial Intelligence has made remarkable strides in academics and research. As the first department in the country to offer an undergraduate degree in AI, it proudly graduated its inaugural BTech AI class in 2023, followed by another successful batch in 2024, both with impressive placement records.
The department recently welcomed new faculty members:

- Karthik P N: Focuses on reinforcement learning.
- Rekha Raja: Specializes in robotics.

They joined the existing faculty members, Ganesh and Konda Reddy, enhancing the department's expertise. The department had an eventful year with several large-scale projects being executed/initiated in this period. The AISWARYAM project for sustainable cities was led by Prof Vineeth. This project aims to use AI for smarter, AI-assisted decision-making at the city level, including areas such as waste management, traffic congestion, pollution, urban flooding etc. Prof Maunendra and Prof Mohan contributed to the ambitious BharatGPT project being carried out at the national level in a consortium mode. Dr Ganesh contributed to the SANKALP project that aims to use AI to reduce infant mortality. The department has been actively engaging with both industry and academia to enhance its visibility and impact. Dr Rekha conducted seminars and workshops at GITAM University and IIT Hyderabad, while Dr Ganesh participated in the organizing committee for the symposium on Game Theory and Artificial Intelligence at IISc Bangalore. Additionally, Dr Ganesh and Dr Vineeth delivered invited talks at the Intel Unnati "AI Everywhere" event at IIT Hyderabad. The department also launched a certificate course titled "Stepping into Modern AI," aimed at academicians and industry professionals seeking hands-on experience in AI. Dr Konda Reddy contributed by giving workshops on computer vision at Hyundai and CVRDE, along with a talk on AI at Nethaji High School in Andhra Pradesh.
Moreover, the department is taking initial steps to establish an AI Experience Centre in collaboration with Intel. This centre will provide students with opportunities to explore innovative AI use cases and applications, with an expected launch by the end of October 2024. On the academic front, the department undertook a significant overhaul of the BTech curriculum this year to better align with future industry and academic demands. Key updates include the addition of several core AI courses, such as Natural Language Processing, Computer Vision, and AI and Humanity, which are now compulsory for students. Additionally, AI and Cybersecurity has been introduced as an elective course, further enhancing the program's relevance and breadth. The department faculty members continued to publish their research outputs at well-reputed venues such as Neurips, IJCAI, AAMAS, ECAI, WINE, ISIT, ICLR, ACL, IEEE Transactions on Computational Social Systems, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Artificial Intelligence, IEEE Transactions on Information Theory, etc. The department also strengthened its connection with the industry through several seminars, sponsored and consultancy projects, invited talks, etc. With the field of Al, 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/

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Publications:

1. Bhardwaj M R, Ghalme G, et al. (2023). Designing Fair, Cost-Optimal Auctions Based on Deep Learning for Procuring Agricultural Inputs Through Farmer Collectives. In IEEE International Conference on Automation Science and Engineering (Vols. 2023-August). https://doi.org/10.1109/CASE56687.2023.10260598.

2. Gupta S, Ghalme G, et al. (2023). Efficient algorithms for fair clustering with a new notion of fairness. In Data Mining and Knowledge Discovery (Vol. 37, Issue 5, pp. 1959–1997). https://doi.org/10.1007/s10618-023-00928-6.

3. Gupta S, Jain S, Ghalme G, et al. (2023). Group and Individual Fairness in Clustering Algorithms. In Studies in Computational Intelligence (Vol. 1123, pp. 31–51). https://doi.org/10.1007/978-981-99-7184-8_2.

4. Gupta S, Ghalme G, et al. (2023). Group Fair Clustering Revisited—Notions and Efficient Algorithm. In Proceedings of the International Joint Conference on Autonomous Agents and Multiagent Systems, AAMAS (Vols. 2023-May, pp. 2854–2856). https://www.scopus.com/inward/record.urieid=2-s2.0851712559 17&partnerID=40&md5=f220dbc210cdff3eaf1d2c72dee024ef.

5. Patil V, Ghalme G, et al. (2023). Mitigating Disparity while Maximizing Reward: Tight Anytime Guarantee for Improving Bandits. In IJCAI International Joint Conference on Artificial Intelligence (Vols. 2023-August, pp. 4100–4108). https://www.scopus.com/inward/record.urieid=2-s2.0851703986 81&partnerID=40&md5=269f1067fa0e4ef096f414d6036113ad.

6. Singh M, Ghalme G, et al. (2023). Algorithmic Recourse based on User's Feature-order Preference. In ACM International Conference Proceeding Series (pp. 293–294). https://doi.org/10.1145/3570991.3571039.

7. Patel G, Mopuri K R, & Qiu Q. (2023). Learning to Retain while Acquiring: Combating Distribution-Shift in Adversarial Data-Free Knowledge Distillation. In Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition

(Vols. 2023-June, pp. 7786–7794). https://doi.org/10.1109/CVPR52729.2023.00752.

8. R Raja, A K Burusa, G Kootstra, EJ Van Henten. (2023). Advanced robotic system for efficient pick-and-place of deformable poultry in cluttered bin: A comprehensive evaluation approach. IEEE Transactions on AgriFood Electronics. https://www.techrxiv.org/doi/full/10.36227/techrxiv.23823117.v1.

9. R Raja, D C Slaughter, S Fennimore, M C Siemens. (2023). Real-time control of high-resolution micro-jet sprayer integrated with machine vision for precision weed control. Biosystems engineering. https://doi.org/10.1016/j.biosystemseng.2023.02.006.

Funded Research Projects:

1. Ganesh Sambhaji Ghalme; Learning in the presence of strategic agents; 55 L. [G532].

2. Ganesh Sambhaji Ghalme; Fair and Explainable AI; 30 L. [S131].

3. Mopuri Konda Reddy; AI for Sustainable Infrastructure and Resource Planning, Analysis and Monitoring (AI-CoE, Stage-I); 100 L. [G693].

4. Mopuri Konda Reddy; Deep Learning for Long-Tailed Computer Vision Tasks; 18.06 L. [G558].

5. Mopuri Konda Reddy; Study and Enhancement of Adversarial Robustness of Deep Learning based Computer Vision Systems in Autonomous Navigation; 16 L. [TiHAN Faculty Fellowship].

6. Rekha Raja; Robot Decision Making and Planning for Harvesting Crops in Dynamic Environments; 35 L. [SG/IITH/F340/2024-25/SG-179].

7. Rekha Raja; Semantic-Infused Graph-Based Planning for Robot Manipulation: Achieving Generalization and Explainability; 60 L. [SPG/2024/001172].

Awards & Recognitions:

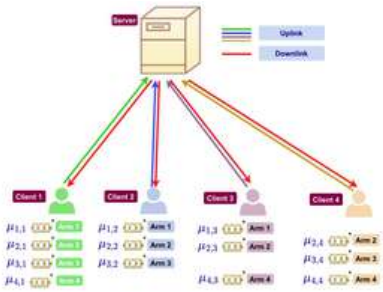
1. Lokesh Badisa, (BTech), working under the guidance of Prof Soumya Jana, has participated in the IEEE Signal Processing Society's recently held 2023 Video and Image Processing (VIP) cup. It was a worldwide competition involving tasks to detect certain ophthalmic biomarkers and held in two online phases, followed by an in-person final at Kuala Lumpur organized at the sidelines of the society's flagship Intl Conference on Image Processing (ICIP).

Research Highlights

1. **"Federated Best Arm Identification with Heterogeneous Clients" Chen Zhirui, P N Karthik, Vincent Y F, Tan, and Yeow Meng Chee, IEEE Transactions on Information Theory, 2024.**

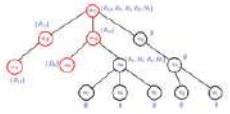
Abstract: We study best arm identification in a federated multi-armed bandit setting with a central server and multiple clients when each client has access to a subset of arms, and each arm yields independent Gaussian observations. The goal is to identify the best arm of each client subject to an upper bound on the error probability; here, the best arm is one that has the largest average value of the means averaged across all clients having access to the arm. Our interest is in the asymptotics as the error probability vanishes. We provide an asymptotic lower bound on the growth rate of the expected stopping time of any algorithm.

Furthermore, we show that for any algorithm whose upper bound on the expected stopping time matches with the lower bound up to a multiplicative constant (almost-optimal algorithm), the ratio of any two consecutive communication time instants must be bounded, a result that is of independent interest.We thereby infer that an algorithm can communicate no more sparsely than at exponential time instants in order to be almost optimal. For the class of almost-optimal algorithms, we present the first-of-its-kind asymptotic lower bound on the expected number of communication rounds until stoppage. We propose a novel algorithm that communicates at exponential time instants and demonstrate that it is asymptotically almost optimal.



2. **"A discrete and bounded locally envy-free cake cutting protocol on trees" Ganesh Ghalme, Xin Huang, Yuka Machino and Nidhi Rathi, International Conference on Web and Internet Economics, 310-328.**

We study the classic problem of fairly dividing a heterogeneous and divisible resource—modeled as a line segment [0, 1] and typically called as a cake—among n agents. This work considers an interesting variant of the problem where agents are embedded in a graph. The graphical constraint entails that each agent evaluates her allocated share only against her neighbours' share. Given a graph, the goal is to efficiently find a locally envy-free allocation where every agent values her share of the cake to be at least as much as that of any of her neighbours' share.



The most significant contribution of this work is a bounded protocol that finds a locally envy-free allocation among n agents on a tree graph using O(n^n) queries under the standard Robertson-Webb (RW) query model.

The query complexity of our proposed protocol, though exponential, significantly improves the currently best-known hyper-exponential query complexity bound of Aziz and Mackenzie for complete graphs. In particular, we also show that if the underlying tree graph has a depth of at most two, one can find a locally envy-free allocation with O(n^4 log n) RW queries. This is the first and the only known locally envy-free cake-cutting protocol with polynomial query complexity for a non-trivial graph structure.

Department of Biomedical Engineering

In the past year, the Department of Biomedical Engineering has introduced several innovative projects that mark significant progress in medical technology and treatments. One of the most exciting developments is the creation of a 3D bioprinted cornea. This advanced technology produces corneal tissues that closely replicate the natural structure and function of human corneas. Using decellularized extracellular matrix hydrogels and human limbal stem cells, this new approach aims to overcome common problems with traditional corneal transplants, like donor shortages and the risk of rejection, providing a promising solution for patients with severe corneal damage. At the same time, we've developed a gold-coated phage nanosystem. This system combines bacteriophages, which target specific bacterial pathogens, with gold nanoparticles. The gold coating stabilizes the phages and enhances their ability to diagnose and treat diseases. This dual-purpose technology could help fight antibiotic-resistant infections and offer targeted cancer therapies by improving imaging and localized treatment. We've also focused on improving patient comfort and health monitoring with a new contact-free system. This system uses non-invasive sensors and advanced algorithms to track vital signs like heart rate and breathing without needing physical contact. This technology is designed to make monitoring more comfortable, especially in hospitals and care facilities, while allowing real-time tracking and early detection of health issues.

Our research into how different vibration patterns affect human perception and emotions is also making strides. By studying how vibrations influence sensory responses, we aim to enhance virtual reality, rehabilitation, and assistive technologies. This research helps us understand how to optimize vibration feedback for better sensory experiences. Another important advancement is a macroencapsulation device for diabetes treatment. This device protects insulin-producing cells from the immune system by encasing them in a biocompatible material. This approach could reduce the need for immunosuppressive drugs and improve the effectiveness and safety of pancreatic islet transplants for type 1 diabetes patients. Finally, we are developing chip-scale microdevices for bioanalytical applications. These tiny devices, including microfluidic chips and lab-on-a-chip systems, can perform complex biological tests on a small scale. This innovation promises to make diagnostic processes faster, cheaper, and more efficient, improving the speed and accuracy of tests in both clinical and research settings.

Overall, these innovations showcase our department's dedication to advancing medical technology and enhancing patient care with cutting-edge research and development. Each project addresses key challenges and offers solutions that could significantly impact healthcare outcomes and diagnostic capabilities.

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

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Patents:

Filed:

1. Aravind Kumar Rengan; A Fluid Collection Device for Collecting Fluids; 202341005050.
2. Aravind Kumar Rengan; High-Affinity Oligonucleotide Nanomatrix and a Nanocarrier System; 202341006125.
3. Aravind Kumar Rengan; Bioinspired Gold-Coated Phase Nanosomes and a Process of Preparation Thereof; 202341013944.
4. Jyotsnendu Giri; Polypropylene Sulphide Coating On Magnetic Nanoparticles as a Novel Platform for Excellent Biocompatible, Stimuli-Responsive Smart Magnetic Nanocarrier for Cancer Therapeutics; 202341003976.
5. Subha Narayan Rath; A Versatile Microfluidic Platform and Its Application Thereof; 202341037655.

Published:

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; A Method for Producing Lipid-Based Nanocochleates Loaded with Hydrophobic Metformin; 202341073856.
3. Subha Narayan Rath; Electreospun Macroenapsulation Devices for Islet Cell Transplantation In The Treatment of Diabetes Mellitus; 202141039638.

Granted:

1. Aravind Kumar Rengan; Fluorescent Polyethylene Glycol; 201841030149.
2. Falguni Pati; Silk Fibroin Microfiber Reinforced Polycaprolactone Composites; 202141055556.
3. Jyotsnendu Giri; Platelet-Rich Plasma Based Formulations for Treating Wounds and a Method for Preparation Thereof; 201841042298.
4. Jyotsnendu Giri; Silk Fibroin Based Lipid Nanocapsule and a Method of Manufacturing the Same; 201741015739.
5. Subha Narayan Rath; Microfluidic Platform for Three-Dimensional Cell Culture and Multi-Drug Testing and Methods of Fabrication Thereof; 202141030041

Books:

1. Mohan Raghavan; Raghavan M, Simha M S H, and C R Ramaswamy. (2023). Elements of Indic Knowledge Systems and Heritage. HTSR Institute, ISBN 978-81-964176-0-4. (Found in the middle of publications).
2. Mohan Raghavan; Text Book for Indian Knowledge Systems and Heritage, authored as the first author, has been accepted by the Ministry of Education's IKS Division as course material for Faculty Development and University Education.

Book chapters:

1. Mohan Raghavan; Iyengar R S, Mallampalli K, Singh A K, Koppula A, Sridharan K S, and Raghavan M. (2023). The NEUROiD neuromusculoskeletal movement simulation platform. In Digital Human Modeling and Medicine (pp. 161-197). Academic Press.

Publications:

1. Alam A, Rengan A K, et al. (2023). Nanofiber-Based Systems for Stimuli-Responsive and Dual Drug Delivery: Present Scenario and the Way Forward. In ACS Biomaterials Science and Engineering (Vol. 9, Issue 6, pp. 3160–3184). https://doi.org/10.1021/acsbiomaterials.3c00363.
2. Ali Mohammad S, Rengan A K, et al. (2023). Radiotherapy, photodynamic therapy, and cryoablation-induced abscopal effect: Challenges and future prospects. In Cancer Innovation (Vol. 2, Issue 5, pp. 323–345). https://doi.org/10.1002/cai2.53.
3. Appidi T, Rengan A K, et al. (2023). Development of a Point-of-Care Cervico-Vaginal Sampling/Testing Device for the Colorimetric Detection of Cervical Cancer. In Diagnostics (Vol. 13, Issue 8). https://doi.org/10.3390/diagnostics13081382.
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105. Ravi S, Rath S N, et al. (2023). 3D Bioprintable Hypoxia-Mimicking PEG-Based Nano Bioink for Cartilage Tissue Engineering. In ACS Applied Materials and Interfaces (Vol. 15, Issue 16, pp. 19921–19936). https://doi.org/10.1021/acsami.3c00389.

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110. Mech D J, Rizvi M S, et al. (2023). AI on DDS for regenerative medicine. In Artificial Intelligence in Tissue and Organ Regeneration. https://doi.org/10.1016/B978-0-443-18498-7.00004-1.

Funded Research Projects:

1. Aravind Kumar Rengan; Functional cationic and neutral Re(I)-based Supramolecular coordination complexes including helicates, mesocates and cavitands for molecular recognitions and anticancer activities; 14.85 L. [G665].

2. Aravind Kumar Rengan; Development of NIR Emitting peptide conjugated metallic nanoclusters for effective photothermal therapy; 12.65 L. [G669].

3. Aravind Kumar Rengan; Nano-Transformable Hydrogel for Targeted chemo-Immunotherapy of Breast Cancer; 79.14 L. [G574].

4. Aravind Kumar Rengan; Biodegradable Lipo-Polymeric Nanoprobes for Cancer Theranostics; 39 L. [G676].

5. Aravind Kumar Rengan; Mechanistic insights into the enhanced permeability and retention, Abscopal Effect, and Circadian Timekeeping Machinery for improved targeted therapeutics for colorectal cancer; 63 L. [G606].

6. Avinash Eranki; Ultrasound-triggered Active Drug Delivery (UADD) System for Triple Negative Breast Cancer Therapy; 62.59 L. [IRIS Cell No. IIRP-2023-2832].

7. Avinash Eranki; Development of indigenous Robotic Ultrasound for synchronous management of Tumor motion and Radiation Hyperthermia; 536.63 L. [EMPS No. IIRPIG-2023-0001429].

8. Avinash Eranki; ICMR-DHR-CoE; 1519.6 L. [IRIS Cell no. ID no.2020-6052N].

9. 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].

10. Falguni Pati; 3D Bioprinted Heterogeneous Cancer/Tumor Organoids: Toward Personalized and Targeted Cancer Therapy; 49.5 L. [G653].

11. Falguni Pati; 3-D Bioprinting of immunocompetent skin equivalent model for safety assessment of cosmetics & personal care products; 35.5 L. [G640].

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

13. Harikrishnan Narayanan Unni; Personalized precision oncology: 3D-printed microfluidic cancer-on-chip device for clinical validation of prior drug sensitivity using carcinoma breast cancer; 82.67 L. [G660].

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

15. Jyotsnendu Giri; Antibacterial, host-modulating and regenerative nanofibers membrane for guided tissue regeneration; 80 L. [DBT/BME/F122/2022-23/G516].

16. Kousik Sarathy Sridharan; Design and validation of upper limb orthopaedic implant using closed-loop neurobiomechanics simulation; 0 L. [G597].

17. Kousik Sarathy Sridharan; Scientific investigation, Digital Documentation & conservation of Petroglyphs of Konkan; 0 L. [G563].

18. Mohan Raghavan; NULL; 0 L. [DST/BME/F143//2022-23/G488].

19. Mohan Raghavan; Multi-Scale Brain Function India-Italy Network of Excellence MSBFIINE; 78 L. [G619].

20. Mohan Raghavan; Design and validation of upper limb orthopaedic implant using closed-loop neurobiomechanics simulation; 90 L. [G597].

21. Nagarajan Ganapathy; KeraEyeFATE: Tensor-based Machine Learning for Early Detection of Keratoconus; 42 L. [G682].

22. Nagarajan Ganapathy; Pilot Health Monitoring system P.O. No: A001449563 Dt:10.04.2023; 2 L. [S275].

23. Nagarajan Ganapathy; Smart -Being Smart multimodal enabled affective computing to promote wellbeing; 20 L. [G568].

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

25. Nagarajan Ganapathy; Sankalp: Strengthening Program Implementation and Monitoring to Achieve Single-digit Neonatal Mortality; 620 L. [1].

26. Nagarajan Ganapathy; Development of Quantum Neural N/W for smart mental healthcare; 40 L. [G567].

27. Subha Narayan Rath; Development of 3dp anti-microbial composite hydrogels with metal binding peptides for anti-inflammatory effects and bone TE; 34 L. [S273].

28. Subha Narayan Rath; Personalized precision oncology: 3D-printed microfluidic cancer-on-chip device for clinical validation of prior drug sensitivity using carcinoma breast cancer; 82.66 L. [G660].

29. Subha Narayan Rath; Sophisticated Analytical and Technical Help Institute (SATHI); 7900 L. [G650].

30. Subha Narayan Rath; Characterization of Mesenchymal Stem Cells for Intervertebral Discs; 60 L. [S298].

Awards & Recognitions

1. Aravind Kumar Rengan received the Merk Young Scientist Award 2023 (Biological Sciences Runner up).

2. Aravind Kumar Rengan received the Prestigious and highly competitive SUPRA Grant from SERB.

3. Aravind Kumar Rengan received the G D Naidu Young Scientist Award 2023.

4. Deepak Bharadwaj PVP (PhD 2020), worked under the guidance of Aravind Kumar Rengan, selected as an Assistant Professor in the Department of Pharmacology and Toxicology at the National Institute of Pharmaceutical Education and Research (NIPER) Guwahati.

5. Falguni Pati received the Teaching Excellence Award from IIT Hyderabad in 2023.

6. Nagarajan Ganapathy has been elected as the Associate Editor of IEEE Transactions on Affective Computing.

7. Nagarajan Ganapathy has been selected as the DAAD Research Ambassador.

8. Subha Narayan Rath has been renewed as the Editor Journal of Materials Science for the Technical Expert Committee on Human Genetics, Genome Engineering & Nanotechnology Applications in Healthcare, Department of Biotechnology, Government of India, and 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.

Research Highlights

1. 3D bioprinted cornea for blinding corneal diseases.
2. Bioinspired gold-coated phage nanosystem for anti-microbial and anticancer theranostics.
3. Enhances patient comfort and enables continuous health monitoring using an indigenously developed contact-free health monitoring system
4. Estimation of human affect response to vibrotactile stimulation
5. Macroencapsulation device for immune-isolation purposes for diabetes. Design and development of chip-scale microdevices for bioanalytical applications.

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 dedicated to cultivating innovative opportunities and system-wide 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 rigour, 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/

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Patents:

Filed:

1. Himanshu Joshi; Aravind Kumar Rengan; High-Affinity Oligonucleotide Nanomatrix and a Nanocarrier System; 202341006125.
2. Rajkumara Eerappa; Enzymatic Synthesis of a Novel Anionic Polymer: Poly (Cytidine Diphosphate Ribose); 202341028077.
3. Rajkumara Eerappa; Synthesis and Evaluation of Inhibitors Against Phosphodiesterases PDE4A, PDE4D, and PDE10; 202341028076.

Published:

1. Anamika Bhargava; A Method for Producing Lipid-Based Nanocochleates Loaded with Hydrophobic Metformin; 202341073856.

Publications:

1. Chakraborty D, Althuri A, et al. (2023). Sustainable enzymatic treatment of organic waste in a framework of circular economy. In Bioresource Technology (Vol. 370). https://doi.org/10.1016/j.biortech.2022.128487.

2. Agarwal M, Bhargava A. et al. (2023). Interactions between genes altered during cardiotoxicity and neurotoxicity in zebrafish revealed using induced network modules analysis. In Scientific Reports (Vol. 13, Issue 1). https://doi.org/10.1038/s41598-023-33145-8.

3. Pullaguri N, Umale A, & Bhargava A. (2023). Neurotoxic mechanisms of triclosan: The antimicrobial agent emerging as a toxicant. In Journal of Biochemical and Molecular Toxicology (Vol. 37, Issue 2). https://doi.org/10.1002/jbt.23244.

4. Sharma A, Bhargava A, et al. (2023). Voltage-Gated T-Type Calcium Channel Modulation by Kinases and Phosphatases: The Old Ones, the New Ones, and the Missing Ones. In Cells (Vol. 12, Issue 3). https://doi.org/10.3390/cells12030461.

5. Anindya R, Rutter G A, & Meur G. (2023). New-onset type 1 diabetes and severe acute respiratory syndrome coronavirus 2 infection. In Immunology and Cell Biology (Vol. 101, Issue 3, pp. 191–203). https://doi.org/10.1111/imcb.12615.

6. Chakraborty N, Acharyya S G, & Anindya R. (2023). Stability of ZnO and Curcumin Decorated Graphene Oxide Nanocomposite in Acidic and Alkaline pH for Efficient Removal of Toxic Cd (II) Ions from Water. In IEEE Transactions on Nanotechnology (Vol. 22, pp. 747–752). https://doi.org/10.1109/TNANO.2023.3326282.

7. Shaji U P, Anindya R, et al. (2023). Interactions between HIV protease inhibitor ritonavir and human DNA repair enzyme ALKBH2: A molecular dynamics simulation study. In Molecular Diversity (Vol. 27, Issue 2, pp. 931–938). https://doi.org/10.1007/s11030-022-10444-2.

8. Islam S T, Sharma G, et al. (2023). Unmasking of the von Willebrand A-domain surface adhesin CglB at bacterial focal adhesions mediates myxobacterial gliding motility. In Science Advances (Vol. 9, Issue 8). https://doi.org/10.1126/sciadv.abq0619.

9. Kakkar R, A Sharma G, et al. (2023). The known, unknown, and the intriguing about members of a critically endangered traditional medicinal plant genus Aconitum. In Frontiers in Plant Science (Vol. 14). https://doi.org/10.3389/fpls.2023.1139215.

10. Narwani T J, Sharma G, & de Brevern A G. (2023). Editorial: Flexibility in the genome and proteome: An adaptive toolkit for organisms. In Frontiers in Genetics (Vol. 14). https://doi.org/10.3389/fgene.2023.1229315.

11. Singhvi N, Sharma G, et al. (2023). Comparative genomics and integrated system biology approach unveiled undirected phylogeny patterns, mutational hotspots, functional patterns, and molecule repurposing for monkeypox virus. In Functional and Integrative Genomics (Vol. 23, Issue 3). https://doi.org/10.1007/s10142-023-01168-z.

12. Podh N K, Mehta G, et al. (2023). Single-molecule tracking dataset of histone H3 (Hht1) in Saccharomyces cerevisiae. In Data in Brief (Vol. 47). https://doi.org/10.1016/j.dib.2023.108925.

13. Joshi H, Li CY, & Aksimentiev A. (2023). All-Atom Molecular Dynamics Simulations of Membrane-Spanning DNA Origami Nanopores. In Methods in Molecular Biology (Vol. 2639, pp. 113–128). https://doi.org/10.1007/978-1-0716-3028-0_7.

14. Prajapati A, Joshi H, et al. (2023). High-Affinity DNA Nanomatrix: A Platform Technology for Synergistic Drug Delivery and Photothermal Therapy. In ACS Macro Letters (Vol. 12, Issue 2, pp. 255–262). https://doi.org/10.1021/acsmacrolett.2c00642.

15. Shen J, Joshi H, et al. (2023). Sulfur-Containing Foldamer-Based Artificial Lithium Channels. In Angewandte Chemie—International Edition (Vol. 62, Issue 39). https://doi.org/10.1002/anie.202305623.

16. Kumar R, Chaudhary K, & Dhanda S K. (2023). Editorial: Recent advances in peptide informatics: Challenges and opportunities. In Frontiers in Bioinformatics (Vol. 3). https://doi.org/10.3389/fbinf.2023.1271932.

17. Manchanda M, R Kumar, et al. (2023). Metabolic Reprogramming and Reliance in Human Skin Wound Healing. In Journal of Investigative Dermatology (Vol. 143, Issue 10, pp. 2039-2051.e10). https://doi.org/10.1016/j.jid.2023.02.039.

18. Rankawat S, Kumar R, et al. (2023). A comprehensive rhythmicity analysis of host proteins and immune factors involved in malaria pathogenesis to decipher the importance of the host circadian clock in malaria. In Frontiers in Immunology (Vol. 14). https://doi.org/10.3389/fimmu.2023.1210299.

19. Viswanathan A, Kumar R, et al. (2023). Deep learning-based classifier of diffuse large B-cell lymphoma cell-of-origin with clinical outcome. In Briefings in Functional Genomics (Vol. 22, Issue 1, pp. 42–48). https://doi.org/10.1093/bfgp/elac038.

20. Dey S, Rajakumara E, et al. (2023). Exploring α, β-unsaturated carbonyl compounds against bacterial efflux pumps via computational approach. In Journal of Biomolecular Structure and Dynamics. https://doi.org/10.1080/07391102.2023.2246568.

21. Hasan U, Rajakumara E, & Giri J. (2023). Reversal of Multidrug Resistance by the Synergistic Effect of Reversan and Hyperthermia to Potentiate the Chemotherapeutic Response of Doxorubicin in Glioblastoma and Glioblastoma Stem Cells. In ACS Applied Bio Materials (Vol. 6, Issue 12, pp. 5399–5413). https://doi.org/10.1021/acsabm.3c00644.

22. Kulhar N, & Rajakumara E. (2023). Binding order and apparent binding affinity in the bisubstrate activity of strictosidine synthase. In Journal of Biomolecular Structure and Dynamics (Vol. 41, Issue 24, pp. 15634–15646). https://doi.org/10.1080/07391102.2023.2193643.

23. Manickavasagam P, Abhishek S & Rajakumara E. (2023). Designing ferritin nanocage-based vaccine candidates for SARS-CoV-2 by in silico engineering of its HLA I and HLA II epitope peptides. In Journal of Biomolecular Structure and Dynamics (Vol. 41, Issue 13, pp. 6121–6133). https://doi.org/10.1080/07391102.2022.2103027.

24. Rajakumara E, et al. (2023). Hijacking Chemical Reactions of P450 Enzymes for Altered Chemical Reactions and Asymmetric Synthesis. In International Journal of Molecular Sciences (Vol. 24, Issue 1). https://doi.org/10.3390/ijms24010214

25. Abhishek S, Rajakumara E, et al. (2023). Allosteric crosstalk in modular proteins: Function fine-tuning and drug design. In Computational and Structural Biotechnology Journal (Vol. 21, pp. 5003–5015). https://doi.org/10.1016/j.csbj.2023.10.013.

26. Abhishek S, Deeksha W, & Rajakumara E. (2023). Mechanistic insights into allosteric regulation of methylated DNA and histone H3 recognition by SRA and SET domains of SUVH5 and the basis for di-methylation of lysine residue. In FEBS Journal (Vol. 290, Issue 4, pp. 1060–1077). https://doi.org/10.1111/febs.16633.

27. Deeksha W, & Rajakumara E, et al. (2023). Regulation of PARP1 and its apoptotic variant activity by single-stranded DNA. In FEBS Journal (Vol. 290, Issue 18, pp. 4533–4542). https://doi.org/10.1111/febs.16875.

28. Deeksha W, Abhishek S, & Rajakumara E. (2023). PAR recognition by PARP1 regulates DNA-dependent activities and independently stimulates the catalytic activity of PARP1. In FEBS Journal (Vol. 290, Issue 21, pp. 5098–5113). https://doi.org/10.1111/febs.16907.

29. Reddy M R, Rajakumara E, & Satyanarayana G. (2023). Transition metal-free and temperature-dependent one-pot access to phenanthrene-fused heterocycles via a 1,3-dipolar cycloaddition pathway. In Chemical Communications (Vol. 59, Issue 92, pp. 13755–13758). https://doi.org/10.1039/d3cc04473d.

30. Satish M, Rajakumara E. et.al. (2023). Computational, biochemical and ex vivo evaluation of xanthine derivatives against phosphodiesterases to enhance the sperm motility. In Journal of Biomolecular Structure and Dynamics (Vol. 41, Issue 11, pp. 5317–5327). https://doi.org/10.1080/07391102.2022.2085802.

31. Campomizzi C S, Rathinavelan T, et al. (2023). Active Site Aromatic Residues Play a Dual Role in the Substrate Interaction and Protein Structure in Functional Dimers of CYP121A1 of Mycobacterium tuberculosis. In ACS Infectious Diseases (Vol. 9, Issue 4, pp. 827–839). https://doi.org/10.1021/acsinfecdis.2c00531.

32. Roshini J, Rathinavelan T, et.al. (2023). Structural diversity among Acinetobacter baumannii K-antigens and its implication in the in silico serotyping. In Frontiers in Microbiology (Vol. 14). https://doi.org/10.3389/fmicb.2023.1191542.

33. Sathyaseelan C, Rathinavelan T, et.al. (2023). CoVe-Tracker: An Interactive SARS-CoV-2 Pan Proteome Evolution Tracker. In Journal of Proteome Research (Vol. 22, Issue 6, pp. 1984–1996). https://doi.org/10.1021/acs.jproteome.3c00068.

34. Sathyaseelan C, Rathinavelan T, et.al. (2023). Sequence patterns and HMM profiles to predict proteome-wide zinc finger motifs. In Pattern Recognition (Vol. 135). https://doi.org/10.1016/j.patcog.2022.109134.

35. Sathyaseelan C, Rathinavelan T, et.al. (2023). Destabilizing Effect of Organo Ru(II) Salts on the Intermolecular Parallel CGG Repeat DNA Quadruplex Associated with Neurodegenerative/Neuromuscular Diseases. In ACS Chemical Neuroscience (Vol. 14, Issue 19, pp. 3646–3654). https://doi.org/10.1021/acschemneuro.3c00285.

36. Sundaresan S & Rathinavelan T. (2023). SSP: A in Silico Tool for Salmonella Species Serotyping Using the Sequences of O-Antigen Biosynthesis Proteins and H-Antigen Filament Proteins. In Journal of Molecular Biology (Vol. 435, Issue 14). https://doi.org/10.1016/j.jmb.2023.168046.

37. Uttamrao P P, Sundaresan S, & Rathinavelan T. (2023). Structure and Folding Patterns of RNA G-Quadruplexes. In RNA Technologies (Vol. 14, pp. 205–232). https://doi.org/10.1007/978-3-031-36390-0_10.

38. Venkata Subbaiah S P, Rathinavelan T. et.al. (2023). Concentration and time-dependent amyloidogenic characteristics of intrinsically disordered N-terminal region of Saccharomyces cerevisiae Stm1. In Frontiers in Microbiology (Vol. 14). https://doi.org/10.3389/fmicb.2023.1206945.

39. Banerjee S, Chakraborty S, & Ray S. (2023). Systems Biology of COVID-19 and Human Diseases: Beyond a Bird's Eye View, and Toward One Health. In OMICS A Journal of Integrative Biology (Vol. 27, Issue 1, pp. 2–5). https://doi.org/10.1089/omi.2022.0107.

40. Banerjee S, & Ray S. (2023). Circadian medicine for ageing attenuation and sleep disorders: Prospects and challenges. In Progress in Neurobiology (Vol. 220). https://doi.org/10.1016/j.pneurobio.2022.102387.

41. Bhatnagar A, Murray G, & Ray S. (2023). Circadian biology to advance therapeutics for mood disorders. In Trends in Pharmacological Sciences (Vol. 44, Issue 10, pp. 689–704). https://doi.org/10.1016/j.tips.2023.07.008.

42. Bhatnagar A, Ray S. et al. (2023). Role of circadian rhythms in metabolic syndrome. In Metabolic Syndrome: From Mechanisms to Interventions. https://doi.org/10.1016/B978-0-323-85732-1.00006-2.

43. Chakraborty S, Ray S. et al. (2023). The Promises of Proteomics and Metabolomics for Unravelling the Mechanism and Side Effect Landscape of Beta-Adrenoceptor Antagonists in Cardiovascular Therapeutics. In OMICS A Journal of Integrative Biology (Vol. 27, Issue 3, pp. 87–92). https://doi.org/10.1089/omi.2023.0003.

44. Rankawat S, Ray S. et al. (2023). A comprehensive rhythmicity analysis of host proteins and immune factors involved in malaria pathogenesis to decipher the importance of host circadian clock in malaria. In Frontiers in Immunology (Vol. 14). https://doi.org/10.3389/fimmu.2023.1210299.

Funded Research Projects:

1. Abhishek Subramanian; Computational approach to discover host-parasite metabolic interactions in human microeukaryotic parasite infections of the gut and lung; 10.5 L. [RCB/BT/F332/2023-24/S268].

2. Abhishek Subramanian; Systems-level discovery of adaptive biological mechanisms in the human innate immune cells and Aspergillus fumigatus arising in lung infections; 30 L. [SG/IITH/F332/2023-24/SG-161].

3. Anamika Bhargava; Hands-on one to one training in

single cell path-clamp; 1.53 L. [SLSL/BT/F145/2022-23/C944].

4. Anamika Bhargava; Study of calcium channel expression and calcium dynamics in cells derived from Indian breast cancer patients; 54 L. [G536].

5. 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. [SOCH2].

6. Anindya Roy; Investigation on the cross-talk among circadian Aberrations, Sleep Deficiency, Aging and DNA Damage for Potential Health and Therapeutic Benefits; 87.1 L. [G570].

7. 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. [G487].

8. Anindya Roy; Methyl enol ethers as versatile building blocks for the one-pot synthesis of novel fused benzenes, furocoumarins, enamides, and benzofurans and evaluation of biological activity.; 52.83 L. [G512].

9. Anindya Roy; Understanding the mechanism of degradation of cytoplasmic DNA containing alkyl-adducts; 42.02 L. [G575].

10. Ashish Misra; Dissecting the Molecular and Biological Function of long non-coding RNA LUCAT1 in Castration-resistant Prostate Cancer Progression; 5 L. [0].

11. Ashish Misra; Targeting CDC-like kinase 1 to overcome drug resistance in Castration-Resistant Prostate Cancer; 66.33 L. [G626].

12. Avanthi Althuri; Broadening the Sugarcane tops derived product portfolio with lignin hydrogel, Nanocellulose-Aerogel, and Yeast Oil-An Integrated strategy for harnessing the sustainable mercantile products for high-value applications; 22.57 L. [CSIR/BT/F304/2024-25/G712].

13. Avanthi Althuri; Integrated platform for lignin-hydrogels and one-pot production of mono-saccharomyces and lactic acid from lignocellulosic waste; 25 L. [SG/IITH/F304/2022-23/SG-135].

14. Avanthi Althuri; A Novel Lignin Reinforced pullulan Bio-composite film as Active food packing material; 32.07 L. [SERB-SRG/BT/F304/2023-24/G686].

15. Avanthi Althuri; Biodegradable polylactic Acid-Microbial Dextran Based Superabsorbent as a sustainable alternative for synthetic non-woven material; 47.77 L. [SERB-EEQ/BT/F304/2023-24/G667].

16. Gaurav Sharma; Microbiome of Critically Endangered Traditional Indian Medicinal (CETIM) Plants Conservation and Biomedical Research; 35 L. [G585].

17. Gaurav Sharma; Genomic diversity and function analysis of chemosensory systems and chemoreceptor proteins, along with identification of sensory ligand molecules in family Vibrionaceae organisms; 28.02 L. [G724].

18. Gaurav Sharma; Medicinal plant-microbe interaction studies can reveal novel insights into the secondary metabolite pathways in Aconitum spp; 30 L. [SG139].

19. 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. [AC2023-02].

20. Gunjan Mehta; National Facility for Single-Molecule and Super-Resolution Imaging; 580.62 L. [G725].

21. Gunjan Mehta; Exploring the cohesin ring independent functions of Rec8 during yeast meiosis; 42.5 L. [G398].

22. Gunjan Mehta; Mechanistic understanding of the functioning of CHD1 remodelers using biochemical, structural and Single-Molecule Imaging approaches; 54.76 L. [G514].

23. Gunjan Mehta; Elucidating the role of chromatin remodelers in yeast meiosis, especially in meiotic recombination, chromosome segregation and transcription of meiosis-specific genes; 61.62 L. [G389].

24. Himanshu Joshi; Multiscale molecular modelling of self-assembled and bio-inspired nanomaterials; 35 L. [G467].

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

26. Himanshu Joshi; Computational Exploration of Membrane Spanning DNA Nanostructures for Cellular Drug Delivery; 26.21 L. [SERB-DST/BT/F286/2022-23/S254].

27. Indranil Malik; RNA Toricity in C9orf12 Frontotemporal Dementia (C9FTD); 0 L. [S309].

28. Raghavendra Nidhanapati K; Characterization of human E2 enzyme Ube2N response to DNA; 35.6 L. [G396].

29. Rajakumara Eerappa; Mechanistic studies on the regulation of poly (ADP-ribose) polymerases 1 activity by non-DNA factors, and PAR mimetics inhibitors design; 63.5 L. [DBT/BT/F131/2024-25/G731].

30. Rajakumara Eerappa; Mechanistic and structural studies on the allosteric regulation of phospho-mimetic variants of poly(ADP-ribose) polymerases 1 activity by DNA break, PAR and PARP inhibitors; 86 L. [STARS-MOE/BT/F131/2024-25/G727].

31. Rathinavelan Thenmalarchelvi; Exploring the mechanistic role of Saccharomyces cerevisiae Stm1 protein in apoptosis-like cell death; 32.71 L. [SERB/BT/F087/2022-23/G535].

32. Rathinavelan Thenmalarchelvi; Development of 3dp anti-microbial composite hydrogels with metal binding peptides for anti-inflammatory effects and bone TE; 0 L. [S273].

33. Sandipan Ray; Nano-Transformable Hydrogel for Targeted chemo-Immunotherapy of Breast Cancer; 79.13 L. [G574].

34. Sandipan Ray; Mechanistic insights into the enhanced permeability and retention, Abscopal Effect, and Circadian Timekeeping Machinery for improved targeted therapeutics for colorectal cancer; 63 L. [G606].

35. Sandipan Ray; Understanding the mechanism of degradation of cytoplasmic DNA containing alkyl-

adducts; 42.02 L. [G575].

36. Sandipan Ray; Comprehensive characterization of the circadian regulations of kinases and diverse signalling pathways; 28.71 L. [G414].

37. Sandipan Ray; Investigation on the cross-talk among circadian Aberrations, Sleep Deficiency, Aging, and DNA Damage for Potential Health and Therapeutic Benefits; 87.5 L. [G570].

Awards and Recognitions:

1. Parth Gupta (PhD Scholar), Department of Biotechnology, working under the guidance of Ashish Misra, received the RNA Society Poster Presentation Prize at the 28th RNA Society Annual International Meeting (RNA 2023) held in Singapore.

2. Avanthi Althuri received the Outstanding Women Researcher in Biofuels Award under Engineering Discipline by the Centre for Women Development, Venus International Foundation, Chennai, India, at the 9th Annual Women's Meet; Invited Reviewer for proposals under SRISTI GYTI Awards;

3. Bhavya Surendran VS (PhD student), working under the guidance of Avanthi Althuri received the Khannal Foundation Award consisting of a Certificate and a Cash prize for poster presentation at NHBT 2023.

4. Gaurav Sharma has been selected as an Associate of the Indian Academy of Sciences Bangalore on 23 May 2023.

5. Gunjan Mehta received the Faculty Teaching Excellence Award from IIT Hyderabad (2024).

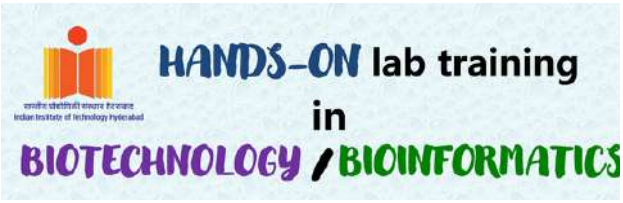
6. Rahul Kumar received the DAAD Research Stays for University Academics and Scientists scholarship.

7. Rajakumara Eerappa has been inducted as a Member of the Board of Studies of the Department of Biotechnology and Bioinformatics, School of Life Sciences of the University of Hyderabad (2023-2025); Member of Board of Studies (BOS), Department of Biotechnology, Woxsen University, 2023-2025; Life Member of Bioinformatics and Drug Discovery Society (BIDDS); Biotechnology theme Convener for DST-TIFAC, held on May 1 & 2, 2023.

8. Sandipan Ray received the Faculty Research Excellence Award 2024, IIT Hyderabad; Invited member of the Board of Studies (BoS), Department of Biotechnology, Woxsen University; Elected as an Executive Committee member of the Indian Society for Chronobiology (InSC).

Highlights

1. The Department of Biotechnology, IIT Hyderabad, conducts a biannual Hands-on lab training (HLT) program in Biotechnology/Bioinformatics. The program is designed to provide intensive hands-on training in tools and techniques in biotechnology or bioinformatics in advanced research labs. HLT program aims to bridge the gap between formal education and research/industry needs in the biotechnology sector by imparting skills at the forefront. Students and industry professionals can advance their skills with our HLT program.



2. The Hyderabad Science (HiSci 2024) conference, organized by the BT department, was attended by 400 students, faculty members, and industry personnel from various institutes. The event was a grand success and ignited many scientific discussions and collaborations among the Hyderabad science cluster.

Research Excerpt

1. Rajakumara Eerappa's group reported the regulation of PARP1 by single-stranded DNA. This study has implications for cancer research and therapeutic development, as PARP1 is a target for cancer therapies. Additionally, selected as a cover article and highlighted by the editor.

2. Another finding from Sandipan Ray and Rahul Kumar's group deciphers the role of the circadian clock in regulating host proteins and immune factors involved in malaria. This work also sheds light on the importance of considering circadian rhythms in infectious disease research.

3. Anamika Bhargava's laboratory investigated how gene interactions are altered in zebrafish models affected by cardiotoxicity and neurotoxicity. Insights from this research have applications in drug development, disease research and biomarker discovery.

4. Thenmalarchelvi Rathinavelan group provides a comprehensive analysis of the structural diversity of K-antigens in Acinetobacter baumannii and its implications for serotyping, highlighting the importance of computational approaches in advancing our understanding of bacterial diversity and improving infection management.

Department of Chemical Engineering

ChE@IITH is known for its pursuit of excellence in chemical engineering education, research and expert consulting support to the process industries. With the support of 22 core faculty, 1 adjunct faculty and 11 staff members, the department adopts a holistic approach of (i) fractal and hands-on / project-based practical teaching, (ii) connecting interdisciplinary research approaches to the socially relevant problems, and (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 state-of-the-art developments in the fields of energy, new materials, nano-science, machine learning, and biochemical engineering. ChE@IITH offers BTech, MTech, and PhD programmes featuring a curriculum that is both comprehensive and as flexible as having the option of exploring internship opportunities. Hosting nearly 64 PhD and 20 MTech students, the department's strong commitment towards research is evidenced by ~INR 45 crores in 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 National Geoscience Award, Vasvik award, and several department faculties appearing among the top 2% scientists in the world (Stanford University list 2023) 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 conferences 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. The department also contributes to nation-building by engaging in several national mission projects associated with the Ministry of Mines and DRDO. PhD students are recruited as faculty members in leading IITs and other CFTIs. Active participation of the department in the Joint PhD Program with Deakin University, Australia & Swinburne University of Technology, Australia. Strong research collaboration with the University of Texas, Austin, University of Exeter, UK, and University of Cape Town, South Africa. Excellent placement for BTech & MTech students. The department is implementing the First Level DST FIST award to improve its current infrastructure.

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

Filed:

1. Chandra Shekhar Sharma; A biomass-derived porous carbon as sulfur host for energy storage devices and a method of preparation; 202341033390.
2. Chandra Shekhar Sharma; Metals-embedded resorcinol-formaldehyde xerogel based carbon cathode for high-performance batteries and a method of preparation; 202341042659.
3. Chandra Shekhar Sharma; Process of Synthesis of SU-8 derived aligned and non-aligned carbon nanofibers and fabrication; 202341070538.
4. Suhanya Doraiswamy; Travelling Surface Acoustic Wave-Based Microfluidic Device for Additive-Free Cell Lysis; 202341040780.

Published:

1. Chandra Shekhar Sharma; Electreospun Macroencapsulation Devices for Islet Cell Transplantation in the Treatment of Diabetes Mellitus; 202141039638.

2. Kirti Chandra Sahu; A System to Recreate Dynamic Weather Conditions; 202341038384.

3. Suhanya Duraiswamy; Bacterial Cellulose Based Microfluidic POC Device for AST; 202241030646.

Granted:

1. Debaprasad Shee; Saptarshi Majumdar; A System and Process for Segregation of Low Ash Clean Coal from Coal Tailings; 202031005007.

2. Kirti Chandra Sahu; Direct paper-based fuel cells for micro-nano systems; 504402.

3. Kirti Chandra Sahu; A system to recreate dynamic weather conditions; 484707.

4. Kishalay Mitra; A System dnd Method for Determining the Optimum Design of the Hot Rolled Steel Products; 503430.

5. Narasimha Mangadoddy; Dense Medium Cyclone for Near Gravity Coal Fraction Separation; 201841023467.

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3. Zachary J Farrell, Alan R. Jacob, Vi Khanh Truong, Aaron Elbourne, Wilson Kong, Lilian Hsiao, Michael D Dickey, and Christopher Tabor. (2023). Compositional Design of Surface Oxides in Gallium–Indium Alloys. Chem. Mater. 35, 3, 964–975. https://doi.org/10.1021/acs.chemmater.2c02696.

4. Garimella S M, Ameenuddin M, & Anand M. (2023). Computational fluid dynamics study of kaolin–water flow in a T-junction using a novel shear-thinning fluid model. Canadian Journal of Chemical Engineering, 101(6), 3624–3633. https://doi.org/10.1002/cjce.24755.

5. Zhu G, Modepalli S, Anand M, & Li H. (2023). Computational modelling of hypercoagulability in COVID-19. Computer Methods in Biomechanics and Biomedical Engineering, 26(3), 338–349. https://doi.org/10.1080/10255842.2022.2124858.

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Funded Research Projects:

1. Anand Mohan; Simulation of Homing System of Naval Torpedo. 34.7 L. [ER&IPR-DRDO/CHE/F045/2023-24/G637].

2. Chandra Shekhar Sharma; Assessing the Environmental Impact of Sanitary pad disposal methods. 10 L. [G617].

3. Devarai Santhosh Kumar; Optimal Production of Ergosterol from Pleurotus ostreatus in Submerged Fermentation. 1.5 L. [ALPL/CHE/F133/2023-24/S277].

4. Giridhar Madras; Chemical recycling of plastic waste to valuable liquid fuels using novel functional bimetal/biomass-carbon catalysts. 58.8 L. [SERB-CRG/CHE/F320/2023-24/G685].

5. Kishalay Mitra; Application of Deep learning techniques for Robust Optimal Design of Integrated Water networks towards sustainable water management in Petroleum Refineries. 63.63 L. [SPARC/CHE/F089/2023-24/G644].

6. Mahesh Ganesan; Adhesion of silane-based adhesion promoters on concrete-based wet surfaces. 56.9 L. [MPMIPL/CHE/F288/2023-24/S286].

7. Narasimha Mangadoddy; Development of cold plasma treatment-based technology for coal to improve its floatation performance and process yield. 17.7 L. [TATA STEEL/CHE/F046/2023-24/S315].

8. Ramkarn Patne; Role of instabilities in the formation of fluid particles. 16.46 L. [SERB-DST/CHE/F280/2023-24/G630].

9. Ranajit Mondal; Energy Assessment P.O. No:4300124783 & Dt: 06.10.2023. 2.3 L. [BIOCON/CHE/F305/2023-24/C1329].

10. Satyavrata Samavedi; Development of intraocular implant providing controlled and localized combination drug therapy- towards efficacious treatment of diabetic retinopathy. 45.3 L. [ICMR/CHE/F164/2023-24/G654].

11. Suhanya Duraiswamy; Urine Tract Infection and Antimicrobial Susceptibility- A Fight Against Superbugs. 43.4 L. [SERB/CHE/F222/2023-24/G656].

12. Vinod Janardhanan; Computational Fluid Dynamics (CFD) analysis of multi-phase flow field and thermal balance in a fused salt electrolytic cell for magnesium metal production. 43.33 L. [DMRL/CHE/F031/2023-24/G572].

Awards & Recognitions:

1. Chandra Sekhar Sharma, Giridhar Madras, Kirti Chandra Sahu, Kishalay Mitra, Narasimha Mangadoddy and Sunil Kumar Maity have been featured in the Stanford top 2% scientists list for the year 2023.

2. Chandra Shekhar Sharma has been elected as a Co-Chair of Global Young Academy (GYA) for the year 2024-25 and has been inducted into the Editorial Advisory Board, Nano Express.

3. Kirti Chandra Sahu has been selected as an Associate Editor of Industrial and Engineering Chemistry Research, a leading journal in Chemistry and Chemical Engineering; invited to join the Editorial Advisory Board of Langmuir; elected as a Fellow of the Indian Academy of Sciences (FASc).

4. Narasimha Mangadoddy has been awarded with National Geoscience Award - 2023 for his contributions to Mineral Beneficiation and Sustainable Mineral Development; selected as Visiting faculty at University of Cape Town.

5. Saptarshi Majumdar has been selected as a member of the National PMRF 2.0 Committee.

6. Satyavrata Samavedi has been selected as a Guest Researcher at NIMS, Japan.

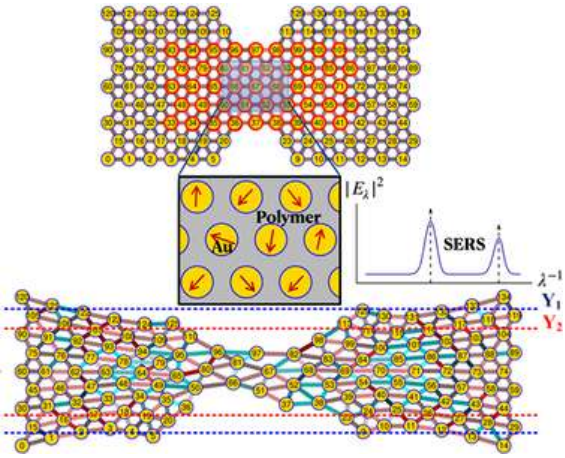
7. Shelaka Gupta has been awarded with IIT Hyderabad Teaching Excellence Award.

8. Suhanya Duraiswamy has been awarded the Best Poster Presentation at the International Research Conference on Microfluidics and Organ-On-A-Chip Technologies, Singapore.

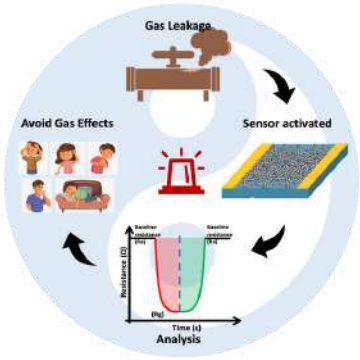
Research Highlights

1. Mechano-Optical Coupling in Polymer Grafted Nanoparticle Thin Films - Balaji Iyer Vaidyanathan Shantha

Thin films made of polymer-grafted nanoparticles (PGNs) can be used to design plasmonic devices based on the choice of the nanoparticle on which the polymer is grafted. Recently, we have shown, via computer simulations, that mechano-optical coupling in thin films of polymer-grafted gold nanoparticles can lead to the evolution of the SERS response when the film is deformed [1]. The results indicate that the use of plasmonic nanoparticles provides a novel approach to tracking local and large-scale structural rearrangements in PGN thin films.



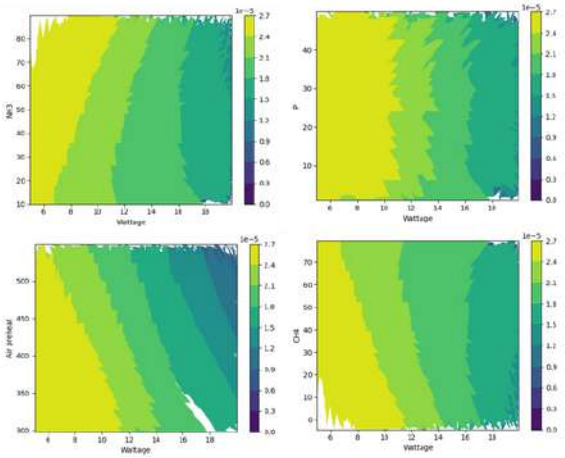
2. Nanofibers based H2S Gas Sensors - Chandra Shekhar Sharma



Our CARBON lab is at the forefront of developing advanced gas sensors for H2S detection, leveraging semiconducting metal oxides like SnO2, WO3, CuO, TiO2, etc. We have successfully achieved room temperature gas sensors using TMD and SMO materials, capable of detecting as low as 0.05 ppm of H2S. This innovation is crucial for early detection, as H2S is a highly toxic gas that poses significant health risks. These nanofibers-based sensors provide timely alerts, enhancing safety in industrial environments and protecting workers from potential hazards. Through continuous research and development, we aim to push the boundaries of gas-sensing technology, ensuring a safer and more secure future.

3. Enhancing the combustion of NH3/H2 fuel blend for better sustainability – Kishalay Mitra

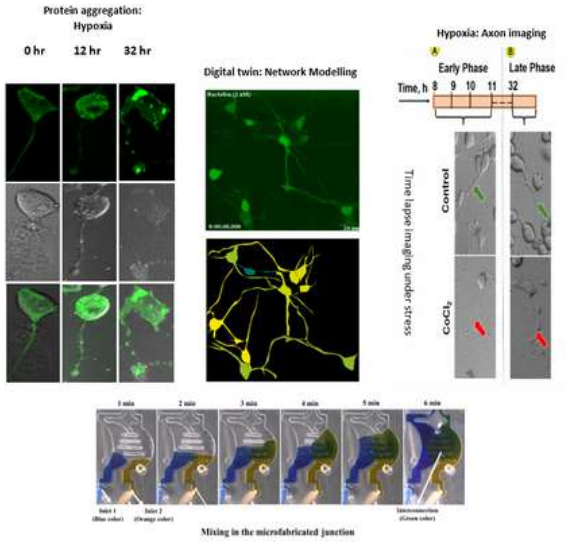
Considering the alarming threats of climate change and global warming, the transition to carbon-neutral fuels is crucial. Though hydrogen (H2) is the best carbon-neutral fuel owing to its highest calorific value, its storage, transportation, and the possibility of embrittlement pose many challenges for its usage. Hence, due to its high gravimetric hydrogen, ammonia (NH3) is currently being exploited as the H2 carrier. However, using NH3 directly as a fuel is ineffective due to its low laminar flame speed, low flame characteristics, and high nitrogen oxide (NOx) emissions. Thus, it is generally blended with H2 and carbon fuels to improve its flame characteristics. Exploiting the recent developments, Artificial Intelligence / Machine Learning is considered as a promising solution to optimize the NH3 fuel blend composition and the combustor parameters such that its flame characteristics are improved, and the NOx emissions are abated, simultaneously. A comprehensive CFD model is developed to simulate the combustion characteristics of the NH3 fuel blend. This model can finally be integrated with the AI/ML techniques to solve the problem of poor flame characteristics of NH3 and high NOx emissions.



Contour plots of the behaviour of NOx in the flue gas with respect to NH3 and CH4% in the fuel, air preheat temperature, and wattage.

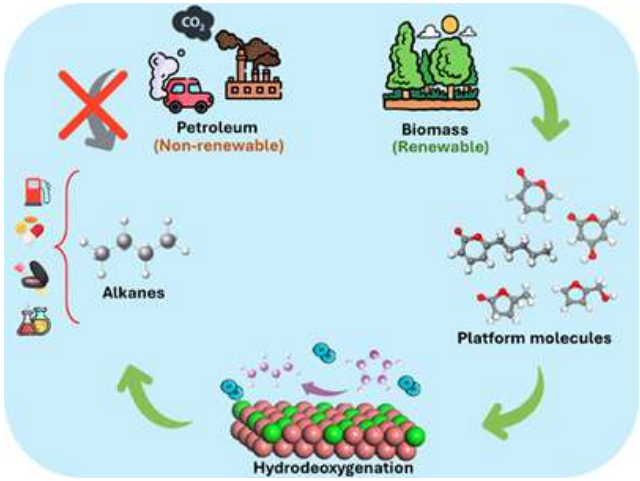
4. **Bio imaging, Statistical modeling and data analysis, Fabrication of imaging device using 3-D printing, Systems Biology - Lopamudra Giri**

Our research group focuses on quantitative microscopy and systems biology to build disease model and gain insights into therapeutic planning. One of the major objectives is to understand the protein aggregation patterns under acute and chronic hypoxia in context of aging/neurodegeneration. One of our recent achievements from our lab is to build a network model to understand cell to cell communication and perform parameter estimation using Monte Carlo and Genetic Algorithm. This sets a platform to obtain the digital twin for collective behaviours of the neurons. In another work, we used machine learning assisted systems model to identify cell states in cancer cells. On the experimental front, we use live imaging of multi-cell system using laser scanning confocal microscopy. In this direction, prototyping of 3D printing-based imaging-device has been fabricated for controlled mixing of multiple cells and can be used for time lapse data acquisition.



5. **Rational Design of Transition Metal Catalysts for the Hydrodeoxygenation of Biomass-Derived Molecules- Shelaka Gupta**

Lignocellulosic biomass is considered an environment-friendly source for the production of value-added fuels and chemicals and reduces the burden on fossil resources. 2-pyrone molecules are the versatile class of platform chemicals that are produced from the fermentation of waste lignocellulosic biomass. Hydrodeoxygenation (HDO) reactions are employed to reduce the oxygen content present in 2-pyrone and thereby catalytically upgrade it to n-alkanes which have wide applications as fuels, precursors, solvents and drugs. Our group has performed Density Functional Theory simulations in combination with experiments to rationally design transition metal-based bifunctional catalysts and obtained n-alkane with a selectivity of 83% and conversion >99% for the HDO reactions.



6. **Sustainable Aviation fuel from Furanics – Sunil Kumar Maity**

Sustainable aviation fuel (SAF) is essential for the sustainability of the aviation sector. Therefore, we propose a new method to produce SAF from biomass-derived furanics, 2-methylfuran (MF), and furfural. The process involves the production of (i) C15 oxygenated SAF precursor via hydroxyalkylation-alkylation (HAA) of furfural with MF, followed by (ii) hydrodeoxygenation (HDO) of C15 precursor to SAF. The first step is an acid-catalysed reaction, which is carried out using cation exchange resin and mesoporous MoO3-ZrO2 catalysts at around 50° C and atmospheric pressure with a high yield of the C15 SAF precursor. The HDO of C15 oxygenated SAF precursor was carried out using Co/g-Al2O3 and mesoporous NiMo-ZrO2 composite catalysts at around 35 bar hydrogen and 300 ° C. The HDO produces mainly branched C14 (~62 %) and C13 (~24 %) alkanes, the dominating components in SAF.

Department of Chemistry

In FY 2023-24, the Department of Chemistry showcased various products and fundamental research in cutting-edge research areas of Chemistry. A computational teaching lab has been set up for undergraduate and postgraduate students with the necessary computers and software for Computational Chemistry. The department established in-situ XRD and close cycle cryostat for the materials characterization. During 2023-2024, the department has published over 175 articles in peer-reviewed journals and 3 patents. Ch Subrahmanyam, M Deepa, Tarun K Panda, Sivakumar V, & Sudarsanam Putla are the 5 faculty of the department has been listed in the Stanford List of Top 2% scientists from IITH for 2022 & 2023.

The department had the 1st Department Advisory Committee meeting headed by Goverdhan Mehta, Javed Iqbal, and Lakshmi Kantham Mannepalli in July 2023. They had an extensive review of the department research, teaching, and research facilities for 3 days and delivered their invaluable feedback. Our department actively takes part in various outreach activities including organizing a conference on Nanomechanics of Pharmaceutical Solids during Dec 2024 by C Malla Reddy. International Conference on Main Group Molecules to Materials (MMM-III Conference) was organized from 09th –11th Dec 2023 by G Prabusankar at IITH in collaboration with HCU. SERB N-PDF Expert Committee Meeting in the area of Chemical Sciences was held in the department, coordinated by Surendra Martha from 11th-12th January 2024. The department organized its annual one-day in-house symposium in April. Over 20 faculty members from abroad and 20 from India visited the department and delivered lectures.

According to Nature Index 2024, IITH performs strongest in Chemistry (462nd globally, 19th in India). Chemistry department research performance has significantly increased (383% hike) during the last couple of years. We hope this performance continues to grow and will make it a leading entity in the country in a few years.

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

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Patents:

Filed:

1. Surendra Kumar Martha; High Energy Lithium-Ion Cell; 201841024810.

2. Surendra Kumar Martha; High-Performance Lead-Acid Batteries and Pastes Therefore; 201741007000.

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Funded Research Projects:

1 Abhijit Sau; Chemical synthesis of bleomycin carbohydrate-base tools for biomedical application; 38 L. [G607].

2. Abhijit Sau; Development of Synthetic Strategey for anti-diabetic compound Montbretin A through electrochemical glycosylation; 33 L. [G600].

3. Annadhasan M; Optically/Electrically pumped Micro lasers from flexible organic crystals for next-generation photonic device application; 35 L. [G586].

4. Annadhasan M; Optically Controlled Micro/Nano-Welding of flexible organic crystals for bandwidth-tuneable photonic integrated circuits; 52.4 L. [G672].

5. Arup Mahata; Facet Engineering in Metal Halide Perovskite Nanocrystals for Catalysis and Optoelectronics Applications; 32.74 L. [SRG/2023/002577].

6. 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].

7. Bhabani Shankar Mallik; Structure and Ion transport in electrolytes for potassium battery; 25.8 L. [G666].

8. Bhabani Shankar Mallik; Ionic Transport, Solvation and Interfacial Interactions of Electrolytes from computer Simulations; 31.06 L. [SERB/CHY/F079/2022-23/G515].

9. Bhabani Shankar Mallik; Dynamic and ionic reactivity inelectrolytes for li-o2 battery; 12 L. [G362-A].

10. 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].

11. C Malla Reddy; Crystal growth and morphology control of viloxazine hydrochloride to reduce the aspect ratio (needle to cuboidal); 6 L. [NULL].

12. Debasish Koner; Computational and machine learning investigation of interface-driven self-assembly and polymorph selection in soft colloidal system; 7.48 L. [G675].

13. Debasish Koner; Exploring the reaction dynamics and molecular spectroscopy in the gas phase for system relevant to atmospheric and Astro chemistry; 35 L. [G583].

14. Debasish Koner; Solving the time-dependent Schrodinger equation for molecular systems using machine learning; 33 L. [G629].

15. Deepa M; Development of Organic Electrochromic Molecules; 9.76 L. [S137].

16. Jai Prakash; Syntheses of New Layered 3d-Transition Metal based Chalcogenides for superconducting and magnetic applications; 4 L. [CRG/2021/003641].

17. Kishore Natte; Design and Development of biocarbon-

supported Mn and Co-based Nano Catalysts for the transfer hydrogenation/Deuteration Reactions using CH3OH / CD3OD as Hydrogen / Deuterium source and synthesis of pharmaceutical intermediates; 10 L. [G681].

18. Kishore Natte; Post-synthetic modification of porous organic polymers for improved CO2 capture and its utilization for the synthesis of acrylic acid and its derivatives; 24 L. [G604].

19. 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].

20. Koyel Banerjee Ghosh; Effect of Electron's Spin in Inducing Chirality during Electrochemical Polymerization and its Application Device Fabrication; 20.92 L. [01/WS/(023)/2023-24/EMR-II/ASPIRE].

21. Narendra Kurra; Development of sustainable zinc-based rechargeable energy storage devices; 13 L. [G579].

22. Prabusankar G; N-Heterocyclic Neutral Donor Ligands and AIE Assisted Luminescent Organometallic Complexes with Higher Quantum; 35.68 L. [DST CRG/CHY/F043/2022-23/S255].

23. Prabusankar G; MSN Laboratories Pvt Ltd-Project 1; 2.3 L. [MSN/CHY/F043/2022-23/C962].

24 Prabusankar G; Carbon fibre reinforced pthalonitrile composites for high-temperature applications (Up to 350 C); 0 L. [G613].

25. Priyadarshi Chakraborty; Bioinspired self-assembly of low molecular weight building blocks and their co-assembly with polymers/nanomaterials for different applications; 33 L. [G625].

26. Priyadarshi Chakraborty; DBT Ramalingaswami Fellowship; 52.5 L. [DBT/CHY/F322/2022-23/G496].

27. Priyadarshi Chakraborty; Antibacterial, adhesive, and conductive supramolecular biomaterials towards functional cardiac patches; 34.94 L. [G700].

28. Satyanarayana G; The synthetic electrochemical strategies and their applications to natural and pharmaceutically relevant products; 62.17 L. [G663].

29. Satyanarayana G; synthesis of oxacarbazepine; 24.99 L. [G584].

30. Satyanarayana G; Consultancy incontext of R&D activites; 2 L. [GPL/CE/F012/2022-23/C995].

31. Satyanarayana G; Development of Organic Electrochromic Molecules; 17.6 L. [S310].

32. Saurabh Kumar Singh; Computational approach Towards Nanostructuring of Lanthanide based magnetic molecules in two-and three-dimensional Networks; 41.3 L. [G677].

33. 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].

34. Somnath Maji; Biohydrogen Production from dark fermentation effluent using MEC; 23 L. [S316].

35. Somnath Maji; Hybrid transition metal redox catalyst nanocomposite platform for plasmon-enhanced electrochemical/photochemical reduction of CO2; 61.64 L. [G652].

36. Subrahmanyam Ch; Coupling Metal Halide Perovskites and Quantum Dots for Synergistic PEC Water Splitting and Mechanistic Understanding; 20 L. [JICA Friendship2].

37. Subrahmanyam Ch; Research and Development of low GWP chemicals including blends thereof; 50 L. [G528].

38. Subrahmanyam Ch; Single Stage conversion of carbon dioxide to e-methanol-Demonstration of nonthermal plasma for a single stage E-methanol under ambient conditions; 41.09 L. [G695].

39. Subrahmanyam Ch; Sea water electrolysis for hydrogen production; 100 L. [Greenko project].

40. Sudarsanam Putla; Chemical recycling of plastic waste to valuable liquid fuels using novel functional bimetal/biomass-carbon catalysts; 58.83 L. [G685].

41. Sudarsanam Putla; Development of new bifunctional heterogeneous catalysts for selective conversion of polyolefin plastic waste into liquid fuels; 49 L. [G601].

42. Sudarsanam Putla; Catalytic production of bio-polymer precursors using active site-tailored zeolites; 34.69 L. [SERB/CHY/F292/2022-23/G510].

43. Surajit Maity; Adsorption of CO2 and CO on Isolated Aromatic Molecular Surfaces: Spectroscopic Characterization of Non-Convalent Bonding and Measurement of Desorption/Dissociation Energy; 70.4 L. [G662].

44. Surendra Kumar Martha; Development and Realization of High Energy Lithium-based Rechargeable Batteries for Electric Vehicles; 110 L. [Greenko School of Sustainability].

45. Surendra Kumar Martha; Financial assistance for organizing the meeting of NPDF Expert Committee - Chemical Sciences during 11th-12th January 2024 at Indian Institute of Technology, Hyderabad; 12.8 L. [G636].

46. Surendra Kumar Martha; Development of 3.8 V/30Ah Pouch-type Lithium-ion cells for EV 2 and 3-wheelers; 19.9 L. [JICA Friendship 2].

47. Tarun Kanti Panda; Preparation of Tris (N, N - bis(trimethylsily)-amide) Lanthanum(III); 10.53 L. [S282].

48. 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].

49. Venkat Rao Kotagiri; Post-synthetic modification of porous organic polymers for improved CO2 capture and its utilization for the synthesis of acrylic acid and its derivatives; 35 L. [G604].

50. Venkat Rao Kotagiri; Three component supramolecular co-assembly and resonance energy transfer to achieve amplification of solar thermal energy using pi-systems; 44.17 L. [G657].

51. Venkat Rao Kotagiri; Development of an optimized

green Synthesis method for MOF-801; 9.98 L. [S312].

52. Venkat Rao Kotagiri; Bandgap Engineered Lead-free Halide Double perovskites with enhanced emission properties; 27.39 L. [S274].

53. Venkat Rao Kotagiri; Printed, wearable sensor array for non-invasive monitoring of diabetic complications and chronic kidney diseases; 40 L. [G621].

Awards & Recognitions:

1. C Malla Reddy was appointed as the Editor-in-Chief for CrystEngComm, published by the Royal Society of Chemistry, UK (the first Indian to be the Editor-in-Chief for an RSC journal) and Co-Editor for Journal of Acta Crystallographica Section B, International Union of Crystallography, Chester, UK.

2. Deepa M has been inducted as a Member of the Editorial Board of Chemistry of Inorganic Materials (Open Access Elsevier Journal).

3. Debanjan Maity, working under the guidance of Deepa M, received the Poster award Certificate and a cash Prize of 150 Singapore Dollars at the IUMRS-International Conference on Advanced Materials and 11th International Conference on Materials for Advanced Technologies (IUMRS-ICAM and ICMAT 2023) held at Singapore.

4. Narendra Kurra received the Teaching Excellence Award in March 2024 at IITH during the 16th Foundation Day and the Best Researcher Award on Supercapacitors 2023-24.

5. Priyadarshi Chakraborty received the BRNS Young Scientist Research Award in 2024.

6. Anil Balajirao Dapkekar, working under the guidance of G Satyanarayana, received the Best Poster Presentation award and a cash prize of 1500 INR at the ICOMC (International Conference on Organic and Medicinal Chemistry) conference held at NIT Warangal.

7. Saurabh Kumar Singh received a JICA Fellowship for New Partnership (5 Lakh INR).

8. Kusum Kumari, working under the guidance of Saurabh Kumar Singh, received the Best Poster Presentation award and a cash prize of INR 3000 at the 31st CRSI National Symposium in Chemistry (CRSI NSC-31) along with the ACS Symposium Series in Chemistry under the auspices of the Chemical Research Society of India which were held at the Department of Chemistry, NIT-Rourkela during 6-8th July 2023.

9. Sivakumar Vaidyanathan received the Best Poster Award along with Sudipta Das, Aayush Aryan, Pardha Saradhi Maram and received the Best Oral Presentation Award along with Sandhya Rani Nayakat at the International Conference on luminescence and its Applications 2023, organized by IICT Hyderabad, IITH.

10. Sivakumar Vaidyanathan is listed in the top 2% of scientists in the world, adjusted by Stanford University; Single crystal data was submitted to the Cambridge Crystallographic Database (CCDC).

11. Priyanka Verma, who worked under the guidance of Ch Subrahmanyam, was selected as an Assistant Professor in the Department of Chemistry at IIT Delhi.

12. Sudarsanam Putla has been Elected as an Associate Fellow of the Telangana Academy of Sciences and is Listed in Stanford's Top 2% of Scientists.

13. Swapna Bhattu, working under the guidance of Sudarsanam Putla, received the Best Poster Presentation Award from RSC Organic and Biomolecular Chemistry at the Transcending Frontiers of Chemical Sciences (TFCS-2023) conference held at NIT Tiruchirappalli during 11-12 August 2023.

14. Simran Baweja, working under the guidance of Surajit Maity, received the SERB international travel grant & Simran Baweja Bronze medal in Oral Presentation at the KHOJ-2024 at IIT Hyderabad.

15. J Ramesh, working under the guidance of Surajit Maity, received the "Excellence in Research 2023" award from IIT Hyderabad; received a Post-doctoral fellowship from the University of California San Diego, USA; SERB international travel grant.

16. Md Shabeeb, working under the guidance of Surajit Maity, received the Best Poster Presentation at the International Conference on Light-Matter Interaction & Ultrafast Processes.

17. Saurabh Khodia, working under the guidance of Surajit Maity, received the Newton International Fellowship.

18. Surendra Kumar Martha received the Best Researcher Award 2023 from IITH.

19. M Bhar (PhD Scholar), working under the guidance of Surendra Kumar Martha, has been awarded the Best Oral Presentation award at the International Conference on Women in Electrochemistry (with a 150 USD cash prize).

20. R D Chakraborty, working under the guidance of Surendra Kumar Martha, has been awarded the Best Poster Presentation award (3000 INR cash prize) at the International Conference on Electrochemistry for Industry, Health, and Environment, EIHE-2023, held at DAE Convention Centre, Anushaktinagar, Mumbai, BARC, during 7-11 February 2023.

21. Madhushri Bhar working under the guidance of Surendra Kumar Martha, received the Best Oral Presentation Award at the International Conference on Women in Electrochemistry (ICWEC-2023) Organized by the Electrochemical Society of India at IISc.

22. Tarun K Panda has published a review article in Chemical Reviews (Chemical Reviews 123 (2023) 13323-13373).

23. Shweta Sagar and Priyanka Nath, working under the guidance of Tarun K Panda, received the Best Poster Award at the 17th International Conference on Polymer Science and Technology SPSI-MACRO-2023" which was held at IIT Guwahati from 10-13 December.

Research Highlights

In the FY 2023-24, the Department of Chemistry showcased various products and fundamental research in cutting-edge research areas of Chemistry, including Bio-inspired synthesis, catalysis, energy storage, ionic liquids, 2D Materials, polymers and composites, supramolecular chemistry, transition metal Chemistry, dynamics of Chemical Systems (ML, Monte Carlo, DFT), etc.

To name a few,

- Arup Mahata has contributed significantly to the area of energy storage, halide perovskite materials, heterogeneous catalysis, and energy conversion techniques.
- Debasish Koner developed a machine-learning model for breast cancer diagnosis from mass spectral data and also explored the fascinating reaction dynamics of water droplets.
- Bhabani S Mallik provided theoretical insights into the spectroscopy and dynamics of electrolytes, ion transport mechanisms in batteries and supercapacitors, and water-splitting.
- Folic Acid-Based Supramolecular Polymer with a Covalent Polymer Toward Fabricating Functional Antibacterial Biomaterials was showcased by Priyadarshi Chakraborty.
- Saurabh K Singh elucidated the interactions in several metal complexes used for spin systems via computational studies.
- Bio-inspired Transition Metal Complexes and their potential applications were demonstrated by Somnath Maji.
- Subrahmanyam Ch's group developed oxide-sulfide-based nanomaterials for efficient photoelectrochemical chemical water splitting
- With our commitment to excellence, innovation, and the pursuit of knowledge in the field of catalysis and renewable energy, industrially viable processes for plastic/biomass waste conversion and renewable energy towards a sustainable society were developed by Sudarshanam Putla.
- Surendranath Martha's group developed 2.7 V Li-ion hybrid ultracapacitors, 3.5 V Sodium-ion batteries and efficient recycling methods to recycle graphite anodes.
- DES as a low-cost, eco-friendly, reusable catalyst and medium and metal-free, and toxic solvent-free synthesis was demonstrated by Tarun K Panda.
- With a strong hold on synthetic organic chemistry, a novel electrochemical organic synthesis approach was developed and established, advancing a step forward toward greener chemistry. Harvesting electrical energy using mechanically flexible organic entities or generating higher order polymer via the interplay of non-covalent interaction or a novel chemical entity as a sub-cellular probe for theragnostic application are the other key achievements from the Organic domain.

Department of Civil Engineering

Welcome to the Department of Civil Engineering at IIT Hyderabad!

We take pride in being one of the largest departments, with 422 enrolled students and 27 active faculty members, including three adjunct professors and two distinguished faculty members. Our dedicated support staff include 6 Senior Technical Superintendents, 1 Technical Superintendent, 3 Technicians, 2 Junior Technicians, 1 Executive Assistant, and 1 Multi-Skill Assistant. Our department offers five specializations, each represented by faculty members engaged in cutting-edge research. As of August 25th, our impressive record includes over 1400 publications and a departmental h-index of 82, highlighting our commitment to impactful research.

We are actively involved in numerous projects, including 26 Grant-in-Aid and Sponsored projects valued at 19 Crores and 260 Consultancy projects worth 18 Crores during the last financial year. This involvement reflects our dedication to advancing civil engineering through research and practical applications. In the previous academic year, we organized several outreach activities. For instance, Prof Parida, Director of the Central Road Research Institute (CRRI), gave a talk on "Transportation Activities." Our faculty members also conducted various activities, such as Dr Digvijay S Pawar conducted a 3-day road safety training program for Dhaka Metropolitan Police.

Faculty members gave invited lectures and provided input for policy-making at various events. The Department of Civil Engineering and the IGS-IITH Student Chapter organized a lecture on the Application of Bio-stimulated Calcite Precipitation to Stabilize Expansive Soils, which was presented by Prof Bhaskar Chittoori and Shreyas Giridharan. The faculty have published their research and academic works in internationally recognized conferences, journals and workshops. The department also organized the “International Conference on Condition Assessment, Rehabilitation & Retrofitting of Structures” held at IIT Hyderabad, which is one of the premier research conferences.

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/


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Patents:

Filed:

1. Ambika S; A Method and System for Water Treatment; 202341083848.
2. Suriya S Prakash; A Method to Produce an Ultra-High-Performance Fiber-Reinforced Concrete; 202341004954.
3. Mahendrakumar Madhavan; Cold-formed Interlocked Built-Up Steel Column for Mid-Rise Building; 202341009493.
4. Mahendrakumar Madhavan; Cold-formed Steel Interlocked Built-Up Beam; 202341047418.

Published:

1. Debraj Bhattacharya; A Novel Algal-Bacterial Photo-Bio Tower for Waste Water Treatment; 202141059299.
2. Subramaniam Kolluru V L; A Sensing System for Vibro-Acoustic Emission Monitoring of Concrete Structures; 202341054901.

Granted:

1. Debraj Bhattacharya; An Improved Sequential Batch Reactor for Wastewater Treatment; 202041031706.

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Funded Research Projects:

1. Ambika S; Sustainability Impact assessment of convergence of projects in smart cities mission Focus Air Pollution; 6 L. [G648].

2. Ambika S; Sustainability Impact assessment of convergence of projects in smart cities mission Focus Solid Waste Management; 6 L. [G647].

3. Amirtham Rajagopal; Non-Local Phase field approach to modelling delamination in high strength composite rocket motor casing; 33.46 L. [ASL-DRDO/CE/F050/2022-23/S249].

4. Amirtham Rajagopal; A thermodynamically consistent model for the evolution of hydride precipitate in zirconium and its alloy; 22.83 L. [BRNS/CE/F050/2022-23/G484].

5. Amirtham Rajagopal; Nonlocal approach to modelling delamination; 56.7 L. [ARDBDRDOG468].

6. Amirtham Rajagopal; Finite element modeling of microstructure evolution & fracture in brittle / quasi-brittle polycrystalline materials; 55 L. [G688].

7. Amirtham Rajagopal; Modeling damage in Masonry during an earthquake; 20 L. [JICA].

8. Anil Agarwal; Development of Rapidly Deployable Lightweight Bridge System; 80.1 L. [G671].

9. 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].

10. Anil Agarwal; Use of Perforated basalt fabric reinforced cementitious matrix in structural strengthening applications; 92 L. [G632].

11. Asif Qureshi; Reimagining the Good City from Ennore Creek, Chennai; 15 L. [Westminster/CE/F116/2022-23/S229].

12. Asif Qureshi; Centre for Godavari river basin management and studies; 627 L. [G687].

13. Asif Qureshi; Bhopal Groundwater Study; 30 L. [S292].

14. Biswarup Bhattacharyya; Time-dependent reliability analysis and structural health monitoring of ship structures considering uncertainty; 31.12 L. [S308].

15. Debraj Bhattacharyya; Developing a Micro-Algae-aided Constructed Wetland; 54.8 L. [S287].

16. Digvijay S Pawar; Realtime Dynamics-Risk Envelope (ReD-RE) for smart and safe mobility applications of Autonomous Navigation systems; 20 L. [S279].

17. Digvijay S Pawar; MVAA-2019 Assessment Study Across Maharashtra; 8.9 L. [S318].

18. Digvijay S Pawar; Crash data collection & Reconstruction in India; 24 L. [Toyota/Honda/CE/F175/2022-23/S248].

19. Mahendrakumar Madhavan; Study on the integrity of cold-formed steel built-up sections using full-field measurement technique; 60.76 L. [CRG/2022/000026].

20. Maheswaran Rathinasamy; Anomalous Moisture Transport for Hydrological Extremes in a Changing Climate AMOTHEC; 23.5 L. [G596].

21. Maheswaran Rathinasamy; NULL; 0 L. [DST (CNA-SERB)/CE/F276/2022-23/G481].

22. Maheswaran Rathinasamy; Understanding the impact of climate change and land use change on the groundwater resources in the future using deep learning models with a focus on data-scarce regions; 36.54 L. [G580].

23. Maheswaran Rathinasamy; Towards Predictive modelling of Indian Summer Monsoon considering Arctic teleconnections using the complexity-based approach; 23.5 L. [G623].

24. Meenakshi; Multicyclic flue gas carbonation curing of blended cement mixes and its influence on the mechanical properties and durability of cementitious composites; 28.18 L. [G651].

25. Meenakshi; white cement, having properties of better workability and good compressive strength for decorative purposes; 8.26 L. [DCPL/CE/F310/2022-23/S265].

26. Munwar B Basha; Development of Design Guidelines for Narrow Backfill Width Mechanically Stabilized Earth Walls built near Rock Faces; 49.13 L. [NHAI/CE/F036/2022-23/G 480 F].

27. Phanindra K B V N; Generation of Date Cube Module in Geo Tiff Format(DIR/ECS/IRDE/Proc(BCR)/23-24/010 (CARS)); 9.36 L. [G690].

28. Phanindra K B V N; Characterizing Hydrogeology of Fractured Granite Aquifers using Experimental and Numerical Studies; 53.73 L. [SERB/CE/F070/2022-23/G474].

29. Phanindra K B V N; Identification, Restoration, and conservation of underground water channels (Karez) of north Karnataka using Non-Invasive techniques; 53.96 L. [G559].

30. Pritha Bhattacharya; Centre for Godavari River Basin Management and Studies; 209 L. [G687].

31. Pritha Bhattacharya; Biohydrogen Production from dark fermentation effluent using MEC; 23.42 L. [S316].

32. 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].

33. Ramya Sri Mullapudi; Self-healing characteristics of warm mix asphalt mixtures; 32.7 L. [G417].

34. Roshan Khan M; Attenuation of vibration and earth pressure in retaining walls supporting high-speed railway embankments using EPS Geofoam; 20 L. [S285].

35. Roshan Khan M; Pavement-friendly Autonomous Vehicle Platooning through preset Inter-Vehicular Wheel Wandering Offsets; 35 L. [G641].

36. Roshan Khan M; Evaluation of dynamic load-settlement characteristics of graviloft earth retention system for high-speed railway embankments; 20 L. [S284].

37. Satish Kumar Regonda; Identification, Restoration, and Conservation of underground water channels (Karez) of north Karnataka using Non-Invasive techniques; 53.96 L. [G559].

38. Seetha N; Centre of Excellence (CoE) proposal on Membrane Technologies for Desalination, Brine Management, and Water Recycling; 38.82 L. [G557].

39. Shruti Upadhyaya; Precipitation type classification with INSAT 3D/3Satellite observations using Explainable XAI; 24.13 L. [G628].

40. Sireesh S; Investigation of Geocomposites as a Replacement of GSB Layer; 66.8 L. [NHAI/CE/F036/2022-23/G 480 C].

41. Sireesh S; Development & Feasibility Studies on Drainage and Reinforcement Functions of 3D Geocomposites in Pavements; 258.7 L. [G581].

42. Sireesh S; 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].

43. Sireesh S; Laboratory and Field Investigation on PET Geogrid-Reinforced Base/Subbase Courses; 227.55 L. [STRATA-MoT/CE/F036/2022-23/G464].

44. Sireesh S; Performance of Geosynthetic-Interlayered Asphalt Layers and Overlays; 52.6 L. [NHAI/CE/F036/2022-23/G 480 A].

45. Surendra Nadh Somala; Seismic Source Characterization using State-of-the-art Signal Processing and Machine Learning Techniques; 31.48 L. [G564].

46. Surendra Nadh Somala; Scientific investigation, Digital Documentation & conservation of Petroglyphs of Konkan; 69.84 L. [G563].

47. Surendra Nadh Somala; Generation of Date Cube Module in Geo Tiff Format(DIR/ECS/IRDE/Proc(BCR)/23-24/010(CARS)); 9.36 L. [G690].

48. Surendra Nadh Somala; India Science and Research Fellowship 2021-22; 2.29 L. [GOI/CE/F155/2022-23/G508].

49. Suriya S Prakash; Corrosion Free Bridge Decks and Pavements using GFRP Bars and Synthetic Fibers; 66.2 L. [NHAI/CE/F036/2022-23/G 480 H].

50. Suriya S Prakash; TARE Project MBCET-IITH; 18.3 L. [SERB/CE/F092/2022-23/G545].

51. Suriya S Prakash; Development of burglary resistant innovative concrete barrier for vault walls and doors; 25 L. [C1245].

52. Suriya S Prakash; Developing Cost-Effective Ultra-High-Performance Fiber Reinforced Concrete (UHPFRC) Solutions for Bridges and Other Infrastructure Applications; 100 L. [S299].

53. Suriya S Prakash; CSR contribution towards carrying out research work on Anchors in India; 15.12 L. [FISCHER/CE/F092/2022-23/S223].

54. Suriya S Prakash; Development of burglary resistant innovative concrete barrier for vault walls and doors; 0 L. [S295].

55. Suriya S Prakash; Chopped Carbon Fibers Project; 25.49 L. [RELIANCE/CE/F092/2022-23/S230].

56. Suriya S Prakash; TARE Project MBCET-IITH; 18.3 L. [SERB/CE/F092/2022-23/G545].

57. Suriya S Prakash; Corrosion Free Bridge Decks and Pavements using GFRP Bars and Synthetic Fibers; 66.2 L. [NHAI/CE/F036/2022-23/G 480 H].

58. Suriya S Prakash; Efficient Hybrid FRP Strengthening Solutions for Concrete Bridge Systems; 58.6 L. [NHAI/CE/F036/2022-23/G 480 G].

59. Umashankar B; Identification, Restoration, and Conservation of underground water channels (Karez) of north Karnataka using Non-Invasive techniques; 0 L. [G559].

60. Umashankar B; Laboratory and field investigation on geosynthetic reinforced unpaved & paved roads overlying soft subgrade; 80 L. [G556].

61. Umashankar B; Advanced numerical models to simulate different transportation infrastructure systems with a focus on geosynthetic reinforced back-to-back walls and geosynthetic reinforced integral bridge structure; 28.2 L. [NHAI/CE/F036/2022-23/G 480 E].

62. Umashankar B; Use of slag and C&D wastes as bases/subbases of pavements or as fill materials in conjunction with geosynthetics; 84 L. [NHAI/CE/F036/2022-23/G 480 D].

Awards & Recognitions:

1. Ambika S won the BUILD Project, IIT Hyderabad, 2023-2024 (Role: Inventor and Faculty Mentor), 2023, and Best Paper Award, RECYCLE 2023, IIT Guwahati, (MTech EWRM: Anuj Sharma), 2023.

2. Anuj Sharma (MTech-EWREM), working under the guidance of Ambika S, won the best presentation award at the 4th International Conference on Waste Management at IIT GUWAHATI.

3. Amirtham Rajagopal received the Best Paper award at DRDO Infra and an Outstanding Researcher Award 2024, Asia International Research Awards 2023; Invited as an advisory editorial board member in the International Journal of Impact Engineering".

4. Anil Agarwal received the Excellence in Teaching award in March 2024.

5. Hemanth Kumar Ch, PhD (2020), worked under the guidance of Anil Agarwal, was selected as an Assistant Professor at IIT Dharwad.

6. Digvijay S Pawar was awarded the Networking Grant by the Academy of Medical Sciences (UK and India) (25 L) and received the Bronze medal in the 14th South Zone Shooting Championship Rifle/Pistol (NR) Events held in Trivandrum, Kerala. He is the only shooter to qualify for the nationals from the State of Telangana in air pistol (NR) championship 10M men's (individual).

7. Mahendrakumar Madhavan received the ASCE Outstanding Reviewer for the Journal of Structural Engineering 2023; Represented the Ministry of Steel in visiting Japan and adopting best construction practices by the Japanese in the usage of structural steel towards implementation in India; Fellow of the American Society of Civil Engineers (ASCE); Chair of ASCE Structural Members Committee; Member of the academic-led Global Advisory Committee(GAC); Fellow of the Institution of Civil Engineers (ICE), London.

8. Sivaganesh Selvaraj, PhD (2019), worked under the guidance of Mahendrakumar Madhavan, was selected as an Assistant Professor at The Hong Kong Polytechnic University.

9. Meenakshi received the Incoming Visiting Research Fellowship 2023, Hosted by the Department of Infrastructure Engineering at the University of Melbourne, a fully funded FEIT Visiting Academic Fellows scheme awarded for two two-week visits to cover the air flight and living expenses during the visit. The FEIT Incoming Visiting Fellowship (Female Identifying and Non-Binary Only) is designed to enhance engagement and collaboration with female academics outside FEIT, with the view to enhancing the research outcomes.

10. Munwar B Basha inducted as the Editorial Board Member (EBM) of Indian Geotechnical Journal (IGTJ), published by Springer in association with Indian Geotechnical Society (https://link.springer.com/journal/40098) from 13 Jan 2024 to Present; Received the third Prize in "Best Reviewer of 2022 (from Non-EBM) based on the contribution to the Indian Geotechnical Journal. The award was presented during the Valedictory function of IGC-2023, which was held on Saturday, the 16th of December 2023, by the IGS-Roorkee Chapter; Best Associate Editor for the Journal of Hazardous, Toxic and Radioactive Waste for 2024, American Society of Civil

Engineers, 1801 Alexander Bell Drive, Reston, VA 20191 703-517-9872; IGS - B B Rai - Shri S N Gupta Biennial Award - 2023 for the paper entitled, Seismic Active Earth Pressure on Narrow Backfill Retaining Walls Considering Strain Localization by Shaik Moin Ahmed and B. Munwar Basha published in Indian Geotechnical Journal, Volume 51, Issue 6 (pp.1263–1282) has been adjudged as the best paper on "Earth and Earth Retaining Structures" published through Indian Geotechnical Society.

11. Shaik Moin Ahmed (PhD Scholar), working under the guidance of Munwar B Basha, received the IGS Dr BB Rai SN Gupta Biennial Award for the Best Paper on Earth and Earth Retaining Structures.

12. Narnepati Krishna Chaitanya, Jesna Fathima, and Debasmita Behera (PhD Scholars), working under the guidance of Pritha Chatterjee, received the Mitacs Globalink Research Award.

13. Roshan Khan M was Invited to deliver a talk on 'High-Speed Railway Geo-dynamics' on 03.07.2023 in the workshop on "Fundamental and Applied Skills for Futuristic Vehicles" conducted by MAE Department, IITH; Invited to deliver a talk on 'Geotechnics of High-Speed Railways' in the technical webinar conducted by the Indian Geotechnical Society, Kochi Chapter; Invited to deliver a talk on 'High-Speed Rail Transport' as part of the 7-day PBL workshop program between IITH and Ritsumeikan University, Japan.

14. Seetha N was inducted as an Editorial Board Member, Interpore Journal, 2023.

15. Samuel Kaki, (PhD Scholar), working under the guidance of Seetha & Mudrika Khandelwal, received the best poster prize at the Conference on Desalination, Brine Management, and Water Recycling, DeSaltM-23, organised by the Environmental Science and Engineering Department, Indian Institute of Technology, Mumbai.

16. Shashidhar T received the Cozzarelli Prize from the National Academy of Sciences (PNAS).

17. Shruti Upadhyaya received the Scientific High-Level Visiting Fellowships (SSHN) – 2023, a Short Research Trip to France (SRFT) by the Embassy of France in India;

Special mention and memento for contributions to the International Precipitation Conference (IPC)-14 held in Norman, Oklahoma, USA.

18. Sireesh S received the Australia Awards Fellowship 2023, Department of Foreign Affairs and Trade, Australian Government (AUD 21,443).

19. Revathy Manohar (PhD Scholar), working under the guidance of Sireesh S, received the Best Oral Presentation 2nd position in the theme Geomaterail Characterization site investigation and exploration.

20. Surendra Nadh Somala received the INSA Young Associate (IYA); Project proposal "Lunar-gravitational Wave Antenna", submitted by him to the European Space Agency for science activities on the Moon, got selected for funding.

21. Suriya S Prakash was inducted as an Editorial Board Member of the ASCE Journal of Composites for Construction.

22. Peerzadi Arzeena Imtiyaz (PhD Scholar), working under the guidance of Shwetabh Yadav, received the Best Oral Presentation 1st position in the Theme Rock Mechanics and Rock Engineering.

23. Umashankar B was inducted as an Editorial Board Member, Indian Geotechnical Journal, Springer; Review Editor on the Editorial Board of Transportation and Transit Systems (Specialty section of Frontiers in Built Environment, Frontiers in Environmental Science, and Frontiers in Mechanical Engineering); UGC nominee on governing body of Government Degree College, Siddipet, Medak, Telangana (a college affiliated to Osmania Univ);Nominated as Chair, Groundwork, Deep Foundations Institute for the term 2022-2024.

24. Uma Harathi N, BTech (2017), worked under the guidance of Umashankar B, Bagged the All India Rank-3 position in UPSC 2022.

25. Vaishnavi Bherde (PhD Scholar), working under the guidance of Umashankar B, received the Best Oral Presentation, 2nd position in the Theme AI/ML Applications in Geotechnical Engineering.

Research Highlights

IIT Hyderabad and Simpliforge Creations install India's first pedestrian bridge using Indigenous 3D Printing Technology - K V L Subramaniam

Highlights

- India's first 3D Printed Bridge deployed on the campus of IIT Hyderabad.
- Material and printing technology collaboratively developed by IIT Hyderabad and Simpliforge Creations, a young startup.
- The bridge designed by IIT Hyderabad presents an efficient structural form that was optimized for strength and performance.
- Technology demonstration for 3D printing technology for form-efficient structures in the transportation sector.

A 3D-printed bridge has been deployed on the campus of IIT Hyderabad. The concept and design were developed and evaluated by Prof K V L Subramaniam and his research group, Department of Civil Engineering, IIT Hyderabad. The bridge was off-site printed by Simpliforge Creations, a startup company specializing in providing 3D concrete printing solutions. Designed as a pedestrian bridge, a full-scale 7.50 m bridge was field deployed after load testing a smaller prototype bridge. The bridge has been designed broadly following form optimization to minimize the use of concrete and reinforcement. The concept of the bridge was developed broadly following 'Material follows Force', and the reinforcement/shape has been determined from stress analysis.

Several advances in material processing and design methodology are highlighted in the bridge design. The material developed by Simpliforge Creations was tested and validated for the required rheological performance. 3D concrete printing is an emerging technology that offers the potential for rapid and efficient construction. Technology for digital construction promises added flexibility in printed forms and efficient structural systems. The prototype bridge serves as a technology demonstrator for 3D concrete printing in developing lightweight, rapidly deployable bridges and structures that are form-optimized for specific applications. Prof K V L Subramaniam and his group have worked extensively on developing 3D printing technology for building and infrastructure applications. IITH is actively working with Simpliforge creations to develop applications using 3D concrete printing technology.

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 25 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/

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Patents:

Filed:

1. Antony Franklin; Data-Driven Multi-Hop Method and System for Dynamic Alert Propagation in Emergency Response; 202341082764.
2. Antony Franklin; A Method and System for Updating High-Definition Map in Vehicle Navigation Systems; 202341083188.
3. Bheemarjuna Reddy Tamma; Methods and Systems for Privacy-Preserving Federated Continuous Internet forensics; 202341041491.
4. Vineeth N Balasubramanian; System and Method for Generating Derained Image Using Self-Supervised Learning Model; US 18/138,060.

Published:

1. Antony Franklin; Method and System for Slice Identification in 5G Ran and Core for Secure Slice Service; 202241021594.

2. Bheemarjuna Reddy Tamma; Method and System for Privacy-Preserving Continuous Internet forensics; 202241035158.

3. Maria Francis; Kotaro Kataoka; System for Generating an Anonymous Credential, over a Blockchain and Method for Opening a Credential Thereof; 202341061008.

4. Vineeth N Balasubramanian; System and Method for Detecting Object in an Adaptive Environment Using a Machine Learning Model; US 18/19,7075.

Granted:

1. Bheemarjuna Reddy Tamma; Method and System for Enabling Fair Coexistence Among Multiple Radio Technologies; 689/CHE/2015.

2. Vineeth N Balasubramanian; Method and Electronic Device for Gender Detection of Humans in One or More Images; 201841015128.

Publications:

1. Annavazzala M, Dubey A K, Tambe S D, Tamma B R, & Franklin A A. (2023). Demonstration of a V2X Use Case Using MEC-assisted 5G Emulation Framework. In 2023 15th International Conference on COMmunication Systems and Networks, COMSNETS 2023 (pp. 210–212). https://doi.org/10.1109/COMSNETS56262.2023.10041326.

2. Chilukuri A, Vittal S, & Franklin A A. (2023). SENTINEL: Self-Protecting 5G Core Control Plane from DDoS Attacks for High Availability Service. In 2023 15th International Conference on COMmunication Systems and NETworkS, COMSNETS 2023 (pp. 554–562). https://doi.org/10.1109/COMSNETS56262.2023.10041318.

3. Joshi N, Thakur A, & Franklin A A. (2023). POSTER: PriAuct: Privacy-Preserving Auction Mechanism. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 13907 LNCS (pp. 705–709). https://doi.org/10.1007/978-3-031-41181-6_44.

4. Kumar P, Kumar R, Kumar A, Franklin A A, Garg S, & Singh S. (2023). Blockchain and Deep Learning for Secure Communication in Digital Twin Empowered Industrial IoT Network. In IEEE Transactions on Network Science and Engineering (Vol. 10, Issue 5, pp. 2802–2813). https://doi.org/10.1109/TNSE.2022.3191601.

5. Kumar S, Franklin A A, Jin J, & Dong Y-N. (2023). Seer: Learning-Based 360° Video Streaming for MEC-Equipped Cellular Networks. In IEEE Transactions on Network Science and Engineering (Vol. 10, Issue 6, pp. 3308–3319). https://doi.org/10.1109/TNSE.2023.3257403.

6. Sharma B, Vittal S, & Franklin A A. (2023). FlexCore: Leveraging XDP-SCTP for Scalable and Resilient Network Slice Service in Future 5G Core. In Proceedings of the 7th Asia-Pacific Workshop on Networking, APNET 2023 (pp. 61–66). https://doi.org/10.1145/3600061.3600073.

7. Toka L, Konrad M, Pelle I, Sonkoly B, Szabo M, Sharma B, Kumar S, Annavazzala M, Deekshitula S T, & Franklin A A. (2023). 5G on the Roads: Latency-Optimized Federated Analytics in the Vehicular Edge. In IEEE Access (Vol. 11, pp. 81737–81752). https://doi.org/10.1109/ACCESS.2023.3301330.

8. Aravind N R, & Saxena R. (2023). Parameterized Complexity of Path Set Packing. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 13973 LNCS (pp. 291–302). https://doi.org/10.1007/978-3-031-27051-2_25.

9. Aravind N R, & Saxena R. (2023). Perfectly matched sets in graphs: Parameterized and exact computation. In Theoretical Computer Science (Vol. 954). https://doi.org/10.1016/j.tcs.2023.113797.

10. Amalapuram S K, Channappayya S S, & Tamma B R. (2023). Augmented Memory Replay-based Continual Learning Approaches for Network Intrusion Detection. In Advances in Neural Information Processing Systems (Vol. 36). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85191165949&partnerID=40&md5=ebd44040ab9d2314ee82dae4d7972ff9.

11. Annavazzala M, Dubey A K, Tambe S D, Tamma B R, & Franklin A A. (2023). Demonstration of a V2X Use Case Using MEC-assisted 5G Emulation Framework. In 2023 15th International Conference on COMmunication Systems and NETworkS, COMSNETS 2023 (pp. 210–212). https://doi.org/10.1109/COMSNETS56262.2023.10041326.

12. Chintapalli V R, Giduturi V S K, Tamma B R, & Antony Franklin A. (2023). RAVIN: A Resource-aware VNF Placement Scheme with Performance Guarantees. In Proceedings of IEEE/IFIP Network Operations and Management Symposium 2023, NOMS 2023. https://doi.org/10.1109/NOMS56928.2023.10154423.

13. Chintapalli V R, Korrapati S B, Adeppady M, Tamma B R, Antony Franklin A, & Killi B R. (2023). NFVPermit: Toward Ensuring Performance Isolation in NFV-Based Systems. In IEEE Transactions on Network and Service Management (Vol. 20, Issue 2, pp. 1717–1732). https://doi.org/10.1109/TNSM.2023.3278731.

14. Daw S, Kar A, & Tamma B R. (2023). On Enhancing Semi-Persistent Scheduling in 5G NR V2X to Support Emergency Communication Services in Highly Congested Scenarios. In ACM International Conference Proceeding Series (pp. 245–253). https://doi.org/10.1145/3571306.3571409.

15. Gautam V K, Chintapalli V R, Tamma B R, & Murthy C S R. (2023). Exploring the Feasibility of Configured Grant for Vehicular Scenario. In IEEE Vehicular Technology Conference. https://doi.org/10.1109/VTC2023-Fall60731.2023.10333389.

16. Gudepu V, Chintapalli V R, Castoldi P, Valcarenghi L, Tamma B R, & Kondepu K. (2023). Adaptive Retraining of AI/ML Model for beyond 5G Networks: A Predictive Approach. In 2023 IEEE 9th International Conference on Network Softwarization: Boosting Future Networks through Advanced Softwarization, NetSoft 2023—

Proceedings (pp. 282–286). https://doi.org/10.1109/NetSoft57336.2023.10175451.

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Funded Research Projects:

1. Antony Franklin; Enabling Multi-Hop in C-V2X Network; 280.56 L. [SUZUKI/CSE/F157/2022-23/S267].

2. Antony Franklin; Minimization of HD Maps data transmission through edge caching and spatial aware update transmission; 24.89 L. [NMICPS TiHAN/CSE/F157/2022-23/S235].

3. Bheemarjuna Reddy Tamma; AI/ML-enabled In-Network Security and Power-Performance Management schemes; 80 L. [G618].

4. C Krishna Mohan; LiDAR and camera sensors data based deep learning algorithm for the autonomous driving system; 23 L. [NULL].

5. C Krishna Mohan; Design and development of machine learning algorithms for traffic analytics; 36.05 L. [NULL].

6. C Krishna Mohan; Earthquake early warning system using deep learning approaches; 19.5 L. [NULL].

7. C Krishna Mohan; Computer-Aided Diagnosis of Liver Cancer using Weakly-Supervised Deep Learning incorporated with Computational Anatomic Models; 104 L. [NULL].

8. C Krishna Mohan; Enhancing Small Language Models through Domain Adaptive Federated Framework; 15 L. [NULL].

9. C Krishna Mohan; Computer vision, optics and algorithms involved in the Hangar Design; 17.7 L. [INNOMINDS/CSE/F016/2022-23/S220].

10. Jyothi Vedurada; Global Compiler Optimizations for CPU - GPU Heterogeneous Computing; 1905340 L. [G627].

11. Jyothi Vedurada; Compiler Optimizations for GPUS; 532800 L. [S290].

12. M V Panduranga Rao; Post Quantum Cryptography; 113 L. [NULL].

13. Maria Francis; Post-quantum cryptography; 113 L. [NULL].

14. Maria Francis; Post-quantum anonymous authentication: Through the lens of Lattice Cryptography; 50 L. [G615].

15. Maunendra Sankar Desarkar; Generating Individual Row Description from Tables; 10 L. [TREDENCE/CSE/F158/2022-23/S225].

16. Maunendra Sankar Desarkar; Non-Toxic Multi-lingual Personalized Auto-suggest Generation; 17.7 L. [Microsoft/CSE/F158/2022-23/S236].

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. Praveen Aravind Babu Tammana; Development of a complete authentication system using printed RRAM-based PUFs; 0 L. [G560].

19. Praveen Aravind Babu Tammana; Real-time Object Detection as a Service for UGVs using Edge Cloud; 10 L. [Project].

20. Praveen Aravind Babu Tammana; Programmable Cryptosystem for 5G telecommunication networks; 0 L. [Project].

21. Rajesh Kedia; Efficient Management of Shared Resources for Edge Systems Executing Concurrent DNNs; 20.27 L. [SERB/CSE/F278/2022-23/G499].

22. Rameshwar Pratap Yadav; A new similarity metric and sublinear time search algorithm for matrix data; 30 L. [SG/IITH/F308/2022-23/SG-144].

23. Sakethanath J; Causal Regularized Models ($630000); 50 L. [FUJITSU/CSE/F197/2022-23/S243].

24. Sathya Peri; Parallelization of Smart Contract Execution in Tezos Blockchain(USD 9,225); 0.09 L. [TEZOS/CSE/F137/2022-23/S198].

25. Sathya Peri; An Efficient Non-Blocking Framework for Large-Scale Graph Analytics; 49.66 L. [SERB/CSE/F137/2022-23/G542].

26. Sathya Peri; Efficient Smart Contract Framework for Tezos Blockchain Ecosystem; 89.43 L. [CEFIPRA/IFCPAR/CSE/F137/2022-23/G539].

27. Shirshendu Das; Efficient utilization and Refresh overhead Minimization of eDRAM based Last Level Cache; 9.76 L. [SERB/CSE/F330/2022-23/G541].

28. Shirshendu Das; Do Not Forget Cache Management Policies While Designing Secure Last Level Cache; 22.9 L. [G661].

29. Sobhan Babu; Big data analytics & IT support systems for innovative activities; 576 L. [G620].

30. Sobhan Babu; Identifying Anomalous dealers using bigdata analytics; 1085 L. [G599].

31. Sobhan Babu; Detection of financial frauds in taxation, banking and in the stock market; 25 L. [G553].

32. Sobhan Babu; Big data analytics & Information Technology support system; 1396 L. [S311].

33. Sobhan Babu; Big data analytics & IT support; 1339 L. [G622].

34. Srijith P K; Time Series Explainability; 10 L. [TREDENCE/CSE/F184/2022-23/S226].

35. Srijith P K; Deep learning for Telemetry data; 5.17 L. [INTEL/CSE/F184/2022-23/S250].

36. Srijith P K; Continual learning for vision and language; 53.19 L. [SRIPL/CSE/F184/2022-23/S246].

37. Subrahmanyam Kalyanasundaram; Conflict-Free Coloring of Graphs and Related Problems; 22.81 L. [SERB/CSE/F081/2022-23/G524].

38. Upadrasta Ramakrishna; Qualcomm Faculty Award; 0 L. [QUALCOMM/CSE/F136/2022-23/S263].

39. Upadrasta Ramakrishna; SMC IITH Computers collaboration; 0 L. [SUZUKI/CSE/F136/2022-23/S266].

40. Vineeth N Balasubramanian; Algorithmic Recourse for Actionable Explanations in AI Models; 17.7 L. [Microsoft/CSE/F121/2022-23/S241].

41. Vineeth N Balasubramanian; Learning with limited labelled Data: Solving the Next Generation of machine learning problems; 0 L. [G582].

42. Vineeth N Balasubramanian; Deep Learning Techniques for BBP Images and Data; 20.5 L. [KLA/CSE/F121/S143].

43. Vineeth N Balasubramanian; AI for Sustainable Infrastructure and Resource Planning, Analysis and Monitoring; 200 L. [AICOE/CSE/F121/G693].

Awards & Recognitions:

1. Ashish Mishra's work on Type-based verification of Under-approximate properties of programs received the "Distinguished Paper" award in one of the top venues of Programming Languages, PLDI '23.

2. Bheemarjuna Reddy Tamma Best Paper Award at 16th International Conference on Communication Systems & Networks (COMSNETS India Internet Governance Workshop 2024) held in Bengaluru.

3. C Krishna Mohan; received the JST Sakura Science Exchange Program; received the Excellence in Research Award in recognition of distinguished research in the the year 2024 at IIT Hyderabad; received the Fulbright-Nehru International Education Administrators Seminar fellowship for the year 2023-2024.

4. M V Panduranga Rao received the Runner-up best paper award for the ITS workshop; was Invited for a talk on the occasion of National Science Day at RCI Hyderabad; was Invited to Talk at IIIT Delhi.

5. Konjengbam Anand, PhD (2014-19), worked under the guidance of Manish Singh, was selected as an Assistant Professor at IIT Dharwad.

6. Maria Francis was Awarded the Mottez fellowship by the Institute Henri Poincaire, Paris, to participate and Collaborate in the trimester, Recent Trends in Computer Algebra Fall 2023.

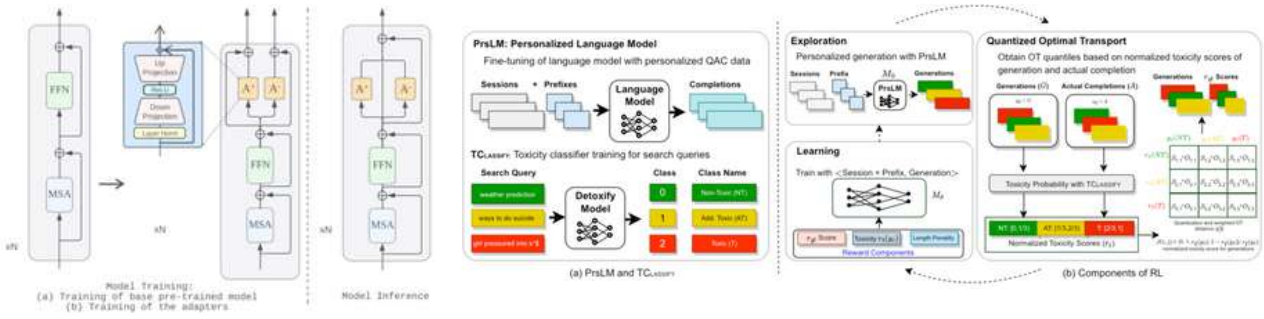
7. Praveen Aravind Babu Tammana received the TiHAN faculty fellowship, Nov'24-Oct'26, - IEEE/ACM COMSNETS invited Speaker, Jan'24 - 1 x PhD (Harish) selected for Full Bright Fellowship, - "Excellent" rating for IITH seed grant project, - IBM Research, Science for scale event invited speaker.

8. Vineeth N Balasubramanian Selected as INSA (Indian National Science Academy) Associate Fellow, 2024; Distinguished Reviewer at IJCAI, 2023; Listed in World's Top 2% Scientists, 2023.

Research Highlights

Mitigating toxicity in Natural Language Generation - Maunendra Sankar Desarkar

In this work with Microsoft under the Microsoft Academic Partnership Grant, we worked on the problem of mitigating toxicity in query autosuggestions. Autosuggestions are suggestions for complete search queries that we see while we type our queries in search systems. Query autocompletion or autosuggest system is a common and important part of web search engines. We develop a series of methods for reducing harmful, racial, and objectionable content in the query suggestions generated by the system.



Publications:

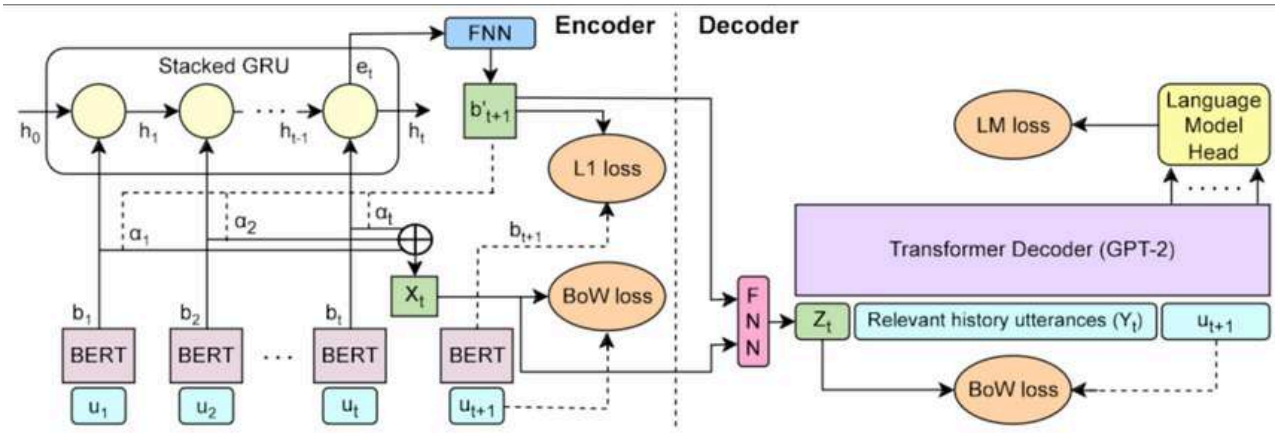
Aishwarya Maheswaran, Kaushal Kumar Maurya, Manish Gupta, Maunendra Sankar Desarkar: DAC: Quantized Optimal Transport Reward-based Reinforcement Learning Approach to Detoxify Query Auto-Completion. SIGIR 2024: 608-618.

Aishwarya Maheswaran, Kaushal Kumar Maurya, Manish Gupta, Maunendra Sankar Desarkar: DQAC: Detoxifying Query Auto-completion with Adapters. PAKDD (6) 2024: 108-120.

Kaushal Kumar Maurya, Maunendra Sankar Desarkar, Manish Gupta, Puneet Agrawal:
TRIE-NLG: trie context augmentation to improve personalized query auto-completion for short and unseen prefixes. Data Min. Knowl. Discov. 37(6): 2306-2329 (2023).

Explainable Dialog Generation - Maunendra Sankar Desarkar

Long-range context modelling is crucial to conversational AI systems for both dialogue understanding and generation. The most popular method for dialogue context representation is to concatenate the last-k utterances in chronological order. However, this method may not be ideal for conversations containing long-range dependencies, i.e., when there is a need to look beyond last-k utterances to generate a meaningful response. We propose DialoGen, a novel encoder-decoder-based framework for dialogue generation with a generalized context representation that can look beyond the last-k utterances. The main idea of the approach is to identify and utilize the most relevant historical utterances instead of last k, which also enables the compact representation of dialogue history with fewer tokens. Even with a compact context representation, DialoGen performs comparably to the state-of-the-art models. The generation process also aligns with the natural process of human conversations, as supported by psycho-linguistic theory. We further work on improving the interpretability of the generated responses by predicting a few important words that we expect to be present in the generated response, and also by grounding the responses on those predicted words.



- Suvodip Dey, Maunendra Sankar Desarkar, Asif Ekbal, and Srijith P K. DialoGen: Generalized Long-Range Context Representation for Dialogue Systems. PACLIC 2023. (pp. 372-386).
- Suvodip Dey and Maunendra Sankar Desarkar, BoK: Introducing Bag-of-Keywords Loss for Interpretable Dialogue Response Generation. SIGDIAL 2024

Department of Design

The fiscal year 2023-24 kicked off with the launch of a new initiative: The Design Festival – Ayaam, a celebration and showcase of the spirit of design. This platform provided students an opportunity to exhibit their work alongside keynote talks, workshops, panel discussions, and more. The department also began admissions for three streams—Visual Design, Interaction Design, and Product Design—under the Master of Design (MDes) program. Notably, this year marked the graduation of the first cohort from the Bachelor of Design, Master of Design (Self-sponsored), and Master of Design by Practice programs. Faculty members actively contributed to the research in the allied areas of design, publishing in reputed national and international journals and conferences. The department also strengthened its industry connections through visits to Green Gold Studios, Ramoji Film City, and IMAGE - Centre of Excellence in Animation, Film, and VFX Incubator, among others.

A Memorandum of Understanding (MoU) was signed with Maulana Azad National Urdu University (MANUU), Hyderabad, to enhance collaboration between industry and academia. Additionally, the department organized industry visits, invited talks, and workshops covering a variety of topics to broaden students' understanding of design's role across different domains. Skill development programs for rural youths were also conducted with the support of Corporate Social Responsibility (CSR) initiatives from various industries. A curated lecture series coordinated by Dr Neelakantan featured eminent design professionals conducting workshops over two weeks.

The Department Advisory Committee (DAC) meeting took place from August 3rd to 5th. Preparations are underway for hosting one of the flagship international design research conferences, the International Conference on Research into Design (2025), scheduled for January 2025. The department will also host the International Conference on Service Design (ServDes2025) in October 2025. The department building is nearing completion, with plans to start the next academic session in the new facility.

The department has played a significant role in the institute's outreach activities, including organizing an Alumni Meet. Faculty and students actively participated in campus development initiatives, such as the selfie point (I♥IITH) designed by Dr Shiva Ji. The department also coordinated the activities of the Rural Development Centre, facilitating a meeting with the headmasters/principals of ZPHS schools in adopted villages for a rural teaching initiative. Faculty and students visited five adopted rural schools near the institute to teach 10th-grade students.
For more information, please visit: https://design.iith.ac.in/

Faculty

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Design Applications

Filed:

1. Deepak John Mathew, Ketan Madan Chaturmutha; Urban Air Mobility Aircraft; 400332-001.
2. Delwyn Jude Remedios, Sandra; Soc Dice; 386532-001.
3. Delwyn Jude Remedios, SandraNumber; Dice386534-001.
4. Prasad S Onkar, B Vivekananda chary; Single Axis Sun Tracking Solar Pergola; 390830-001.
5. Rishabh Singh, Srikar A V; Micro Ambulance Design to Enhance Access to Remote Locations in India; 393073-001.
6. Shiva Ji; Landmark Tower; 393440-001.
7. Shiva Ji, Aman Sharma; Landmark Cube; 393441-001.

Published:

1. Delwyn Jude Remedios, Sandra; Game Board; 386533-001.
2. Srikar AVR; Vishnu Prasad Herbal Decoction Maker; 385595-001.
3. Srikar A V; Uvc Air Purifier; 375166-001.
4. Suriya S Prakash, B Taraka Malleswara Rao, M Rahul Reddy; Multi Laminate Prestressing Device; 383016-001.
5. Suriya S Prakash; B Taraka Malleswara Rao; M Rahul Reddy Prestress Jack Holding Device; 383017-001.

Publications:

1. Bhandari U, & Mathew D J. (2023). Development of Design Education Curriculum for Grade 5 Indian CBSE Schools to Facilitate 21st Century Skills. In 2023 IEEE 12th International Conference on Engineering Education, ICEED 2023 (pp. 165–170). https://doi.org/10.1109/ICEED59801.2023.10264027.
2. Chaturmutha K M, & Mathew D J. (2023). A Visual Design Analysis of Urban Air Mobility for Indian Users. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 209–223). https://doi.org/10.1007/978-981-99-0264-4_19.
3. Mishra M, Mathew D J, & Chaturmutha K M. (2023). Study and Evaluation of User Interaction and User Experience Design for the Development of a Fully Autonomous Passenger Drone Interior Cabin for India. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 501–512). https://doi.org/10.1007/978-981-99-0293-4_40.
4. Rautray P, Roy A, & Mathew D J. (2023). HappyBin Remodifying Social Behaviors. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 997–1009). https://doi.org/10.1007/978-981-99-0293-4_80.
5. Remedios D J, Mathew D J, & Scheleser M. (2023). Insider–Insider Observations and Reflections from the Director, Cast, and Crew of Table for Two—A Parallel Interactive Narrative in Virtual Reality. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 973–984). https://doi.org/10.1007/978-981-99-0293-4_78.
6. Sen A, & Mathew D J. (2023). Rediscovering the Work of Sham Sundar Das: A Look at the Photographer's Unrecognized Legacy. In Photography and Culture (Vol. 16, Issue 2, pp. 167–182). https://doi.org/10.1080/17514517.2023.2208450.
7. Sen A, & Mathew D J. (2023). User Experience of Virtual Reality Showcasing Sham Sunder Das Archive: A Case Study of Digital Preservation of the Archival Artifact. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 701–714). https://doi.org/10.1007/978-981-99-0293-4_56.
8. Som S, Mathew D J, & Vincs K. (2023). Virtual Reality for Creativity Practice and Art and Design Education: A Literature Review. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 1011–1022). https://doi.org/10.1007/978-981-99-0293-4_81.
9. Gattoz K R, Simha S, & Onkar P S. (2023). SIMBA: An Interactive Sketch-Based Tool for Motion Visualization. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 14056 LNCS (pp. 181–195). https://doi.org/10.1007/978-3-031-48044-7_13.
10. Raju S K K, & Onkar P S. (2023). Design Paradigms of Hierarchical Lattice Structures. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 647–658). https://doi.org/10.1007/978-981-99-0264-4_54.
11. Rakhin K V, Onkar P S, & Hayavadana J. (2023). Modelling and prediction of visual-haptic perception in textiles. In Indian Journal of Fibre and Textile Research (Vol. 48, Issue 3, pp. 253–261). https://doi.org/10.56042/ijftr.v48i3.6053.
12. Rangarajan V, Onkar P S, de Kruiff A, & Barron D. (2023). Imager, interpreter, aesthete: Roles played by design students in graphic design ideation. In Design Computing and Cognition'22. https://doi.org/10.1007/978-3-031-20418-0_42.
13. Sagar V, & Onkar P. (2023). Recreating Gaming Experience Through Spatial Augmented Reality. In Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST: Vol. 479 LNICST (pp. 149–160). https://doi.org/10.1007/978-3-031-28993-4_11.
14. Shreya, L., & Shahid, M. (2023). Traditional Educational Experiences in the Age of Pandemic. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 505–517). https://doi.org/10.1007/978-981-99-0264-4_42.
15. Avinash P K, Mohapatra S, & Ji S. (2023). The Transition of Food Grain Purchasing Systems in Urban Gated Communities Towards a Circular Economy in India. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 1185–1194). https://doi.org/10.1007/978-981-99-0264-4_96.
16. Chakraborty S, & Ji S. (2023). Exploring Architectural Façade characteristics of Bag Bazar Street, Kolkata. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 49–59). https://doi.org/10.1007/978-981-99-0293-4_5.
17. Chakraborty S, & Ji S. (2023). Heritage impact assessment of Adi Ganga Kalighat, Kolkata, India, towards SDG 11.4 and 8.9 for urban heritage. In Journal of Engineering and Applied Science (Vol. 70, Issue 1). https://doi.org/10.1186/s44147-023-00269-7 .
18. Chakraborty S, & Ji S. (2023). Urban Metamorphosis of Kolkata Through Visual Mapping (1690–1962). In Smart Innovation, Systems and Technologies (Vol. 342, pp. 829–839). https://doi.org/10.1007/978-981-99-0264-4_68.
19. Chakraborty S, & Ji S. (2023). Visualization Techniques for Visibility Graph Analysis in Virtual Reality for the Case of the Indian Institute of Technology, Hyderabad. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 941–951). https://doi.org/10.1007/978-981-99-0293-4_75.
20. Krishna E A, Mohapatra S , & Ji S. (2023). Furniture Design: Reimagining a Designer's Workstation Through an Ergonomic Lens. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 315–324). https://doi.org/10.1007/978-981-99-0293-4_25.

21. Pawar, T., Sharma, A., & Ji, S. (2023). Projection Mapping on Building Facade Using Augmented Reality. In Smart Innovation, Systems and Technologies (Vol. 343, pp. 953–960). https://doi.org/10.1007/978-981-99-0293-4_76.

22. Sharma A, Mohapatra S, Pawar, T., & Ji, S. (2023). Aligning the Criteria of UNSDG's Goal 11 with Vernacular Habitats of North-East India. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 1205–1213). https://doi.org/10.1007/978-981-99-0264-4_98.

23. Sharma A, Pawar T, & Ji S. (2023). Exploring Site-Responsive Characteristics in the Tribal Architecture of Northeastern Indian States (Meghalaya, Nagaland). In Smart Innovation, Systems and Technologies (Vol. 342, pp. 1041–1051). https://doi.org/10.1007/978-981-99-0264-4_85.

24. Sharma A, Pawar T, & Ji S. (2023). Solar Passive Design Features in the Vernacular Architecture of Telangana. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 687–696). https://doi.org/10.1007/978-981-99-0264-4_57.

25. Sridharan, K., & Ji, S. (2023). Climate Change Impacts on the Built Heritage of Hyderabad. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 1087–1101). https://doi.org/10.1007/978-981-99-0264-4_89.

26. Sridharan K, Pawar T, Sharma A, & Ji S. (2023). The Architecture of the Ao Nagas: Culturally Deep-Rooted to Venerate and Conserve the Local Biodiversity. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 1115–1127). https://doi.org/10.1007/978-981-99-0264-4_91.

27. Sridharan K, Sharma A, & Ji S, (2023). Cultural Heritage Conservation Through the Framework of UNSDG. In Smart Innovation, Systems and Technologies (Vol. 342, pp. 1129–1145). https://doi.org/10.1007/978-981-99-0264-4_92.

Funded Research Projects:

1. Ankita Roy; Adolescent Sexual Health Education through Picture Books: Designing and Disseminating Picture Books on Sexual Health-Taking the Conversation to Children, Doctors, Teachers; 18 L. [S319].

2. Deepak John Mathew; Virtual Recreation and Digital Preservation of Cultural Heritage Temple sites of Southern States of India submitted under the Science and Heritage Research Initiative (SHRI) programme of DST; 112.32 L. [NULL].

3. Delwyn Jude Remedios; Mural Art at IIT Hyderabad; 1.5 L. [NULL].

4. Delwyn Jude Remedios; Haww! (Board Game on Societal perception and stereotypes towards genders in India); 0.5 L. [NULL].

5. Delwyn Jude Remedios; Video Wall Mural Art at Academic A block entrance; 1 L. [NULL].

6. Delwyn Jude Remedios; Consultancy and Design of TiHAN IIT Hyderabad Logo; 1 L. [NULL].

7. Delwyn Jude Remedios; NCERT Graphic Narratives for Adult learners towards acquiring Critical Life Skills; 0 L. [NULL].

8. Shahid Mohammad; Cheriyal Craft; 11 L. [S269].

9. Shiva Ji; Creating Digital Immersive Heritage Experience, Risk Assessment and Vernacular Architecture Analysis of Five Historically Significant Temple Marvels of Kashi; 89.92 L. [DST/SHRI/DES/F205/2022-23/G483].

10. Srikar A V R; Redefining User experience of smart glasses for the visually impaired through generative design & other strategies; 3 L. [G589].

Awards & Recognitions:

1. Ankita Roy received the Best Typography Poster Design Award - TYPODAY 2023, IIT Bombay (October 2023).

2. Harsh Raj Gond (MDes 2023), working under the guidance of Ankita Roy, received recognition at National & International Film Festivals.

3. Delwyn Jude Remedios's Mitti (IITH / Independent film / Sand animation).
   - Selected as the Runner-up in the Advertisement category at the Cineaste International Film Festival of India - CIFFI 2023.
   - Official Selection at CMS, International Children's Film Festival (ICFF), Lucknow, India 2023
   - Official Selection at Toronto Animation Arts Festival International, Toronto, Canada 2023
   - Official Selection at Liff-Off Filmmaker Sessions, United Kingdom 2023
   - Official Selection at Khabarovsk International Animation Film Festival "Animur" Khabarovsk, Russia 2023
   - Official Selection at Green Panorama Environmental Film Festival, Kerala 2024

4. Delwyn Jude Remedios's Save Our Species (IITH / Independent film / Stop-motion animation)
   - Official Selection at The NGO International Film Festival, Nairobi, Kenya 2023
   - Official Selection at Khabarovsk International Animation Film Festival "Animur", Russia 2023
   - Official Selection at Animatic, Saronno, Italy 2023
   - Official Selection at Reto por el Mundo / Erronka Munduan / Challenge for the World, San Sebastián, Guipúzcoa - Gipuzkoa 20007, Spain 2023
   - Official Selection at The NGO International Film Festival, Nairobi, Kenya 2023

5. Delwyn Jude Remedios's Something More (IITH / / Music Video / Stop Motion / Single Thread) Director: Delwyn Jude Remedios Music by: Aditi Kujur Music Producer: Michel Kroll Animation Team: Akash Tapadar, B Shivranjani, Rahul Chakraborty, Ruchira Bhattacharya, Rutvik Vilas Kokate, Tanmay Agarwal.
   - Official Selection at in Love with Art Fest, Saint Petersburg, Russia 2023
   - Official Selection at Mumbai International Film Festival, India 2024
   - Official Selection at ANIMAPHIX New Contemporary Languages Film Festival, Italy

6. Deepak John Mathew received the Lifetime Achievement Prathibha Puraskaram Award for his contribution to the field of education by Union Christian College.

7. Sumana Som (PhD), who worked under the guidance of Deepak John Mathew, was selected as an Assistant Professor at IIT Jodhpur.

8. Neelakantan P K received the JICA Friendship

Fellowship 2024 and the Aarhus Institute of Advanced Studies Visiting Fellowship 2024.

9. Saurav Khuttiya Deori received the award for Excellent teaching contributions, curated by Honourable Director Prof B S Murty of IIT Hyderabad during the 16th Foundation Day '24.

10. Yash Shrivastava, working under the guidance of Seema Krishnakumar, won under the communication design category with the brief "To design an awareness campaign for one of the Latter 8 SDGs" at D'Source Design Challenge 2023 (IDC, IIT Bombay and BHU).

11. Shahid Mohammad received the Best Typography Poster Design award at Typography Day 2023, BHU & IDC, IIT Bombay; Session Chair, 9th International Conference on Research into Design, 9 - 11 January 2023 at Indian Institute of Science, Bangalore, India; Panelist for the Craft & Design Exchange Forum being held at the Aatmanirbhar Bharat Centre of Design (ABCD) housed in the historic Barrack of the Red Fort, Delhi. Title: Role of Academic Institutions in Craft Revival and Documentation.

12. Shiva Ji received a Fellowship from the Japan Science and Technology Agency for the Japan-Asia Youth Exchange Program (Sakura Science Program), hosted at Kyushu University, Japan, for two weeks; won the Best Paper Award in ICET2023 at MA NIT Bhopal, 10 April 2023; won two Best Research Paper Awards at ICoRD'23, organized by IISc Bangalore 2023.

13. Subhashree Mohapatra (PhD scholar IITH-SUT JDP), working under the guidance of Shiva Ji, won the Best Paper Award at MN NIT Bhopal on "Indoor Air Quality Analysis of 80-year-old Traditional House in Kalabgoor, Telangana, India during the winter". It is a part of her research on the rural architectural systems of Telangana.

14. Mr Srikar A V R received the Presenter Certificate, World Design Assembly, Japan, International Conference 2023; Visiting Scholar Award, Ubon Ratchathani University, Thailand, 2024; Rolled out grass-root Innovation program at IITH under the guidance of Dr Anil Gupta; Juror for Design programs at National Institute of Design and Woxen University; Change Management Certification Award, AWA, London, 2023-24; Reviewer 4th Asian Conference on Ergonomics and Design (ACED) 2023 jointly with HWWE 2023 and BRICS plus HFE.

Research Highlights

Several faculty members have made notable contributions to design practice and research.

- Ankita Roy published an interactive Augmented Reality book titled Embark Explore Experience Ancient Egypt with Augmented Reality.
- A permanent exhibition of Cherial Dolls, curated by Shahid Mohammed and his team in collaboration with artisans, was showcased at the Atmanirbhar Bharat Centre of Design (ABCD) at Red Fort, New Delhi.
- An international photography exhibition was coordinated by Prof Deepak John Mathew in collaboration with Woxen School of Art and Design, Hyderabad, and University College of Arts, Farnham, UK.
- Prasad S Onkar conducted a two-day workshop on Mind-Body-Space Tangible Computing in Extended Reality in collaboration with Vinayak from Texas A&M University, USA.
- Animation films like Save Our Species, Mitti, and Something More, guided by Delwyn Remedios, received national and international recognition at various film festivals.
- The second edition of Ayaam – IITH Design Festival also took place, with the inaugural session part of the JICA Lecture series delivered by Yozo Fujino (President of Josai University, Professor Emeritus of the University of Tokyo, Japan), Hidetoshi Ohno (Architect, Partner, and Representative Director), and Yoshiyuki Kawazoe (Associate Professor at the University of Tokyo, Japan).

Overall, this year saw several new initiatives and transitions, and the department was gearing up for shifting to its own building as it was getting ready for handover. Looking forward to another exciting year


Design Department Building

Department of Electrical Engineering

Welcome to the Electrical Engineering Department Annual Report for the year 2023-2024. 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 2023-2024. 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, specialising 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 EE department reached a total of 395 students (on roll up to 2024 March: BTech + MTech + PhD). Our department is home to 35 dedicated faculty members, each possessing a strong academic background and expertise in diverse electrical engineering domains, and 17 support staff 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.

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 of around 126300708 INR received through various private/public agencies have been instrumental in advancing the research and educational endeavours of the Electrical Engineering department during 2023-2024. 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: BTech - 86.67 %, MTech - 76.47% and 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/

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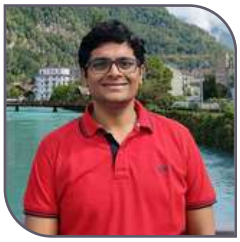

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Patents:

Filed:

1. Amit Acharyya; Graph Representation Learning-based Average Power Estimation of Synthesized ASIC RTL Designs; 202341047558.
2. Shishir Kumar; A Device and Method for Integrating 2D Nanoporous Membranes in Microfluidic Circuits; 202341090061.
3. Sushmee Badhulika; A Method for Producing a Bismuth Tungstate Polymer Composite Mold; 202341017456.

Published:

1. Abhinav Kumar; A Method for Adaptive Multi-User Clustering in Non-Orthogonal Multiple Access Systems with Imperfect; 202241018280.
2. Amit Acharyya; Digital-Twin Based Cost Effective and Scalable Fault-Tolerance Framework for Rram Based Neural Computing Systems; 202341044159.
3. Kiran Kumar Kuchi; Nb-IoT and GNSS Chip Design and Architecture; 202141034798.

4. Kiran Kumar Kuchi; Methods for Signaling Channel State Information Feedback Between User Equipment and Base Station; 202241023541.

5. Kiran Kumar Kuchi; Method and System for Transferring Data Between Distributed Unit and Radio Unit; US 17/926,808.

6. Rajalaksmi P; System and Method for Hyperspectral Imager Interface on UAV for Data Acquisition; 202141042862.

7. Rupesh Wandhare; A Hybrid Charging System; 202111023691.

8. Shishir Kumar; A Detachable Connector for Transferring Fluids to a Microfluidic Device; 202341074239.

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3. Kiran Kumar Kuchi; System and Method to Generate a Waveform in a Communication Network; 201947006811.

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14. Siva Rama Krishna Vanjari; Shiv Govind Singh; Optimized Ultra-Thin Alloys Leads Sub 140 Degree Celsius and Low Pressure 2.5 Bar Cu-Cu Bonding for 3D ICS; 201641035405.

15. Sushmee Badhulika; Chemiresistive-Paper-Based Biosensor for Detection of a Biomarker; 202141054721.

16. Zafar Ali Khan Mohammed; Improved Field Programmable Gate Array Arrangement for Single Event Upset Detection and a Method Thereof; 1158/CHE/2013.

17. Zafar Ali Khan Mohammed; A Universal Generalized Flip Decoder and a Method of Decoding Thereof; 202241074335.

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1. G V V Sharma; Digital Design through Arduino.

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Funded Research Projects:

1. Abhishek Kumar; Sponsorship agreement of MTech thesis project in Mediatek Bangalore; 5.4 L. [S281].

2. Abhishek Kumar; Design of transceiver for On Board Wireless interface of distributed control systems; 58 L. [Approved in Nov 2023].

3. Aditya T Siripuram; Fast DET Computation for signals with additively structured support; 6 L. [G673].

4. Amit Acharyya; Hardware-Software interaction-based Novel Config-Ware design to handle run time power, performance, temperature and algorithm complexity and platform Aware DNN Adaptation; 100 L. [S317].

5. Amit Acharyya; National Network project of CSIR Centre for Cellular and Molecular Biology Hyderabad; 187 L. [G603].

6. Amit Acharyya; Unique Face Vector Generation; 29 L. [S307].

7. Amit Acharyya; AI Empowered loT based Miniaturized Lead-less and Patchless Sleep Disorder Monitoring System Design; 95 L. [G624].

8. Amit Acharyya; Power Optimization of Auxiliary Systems SO. No:sezu-2-20220714-054 Dt:14.07.2022 (Payment milestone:35% after releasing SO); 30 L. [MOBIS/EE/F091/2022-23/S234].

9. Amit Acharyya; AI/ML-enabled In-Network Security and Power-Performance Management schemes; 80 L. [G618].

10. Gajendranath Chaudhury Ch; Chips to Startup (C2S); 96 L. [G576].

11. Gajendranath Chaudhury Ch; Visvesvaraya PhD Scheme for Electronics and IT: Phase II; 153.24 L. [G611].

12. Gajendranath Chaudhury Ch; Printed, wearable sensor array for non-invasive monitoring of diabetic complications and chronic kidney diseases; 40 L. [G621].

13. Jose Titus; Six-phase induction motor 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].

14. Kapil Jainwal; A Direct Time-of-Flight sensor based System-on-a-chip LiDAR system for space aircraft navigation and autonomous landing; 32 L. [NULL].

15. Kapil Jainwal; System-on-a-chip (SoC) CMOS imager sensors design, development, and characterization; 31.92 L. [SG/IITH/F336/2023-24/SG-172].

16. Kapil Jainwal; A fully integrated low-latency, high dynamic range, bio-inspired event-based dynamic and active vision sensor (DAVIS) with global shutter operation for object tracking, classification, and recognition in a highly dynamic scene; 46 L. [G587].

17. Kapil Jainwal; High Precision Interfacing Circuits for Capacitive based Sensors (HPICCS) for defense Applications; 100 L. [G11].

18. Lakshmi Prasad Natarajan; Versatile Codes for 6G Communications; 50 L. [QUALCOMM/EE/F176/2024-25/D-01].

19. Mohammed Zafar Ali Khan; IIT-H-Terragraph-60 GHz Trial; 49 L. [FCL/EE/F013/2022-23/S244].

20. Naresh Kumar Emani; Engineering Light Emission in Nanophotonic Structures Using Two-Pulse Excitation; 51.7 L. [SERB/EE/F195/2022-23/G534].

21. Naresh Kumar Emani; High-Speed Electronic and Photonic component co-design for on-chip QKD transceivers; 13.92 L. [S283].

22. Oves Mohamed Hussein Badami; Development of a complete authentication system using printed RRAM-based PUFs; 20 L. [G560].

23. Oves Mohamed Hussein Badami; Development of simulation framework and modelling of bipolar valence change RRAM: Focus on the electron transport and ambient temperature; 28.96 L. [DST-SERB/EE/F241/2022-23/G498].

24. Pradeep Kumar Yemula; AI CoE on Sustainable Cities; 0 L. [G693].

25. Pradeep Kumar Yemula; Standardized way of sharing Energy data with end consumer applications; 6.62 L. [NSGM/EE/F126/2022-23/G500].

26. Pradeep Kumar Yemula; Industrial Energy Assessment as part of "Kotak-IITM Save Energy Mission(KISEM) – IIT Hyderabad"; 0 L. [S270].

27. Rajalakshmi P; ADAS for point-to-point navigation system for autonomous car adaptable to Indian scenarios; 5.46 L. [S186].

28. Rajalakshmi P; Teachers Associateship for Research Excellence(TARE); 6.70 L. [G441].

29. Rajalakshmi P; Real-Time Edge Computing Architectures for LiDAR-based Intelligent Transportation System; 59.09 L. [G335].

30. Rajalakshmi P; AI Driven High Throughput Phenotyping to Accelerate Crop Improvement through Images captured from unmanned aerial vehicle (UAV) with on-vehicle sensors; 14.22 L. [G174].

31. Rajalakshmi P; TiHAN/DST -National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) - Implementation Mechanism - Technology Innovation Hubs (TiHs); 300 L. [DST/EE/F002/019-20/G283/T283].

32. Rajalakshmi P; AI for Sustainable Infrastructure and Resource Planning, Analysis and Monitoring; 200 L. [G693].

33. 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].

34. Rupesh Ganpatrao Wandhare; A HYBRID CHARGING SYSTEM; 30 L. [G571].

35. Rupesh Ganpatrao Wandhare; Hybrid Bridge Isolated DCDC Converter with Zero Voltage Switching for a Wide Range of Operations and Suitable for Auxiliary Supply in EV; 37.54 L. [G460].

36. Rupesh Ganpatrao Wandhare; Industrial Energy Assessment as part of "Kotak-IITM Save Energy Mission(KISEM) –IIT Hyderabad"; 139.8 L. [S270].

37. Shashank Vatedka; Distributed estimation and learning with limited communication; 30.51 L. [SERB/EE/F228/2022-23/G522].

38. Shiv Govind Singh; Development of ultrasensitive multiple biomarker detection platforms for minimally invasive diagnosis and monitoring of Alzheimer's disease and study of combination drug therapy on AD biomarker in neuronal cell; 36.95 L. [DST/CHE/F029/2022-23/G507].

39. Shiv Govind Singh; Fabrication of High-Temperature Piezo Sensors for Aeronautical Application; 56.9 L. [AR&D/BPROJECT NO 2060, M&M PANE].

40. Shubhadeep Bhattacharjee; India US Collaborative Workforce Development Program in Semiconductor Manufacturing; 700 L. [SPARC-MOE/EE/F029/2024-25/G707].

41. Shubhadeep Bhattacharjee; Scalable co-integration of 2D materials for the hardware realization of spiking neural networks; 34.97 L. [BRNS-YSRA/EE/F279/2024-25/G710].

42. Shubhadeep Bhattacharjee; Heterogenous Integration of Neuromorphic Devices with 2D Semiconductors; 25 L. [SG/IITH/F279/2022-23/SG-117].

43. Shubhadeep Bhattacharjee; Tunable Synaptic plasticity in Mos transistor for low-power spiking neural networks; 33.1 L. [SERB/EE/F279/2022-23/G497].

44. Siva Rama Krishna Vanjari; Fabrication of high-temperature piezo pressure sensor for Aeronautical application; 0 L. [ARDB/EE/F029/2022-23/G505].

45. Sri Rama Murty Kodukula; Development of real-time audio and speech modules for robot audition; 230.4 L. [S232].

46. 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].

47. Sri Rama Murty Kodukula; Recent Advances in Speech Recognition; 0.33 L. [QUALCOMM/EE/F001/2022-23/S221].

48. Sri Rama Murty Kodukula; Speech-to-speech translation for tribal languages using deep learning framework; 65.92 L. [G384].

49. Sumohana S Channappayya; Development of Digital Scene Matching Area Correlation (DSMAC) Algorithms and Prototype System; 113 L. [G378].

50. Sundaram Vanka; Scalable Network Architectures for Unmanned Aerial Vehicle Swarms; 50 L. [S293].

51. Sushmee Badhulika; Pre-diabetic detection kit measuring acetone levels in human breath using unique nanomaterials based self-powering sensor; 25 L. [S276].

52. Sushmee Badhulika; Scalable, flexible, Mixed-dimensional 2D nanomaterials-3Dhydrogels based devices via Soft Embossing technique for smart electronic technologies; 49.41 L. [G610].

Awards and Recognitions:

1. Pawas Dwivedi (Btech), working under the guidance of Digvijay S Pawar, received the NCC- Overall Best Cadet of the Camp Award.

2. Jose Titus received the First Prize Paper from the IEEE Industrial Drives Committee at the IEEE Energy Conversion Congress and Exposition.

3. Rajalakshmi P received the Best Paper Award (World PetroTech Congress-2024 oral presentation) at NDMC-Convention Centre, Parliament Street, New Delhi, India.

4. Annu, working under the guidance of Prof Rajalakshmi P, received the Best Paper Award at IEEE ANTS'23 - Women in Engineering Track.

5. Rupesh Ganpatrao Wandhare received the "SERB Technology Translation Award".

6. Shashank Vatedka has been elevated to Senior Member of the IEEE.

7. Ritesh (PhD Scholar), working under the guidance of Shashank Vatedka, received the Best Paper Award (Communications Track) at the 2023 National Conference on Communications held at IIT Guwahati.

8. Shubhadeep Bhattacharjee has received the BRNS- DAE Young Scientist Research Award.

9. RVBRN Aaseesh, Utkarsh Doshi, Atharv Ramesh Nair, and Nithish S (BTech), working under the guidance of Prof Soumya Jana, received the IEEE Signal Processing Society's recently held 2023 Video and Image Processing (VIP) cup.

10. Sushmee Badhulika received the prestigious Kasturi Lal Chopra Memorial Distinguished Lecture Award 2023 instituted by IIT Delhi for contributions to thin film science and technology in India, 2023 and Featured in the World's Top 2% Scientists ranking published by Stanford University, 2023.

11. Jayasimha Reddy Ravula, BTech (2019), Bagged the All India Rank-217 position in UPSC 2022.

Research Highlights

Kiran Kumar Kuchi:

Pandit Deendayal Upadhyaya Telecom Excellence Award 2023 for "outstanding contributions in telecom technology advancement and mentorship"

This award is granted to only 5 (individuals/companies) across the entire nation, making it an exceptionally selective and esteemed recognition based on their outstanding achievements and significant contributions to the telecommunications sector.

This award underscores the national importance of their work and their impact on advancing telecommunications technology in India. His recognition among this elite group highlights his exceptional expertise and dedicated contributions in this field. Prof Kiran Kuchi's contributions to 5G and 6G wireless communication Technology are remarkable.

IIT Hyderabad has won the award for the Best Educational Institute Exhibit at the India Mobile Congress, which was held in New Delhi on 27th, 28th & 29th October 2023, led by Prof Kiran Kuchi

The Exhibit Description:

- NB-IoT applications include: 1) converting legacy electricity meters into smart meters, 2) remote monitoring of process plant consisting of temperature, pressure, flow and level sensors, and 3) remote monitoring of electrical substations demonstrated
- Converting legacy electricity meter into smart meter - NB-IoT module communicates with legacy meter through DLMS protocol. This solution minimizes capital investment to replace the old meter with a completely new meter and also reduces e-Waste generation.
- Remote monitoring of process plant - Industry4.0 sensor node - NB-IoT module communicates with process plant through Modbus protocol over Rs485 and transfers data to SCADA system hosted in cloud server over HTTP/MQTT protocols.
- Remote Monitoring of Substations - The NB-IoT module communicates with multifunction meters and other measuring devices through Modbus protocol over Rs485 and transfers data to the SCADA system.

Some other significant achievements

- IMT-2030 6G Development at ITU WP 5D
- Bharat 6G Alliance – Chairing Technology WG, TOR for Technology WG defined
- Introduced Pi/2 BPSK waveform adopted UE mandatory for NTN (Non-Terrestrial Networks)

Shiv Govind Singh:

COVIHOME RNA Test Kit is among the 23 Health care innovations that have been selected for the best 100 from India.

Department of Entrepreneurship and Management

The Department of Entrepreneurship and Management is one of the recently established departments at IIT Hyderabad. The first batch of MTech Techno-Entrepreneurship program with 10 students is intended to convocate in 2024. Apart from the MTech Techno-Entrepreneurship program, the department also offers a Minor in Entrepreneurship for Undergraduate students & PhD program. The first batch of students for the Double Major in Entrepreneurship program will be enrolled in July 2024.

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

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Publications:

1. Bishnoi S, Patnaik J, et al. (2023). Contribution of R&D and Innovation in Technology-Based Startups in India. In Proceedings of the 29th International Conference on Engineering, Technology, and Innovation: Shaping the Future, ICE 2023. https://doi.org/10.1109/ICE/ITMC58018.2023.10332311.

2. Maiyar L M, et al. (2023). A Decision Support Model for Cost-Effective Choice of Temperature-Controlled Transport of Fresh Food. In Sustainability (Switzerland) (Vol. 15, Issue 8). https://doi.org/10.3390/su15086821.

3. Maiyar L M, Ramanathan R, et al. (2023). Fighting Food Waste: How Can Artificial Intelligence and Analytics Help? In Innovation Analytics: Tools for Competitive Advantage. https://doi.org/10.1142/9781786349989_0008.

4. Anand A, Parameswar N, et al. (2023). Exploring the role of knowledge management in contexts of crisis: A synthesis and way forward. In International Journal of Organizational Analysis (Vol. 31, Issue 7, pp. 2953–2978). https://doi.org/10.1108/IJOA-02-2022-3156.

5. Anand A, Parameswar N, et al. (2023). The effect of job security, insecurity, and burnout on employee organizational commitment. In Journal of Business Research (Vol. 162). https://doi.org/10.1016/j.jbusres.2023.113843.

6. Anand A, Parameswar N, et al. (2023). Diving deep into the dark side: A review and examination of research on

organizational misconduct in emerging markets. In Business Ethics, the Environment and Responsibility (Vol. 32, Issue 2, pp. 612–637). https://doi.org/10.1111/beer.12514.

7. Parameswar N, et al. (2023). Exploring the barriers to ESG adoption using a modified TISM approach. In Kybernetes. https://doi.org/10.1108/K-05-2023-0888.

8. Praveen S V, Ittamalla R, et al. (2023). The Perspectives of Individuals with Comorbidities Towards COVID-19 Booster Vaccine Shots in Twitter: A Social Media Analysis Using Natural Language Processing, Sentiment Analysis and Topic Modeling. In Journal of Pure and Applied Microbiology (Vol. 17, Issue 1, pp. 567–575). https://doi.org/10.22207/JPAM.17.1.54.

9. Samarakoon S M R K, Maradana R P, et al. (2023). What determines the success of equity derivatives markets? A global perspective. In Borsa Istanbul Review. https://doi.org/10.1016/j.bir.2023.10.008.

Funded Research Projects:

1. Nakul Parameswar; Strategic Alliance by Start-ups and Entrepreneurial Ventures: An Exploratory and Longitudinal Study; 17.5 L. [SG/IITH/F269/2021-22/SG-105].

2. Nakul Parameswar; Competitiveness of Indian Technological Start Ups-An Exploratory Study; 6.93 L. [G468].

3. Rajesh Ittamalla; Creating Agritourism Experiences: Customers Perspectives, Service Providers' Perspectives, and Entrepreneurial Perspective; 12.00 L. [G561].

4. Rajesh Ittamalla; Startup Branding: Determinants, Dynamics, Management Strategies; 13.00 L. [SG149].

5. Ranapratap Maradana; Venture Capital Funding and University Startups Connection: Catalysts' Role for Innovation; 14.20 L. [SG/IITH/F314/2023-24/SG-173].

Awards & Recognitions:

1. Rishab Prasad Soni, (Full Time Research Scholar) working under the supervision of Ganesh M P, has received the Best Methodology Award for the presentation of his paper titled " Beyond the Buzz: Exploring the Effectiveness of Moment Marketing for Consumer Engagement " in the 8th International Marketing Strategy and Policy Conference organized at Goa Institute of Management from 27 March to 29 March 2024.

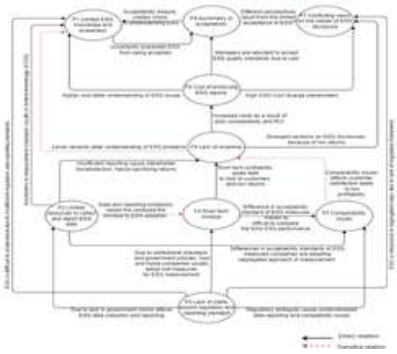
2. Manimaran V, (Full Time Research Scholar) working under the supervision of Lohithaksha M Maiyar, has received the best thesis proposal award for his presentation titled "Cost-efficient Humanitarian Logistics Network Design for relief material deliveries considering social vulnerability" at the International Conference on Emerging, Technologies, Analytics and Operations (ICETAO 2024) held during March 22-23, 2024 at ICFAI Business School (IBS) Hyderabad.

3. Indira Roy, (Research Scholar) working with Lohithaksha M Maiyar, has received the Best Student Paper Award for her full Conference Paper Titled "An Ecologically Sustainable Omnichannel Fresh Food Distribution Model Considering Freshness-Keeping Effort and Carbon Emissions" submitted to the 12th International Conference on Soft Computing for Problem Solving (SocProS2023) Moving Towards Society 5.0 (11-13th August 2023) organized by Department of Applied Mathematics and Scientific Computing of the Indian Institute of Technology Roorkee, India.

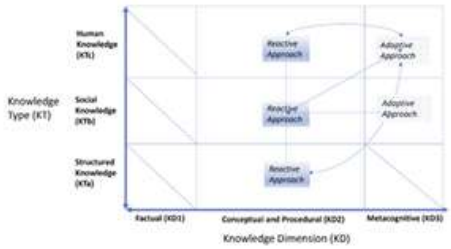
Research Highlights

1. Research is being undertaken in the areas of – Frugal Innovation, Sustainable Food Supply Chain, Startup Branding and New Venture Marketing, Venture Capital Investments and Innovation, Financial Inclusion, AI & Entrepreneurship, Women in Entrepreneurship and Competitiveness of Tech Start-ups.

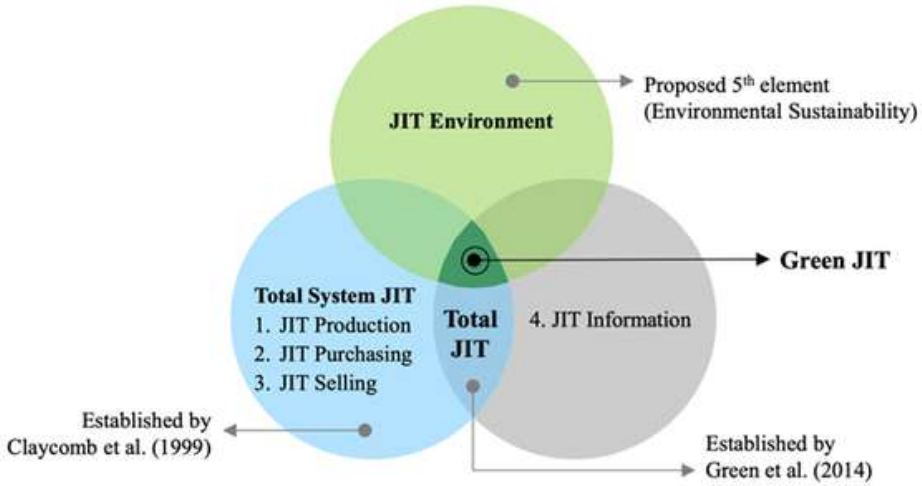
2. m-TISM Model for Barriers of ESG Adoption by Nakul Parameswar, Zuby Hasan, Charu Shri & Neha Saini, 2023 (DOI: https://doi.org/10.1108/K-05-2023-0888)



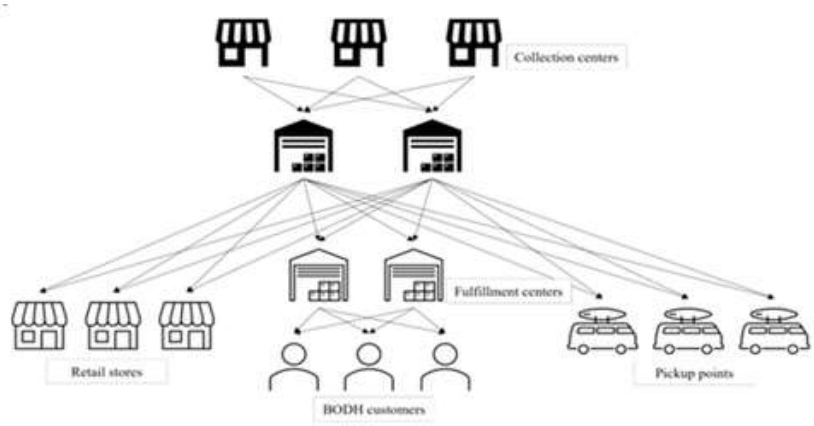
3. Framework on Interplay of Knowledge Types and Knowledge Dimensions in Pandemics - Example of COVID-19 by Nakul Parameswar & Krishna Venkitachalam, 2024 (DOI: https://doi.org/10.1002/kpm.1775).



4. Environmentally conscious steps to Just-in-time: Environmental sustainability consideration with just-in-time practices in industry 4.0 era – A state of the art. Co-authored by Vivek Singhal, Lohithaksha M Maiyar and Indira Roy. https://doi.org/10.1007/s12063-024-00478-0.



5. Minimizing food waste and emissions: An Ecologically Sustainable Omnichannel Fresh Food Distribution Model Considering Freshness-Keeping Effort and Carbon Emissions. Coauthored by Indira Roy and Lohithaksha M Maiyar. https://doi.org/10.1007/978-981-97-3180-0_58.



Highlights of Activities in the Department:

The Department undertook many activities during the year to promote and nurture entrepreneurial mind set and innovative thinking among the students of IIT Hyderabad. A few notable programmes undertaken during the year are:

Tongali Program 2024

The Department of Entrepreneurship and Management (EM) at IIT Hyderabad, in association with the Institute's Innovation Council, hosted a Startup Challenge Event as part of the "IITH Tongali Entrepreneurship Program from 18th to 23rd February 2024. Student entrepreneurs from various universities in Aichi Prefecture, Japan, along with two professors, Dr Sawako Tanaka from Nagoya University and Dr Sai Chandra Teja from Japan, visited our institute under the program titled "Overseas Training for Fostering Global Entrepreneurs (Tongali Project)." The Department of EM hosted and supported them for all the field visits in Hyderabad and conducted several events like the Business Plan Development Challenge (LEAD Pitch) for Japanese and Indian students. The exchange of diverse perspectives and the collective effort invested in crafting innovative business strategies underscored the event's significance in fostering entrepreneurial spirit and cross-cultural exchange.

The distinguished panel of judges, including Prof Tarun Kanti Panda (Dean International Relations IITH), Ms Chikako Kasai (JICA FRIENDSHIP Project Representative), and EM faculty, provided expertise and insightful evaluations that greatly contributed to the event's success. Additionally, the presence of Prof B S Murty, the esteemed Director of IIT Hyderabad, whose support and encouragement inspired the participants.

Webinar on The Indian Tech Startup Landscape Report 2023

The Department of Entrepreneurship and Management (EM), under the aegis of the Institute Innovation Council and iTIC, IIT Hyderabad, in collaboration with Zinnov, organized a webinar on "THE INDIAN TECH START-UP LANDSCAPE REPORT 2023: A Debriefing Session" on 20th March 2024.

This event offered insights into India's tech start-up ecosystem, along with a sector spotlight, deep tech focus, key strengths, and opportunities for global tech start-up ecosystems. The events had esteemed speakers like Mr. Praveen Roy and Mr. Vishnu Rajeev, whose valuable insights ignited compelling discussions and offered profound perspectives on the tech landscape.

Entrepreneurship Talk Series

The flagship Entrepreneurship Talk Series organized by the Department of Entrepreneurship and Management gained further traction in the year 2023-2024, wherein 11 talks were undertaken as part of the series (details of these talks are mentioned below)

1	Ms. Shweta Suresh Thakare	Co-Founder of GramHeet
2	Mr. Suresh Susurla	CEO and MD of Startoon Labs Pvt Limited
3	Mr. Srinivas Raghavan N	CTO of StartupXSeed
4	Mr. Tushar Kansal	Founder & CEO, Kansaltancy Ventures
5	Mr. Sunny Sabharwal	Senior Financial Consultant
6	Mr. B V Satyaram	Founder & CEO, Code Astra
7	Mr. Rupessh Goel	Managing Director, Silicon Valley Bank
8	Mr Samir Kuamr	Partner, Athera Ventures
9	Mr Srinivasan Krishnaswami	Audit and IT Professional
10	Mr Nikesh Chitlangya	Director Acct Management, Microsoft India
11	Dr V Barla	Industry Professional

Sarvodaya

The Department of Entrepreneurship and Management collaborates with Sarvodaya Women Entrepreneurs Cottage Industries in Gonguluru village, Sangareddy district, Telangana, to support village-level women entrepreneurs. This support includes connecting their products to markets and providing assistance with branding and content creation on online and social media platforms. Dr. Rajesh and his team visit the Sarvodaya farm to interact with the women entrepreneurs, helping to identify challenges and explore new opportunities.

Sarvodaya Manjeera is a unique and pioneering initiative led by over 100 self-help groups of women entrepreneurs. They have formed a collective called "Sarvodaya Women Entrepreneurs-Gongloor" and have created a single brand called "Sarvodaya's Manjeera." This brand offers a range of healthy and affordable products, including cold-pressed edible oils, safely harvested unpolished dals, processed millet, handmade soaps, spices, pickles, and detergents.

Department of Liberal Arts

The Department of Liberal Arts at IIT Hyderabad houses a fast-growing and extremely diverse group of academics and scholars, where faculty and students strive through their research and practice to forge a world that enables a better quality of life for one and all. This quality of life in a progressive, fast-changing, and demanding world can be enhanced through solid education, training, research, and advocacy. While at Liberal Arts, we engage with a significant amount of phenomenological and theoretical work. We are equally invested in applied and hands-on learning and field-based research such that there is a strong continuum between academia, society, industry, healthcare, policies, and media, to name a few. The advanced pedagogical practices of our department also attest to these principles.

Naturally, the Department of Liberal Arts at IIT Hyderabad is keenly aware of the Sustainable Development Goals of the United Nations, and our pedagogy and research function relentlessly toward these goals. As a department, we boast of Economists dealing with the National Agricultural Market and Electronics; the Economic Growth of India's Urban Poor in post-Covid Times; Gender, Education, and the use of AI and other disruptive technologies in society and economy. We also house psychologists, anthropologists, gender studies experts, and littérateurs who together work on Mental and Physical health, including Disability, Gender, Reproductive Health, Disease and Pathology, Body Image, Geriatric Healthcare, Cancer Care, Chronic Disease Management, Personality Psychology, Health Behavior Change, Caste and Feminism, Gendered Violence, and also Issues of Climate Change, Global Warming and Environmental Crises. We, likewise, have Development Studies and Cognitive Science experts who variously work on Migration and Labor Policies, Mathematical and Formal Foundations of Language, Biolinguistics, Issues of Cognition, Brain, Learning, and Memory Consolidation, to name a few. We also have substantial work going on in the areas of Media, Popular Culture, and literary studies, along with cutting-edge discourses in Digital Humanities. Finally, we are also immensely happy to foster both practice and training in creative and performing arts. We not only run a hugely popular Minor program in creative arts for our students but also house exceptionally gifted artists and performers such as Mridula Anand, Timothy Marthand, and Yuka Kataoka, to name a few of the stalwarts who are associated with us.

We also boast of extraordinarily gifted MA and PhD students. Notably, many of our alumni are placed in various institutes of repute as faculty members. Recent names include Dr Kumar Shaurav as Assistant Professor at IIM Ranchi, Dr Shweta Chawak as Assistant Professor at the Dept of HSS at IIT Bombay, Dr Sanjiv Kumar at the Dept of HSS at IIT Kanpur, Dr Aswathi V Anand as Assistant Professor at the Dept of Communications at IIM Indore. Additionally, our current PhD student, Shankar Gugoloth, has been awarded the Fulbright-Nehru doctoral fellowship for 2024-2025. This list has been consistently growing and makes us a proud department in a second-generation IIT for contributing significantly to Indian academia. Our students have also won several awards and have been actively publishing and presenting their work on various national and international platforms of repute.

In sum, at Liberal Arts we therefore work with both traditional and upcoming discourses in the Humanities, the Social Sciences, and the Fine and Performing Arts. We deeply aspire to connect humanity and culture to science and technology in holistic and profound ways, forge interdisciplinary ties that encourage cutting-edge scholarship, and cultivate a deeper understanding of humanity at large.

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

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Books:

1. Prakash Mondal; The Cognitive Variation of Semantic Structures. London/New Delhi: Routledge (2024).

Book Chapters:

1. Haripriya Narasimhan; Brahmins of Urban India in Surinder Jodhka and Jules Naudet. (2023). The Oxford Handbook of Caste, OUP. 'Hinduism and Television' (with Indira Arumugam, Oxford Bibliographies.
2. Haripriya Narasimhan with Pooja Purang and Mahati Chittem; (2023). Reimagining work but operating with a no off button: experiences of working mothers in India during the COVID-19 pandemic. Gender and Management.
3. Srirupa Chatterjee & S Krishna Swathi; (2023). Gendered Violence in Public Spaces: Women's Narratives of Travel in Neoliberal India. Lexington Books, Maryland, USA. Oct, 2023.

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5. Srirupa Chatterjee & S Krishna Swathi; (2023). Conclusion: Women and the Road: Possibilities and Promises." Gendered Violence in Public Spaces: Women's Narratives of Travel in Neoliberal India. Lexington Books, USA. Pg. 245-248. 2023.

6. Srirupa Chatterjee and Nilanjana Ghosal; (2023). Monstrous Discourses: Female Body Image and Gothic Subjectivity in Short Stories by Alice Walker, Judith Ortiz Cofer, and Joyce Carol Oates. American Literary Studies in Postmillennial India: Critical Perspectives. Sharada Chigurupati and Nageswar Rao Konda (Eds.). Maryland, USA: Lexington Books. Pg. 179-194. 2023.

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10. Srirupa Chatterjee & S Krishna Swathi; (2023). Lexington Books: Maryland, USA. Pg.19-31. 2023.

11. Srirupa Chatterjee. (2023). "Autobiography" and "Psychogeography." "London Psychogeographical Association" Encyclopedia of London's East End. Ed. Kevin A. Morrison. McFarland.

Publications:

1. Khandekar A, Cross J, & Maringanti A. (2023). Scale and modularity in thermal governance: The replication of India's heat action plans. In Urban Studies. https://doi.org/10.1177/00420980231195193.

2. N S V S C, Khandekar A, & Maringanti A. (2023). Towards a climate-health approach in Indian healthcare: Perspectives of specialist doctors on health impacts of extreme heat in Hyderabad. In Journal of Climate Change and Health (Vol. 14). https://doi.org/10.1016/j.joclim.2023.100269.

3. Soumya C P, Khandekar A, & Maringanti A. (2023). Social security for urban informal workers: The case of Hyderabad, India. In COVID-19 and Informal Workers in Asian Cities: Impact, Response, and Implications for Urban Recovery. https://doi.org/10.4324/9781003438083-3.

4. Hakkim A, & Deb A. (2023). Empowering local response and community-based disaster mitigation through legislative policies: Lessons from the Kerala floods of 2018-19. In Journal of Emergency Management (Vol. 20, Issue 4, pp. 347–353). https://doi.org/10.5055/jem.0766.

5. Jacobson H, König A, & Majumdar A. (2023). Im/mobility in the transnational surrogacy market: Disruptions and vulnerabilities in and beyond pandemic times. In Applied Mobilities. https://doi.org/10.1080/23800127.2023.2274238.

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17. Bose C, & Mohsini M. (2023). Coda. In Encountering Craft: Methodological Approaches from Anthropology, Art History, and Design. https://doi.org/10.4324/9781003026136-10.

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39. Gairola V & Ranganathan S. (2023). Worship in Transition: An Encounter with the Rājrājeshwarī Devī of the Garhwal Himalaya. In Himalaya (Vol. 42, Issue 1, pp. 118–140). https://doi.org/10.2218/himalaya.2023.6678.

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45. Chatterjee S & Krishna S S. (2023). Roads, Misogyny, and the Rape Culture in Joyce Carol Oates' Rape: A Love Story and Cara Hoffman's So Much Pretty. Lit: Literature Interpretation Theory, 34(3), 196–219. https://doi.org/10.1080/10436928.2023.2239697.

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47. Bhattacharjee S. (2023). "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. https://doi.org/10.1007/978-3-031-10232-5_13.

Funded Research Projects:

1. Aalok Dinkar Khandekar; Democratizing Delphi: towards more inclusive methodologies for assessing technologies for development; 86.97789 L. [S314].

2. Aalok Dinkar Khandekar; Tackling Society's Grand Challenges: Approaches to Responsible Innovation in Science and Technology and Technology and Indo-Pacific Region; 75 L. [G642].

3. Aardra Surendran; Labour Migration networks in the Construction industry in Bangalore; 6 L. [ICSSR/LA/F265/2022-23/S257].

4. Amrita Datta; Odisha Migration Study; 158 L. [S252].

5. Anindita Majumdar; Conditional Assessment and Management Plan for Six River Basins; 0.01 L. [NULL].

6. Anindita Majumdar; Kings college Social Science & Public Policy global fellowship 2023; 0.07 L. [KINGS COLLEGE/LA/F187/2022-23/S259].

7. Anindita Majumdar; Lifestyle, chronicity, and wellness in South Asia; 0 L. [G612].

8. Chandan Bose; Intimacy and Risk: Understanding violence taking place through queer dating applications in contemporary India; 15 L. [ICSSR/LA/F211/2022-23/G544].

9. Dinabandhu Sethi; Jan Dhan Yojana and Affordable Access to Financial Services in Aspiration Districts of India; 5 L. [G591].

10. Haripriya Narasimhan; 'Portable imaging solutions towards affordable healthcare: Microfluidic devices for the detection of disease-specific proteins', Royal Academy Engineering, UK; 69 L. [TSP-2325-5-IN-200].

11. Mahati Chittem; Adolescent Sexual Health Education through Picture Books: Designing and Disseminating Picture Books on Sexual Health-Taking the Conversation to Children, Doctors, Teachers; 18 L. [S319].

12. Neeraj Kumar; Nature of plasticity in somatosensory cortex and its role in motor learning and memory consolidation; 30.91 L. [G431].

13. Neeraj Kumar; Role of motor and sensory plasticity in motor memory retention, consolidation and enhancement; 72.66 L. [G562].

14. Prabheesh K P; Covid -19 uncertainty and monetary policy; 1.71 L. [APAEA/LA/F007/2022-23/S264].

15. Shubha Ranganathan; Lifestyle, chronicity, and wellness in South Asia; 30.97 L. [G590].

16. Shubha Ranganathan; Lifestyle, chronicity, and wellness in South Asia; 30.97 L. [G612].

17. Shuhita Bhattacharjee; Adolescent Sexual Health Education through Picture Books: Designing and Disseminating Picture Books on Sexual Health-Taking the Conversation to Children, Doctors, Teachers; 18 L. [ICSSR/RPD/MJ/2023-24/G/157].

18. Shuhita Bhattacharjee; Victorian Diversities Research Network; 1.7 L. [UKRI Ref: AH/Y002598/1].

19. Shuhita Bhattacharjee; Violence through Queer Dating Applications: An Exploratory Study in Contemporary India; 15 L. [02/155/2022-23/ICSSR/RP/MJ/GEN].

Awards & Recognitions:

1. Aalok Dinkar Khandekar received the STS Infrastructure Award from the Society for Social Studies of Science (4S). Third World Academy of Sciences, Visiting Expert Fellowship, Dept of Hydrology, Tribhuvan University, Nepal.

2. Aardra Surendran joined the editorial board of the journal Gender Place and Culture and joined the editorial board of the Journal of South Asian Development (JSAD) as associate editor.

3. Anindita Majumdar was admitted as a Jury Member, Mullins Prize for Best Research Paper, 4S (Society for Social Studies of Science), 2024.

4. Badri Narayan Rath received the Best Research Paper Award (Third Prize) for the Paper "The interconnectedness between crude oil and stock market volatility in case of G20 countries" in a research symposium from IMFR KREA University.

5. Kumar Shaurav (PhD Scholar), working under the guidance of Badri Narayan Rath selected as an Assistant Professor Grade II at Indian Institute of Management Ranchi.

6. Dinabandhu Sethi joined as Associate Editor (handling) to a Q1 journal of nature group, " HSS Communications". Also, joined the editorial board of "SN Business & economics" (Springer).

7. Ganesh M P received the best paper in methodology at the 8th International Conference of Marketing Strategy and Policy Research, in Goa (coauthored with Mr Rishab Soni).

8. Gaurav Dhamija received the best paper presentation at

a conference at IFMR KREA University; Best paper presentation at the 2023 DSE Winter School.

9. Sanjiv Kumar, (PhD Scholar) working under the guidance of Prabheesh K P, was selected as an Assistant Professor at the Indian Institute of Management (IIM), Sirmaur, Himachal Pradesh.

10. Prakash Chandra Mondal was admitted as a Fellow of the Royal Society of Arts (RSA) London.

11. Ratna KNSR (PhD Scholar), working under the guidance of Prakash Chandra Mondal, whose paper was selected as the 'Best Presentation' at the 5th International Conference on Natural Language Processing.

12. Shubha Ranganathan has been inducted as an Associate editor of the journal South Asia Research.

13. Sudarshan Kottai, PhD (2020), who worked under the guidance of Shubha Ranganathan, was selected as an Assistant Professor at IIT Palakkad.

14. Vineet Gairola (PhD Scholar), working under the guidance of Shubha Ranganathan, received the 2023 APS Student Grant from the Association for Psychological Science (APS).

15. Vineet Gairola (PhD Scholar), working under the guidance of Shubha Ranganathan, received the APA Division 29 Student Diversity Paper Award for their paper "Linking Body, Memory, and Divine Embodiment: Two Cases of Ritual Healers from the Garhwal Himalaya".

16. Shuhita Bhattacharjee received the prestigious UKRI Arts and Humanities Research Council (AHRC) Research. Grant.

17. Aswathi Velayathikode Anand (Alumnus-PhD Scholar), who worked under the guidance of Srirupa Chatterjee, was selected as an Assistant Professor at NIT Raipur.

18. Amisha, Riddhi (MA) received the first prize at the 'India's Vision 2047' held at the Administrative Staff College of India.

19. Subhanjali (MA) received the second prize at the 'India's Vision 2047' held at the Administrative Staff College of India.

20. Sanjiv Kumar, PhD (2020), who worked under the guidance of Prabheesh K P, was selected as an Assistant professor at the Department of Economics Sciences, IIT Kanpur.

Highlights

NIT Warangal delegation at IITH

CA Heritage Walk

Department of Materials Science & Metallurgical Engineering

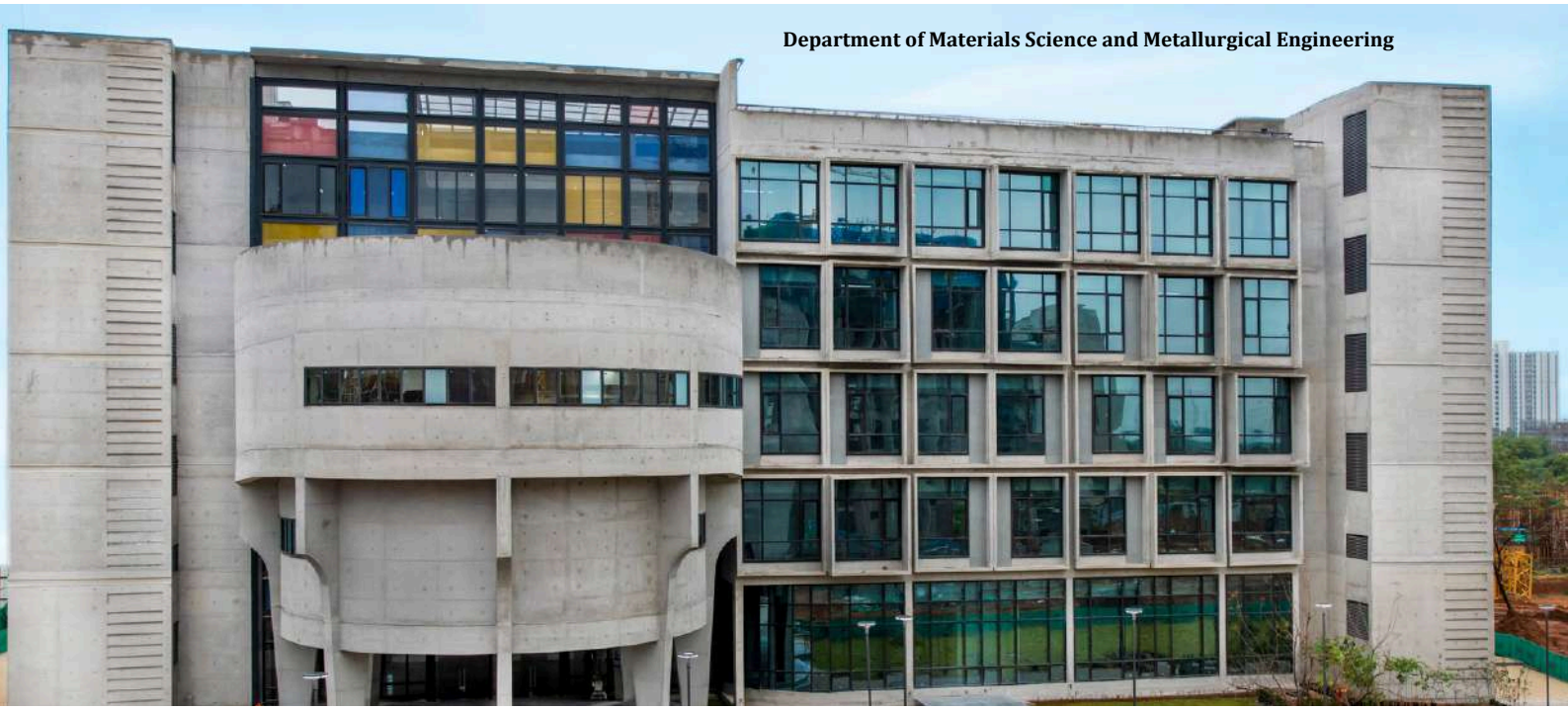
The Department of Materials Science and Metallurgical Engineering at IIT Hyderabad is a premier hub for education and research in materials and metallurgical science and engineering. With 21 full-time faculty members, one Professor of Practice, four Distinguished Professors, and four Adjunct Professors, the department is well-equipped to offer diverse and cutting-edge academic programs. We offer BTech and MTech courses in Materials Science and Metallurgical Engineering, and a specialized MTech in Semiconductor Materials and Devices. We also provide an online MTech in Industrial Metallurgy designed for industry professionals, as well as an interdisciplinary MTech in Integrated Computational Materials Engineering, also tailored for industry professionals. In collaboration with the Departments of Mechanical Engineering and Biotechnology, we offer an interdisciplinary BTech program in Computational Engineering.

Additionally, in partnership with the Departments of Mechanical Engineering and Design, we offer an MTech in Additive Manufacturing. We have also recently launched an interdisciplinary MTech in Lightweighting Technology with the Department of Mechanical Engineering. The department is also actively involved in organizing training programs, such as the recently organized SPARC workshop on Semiconductors.

Since its inception, the department has been deeply engaged in ground-breaking research. Key focus areas include the design and development of advanced materials like high entropy alloys, creep-resistant steels, multiferroics, and nanostructures for applications in aerospace, defence, and spintronics. Pioneering research encompasses interdiffusion studies, microstructural simulations using GPU-accelerated models, and sustainable metallurgy, including green steelmaking and e-waste processing. Our faculty have received numerous prestigious national and international awards in recognition of their excellence in research and contributions to science and engineering. These accolades include the SERB STAR Award, Japan Society for the Promotion of Science (JSPS) Fellowship, INSA Young Scientist Award, INSA Associate Fellowships, Ramanujan Fellowship (DST), ASM-IIM Visiting Lectureship Award, DAAD Research Ambassadorship, Fellowship of INAE, Promising Young Powder Metallurgy Professional Award, SERB Women Excellence Award, and Institute Awards for Teaching and Research Excellence. The fact that several of our alumni have become faculty members at various IITs is a testament to the department's research and teaching excellence.

Our department boasts state-of-the-art facilities, including transmission electron microscopes, scanning electron microscopes, focused ion beam systems, thin-film XRD, a Physical Property Measurement System, sputtering, CVD and PLD systems, a high-temperature nanoindenter, high-temperature UTM with DIC, rolling mills, and advanced computational tools like ThermoCalc, VASP, and our in-house MicroSim software for computational modeling. With a strong focus on innovation, the department has produced 54 PhD graduates, published 580 papers in reputed journals, and secured 299 sponsored research projects with a total funding of ₹132 crores. Our key research thrusts include the development of novel alloys for critical industries (defence, aerospace, automotive), the design and fabrication of functional materials and devices (spintronics, thermoelectrics, flexible electronics), multiscale modeling of materials and defects, sustainable metallurgy and green steelmaking, advanced manufacturing techniques such as metal additive manufacturing, and the application of cutting-edge characterization techniques.

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



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Patents:

Filed:

1. Mudrika Khandelwal; Bacterial Cellulose Based Microfluidic POC Device for AST; 202241030646.

Granted:

1. Chandrasekhar Murapaka; Skyrmion Based Majority Logic Gate in a Nanomagnetic Device; 202241010372.

2. Mudrika Khandelwal; Pharmaceutical Compositions and Delivery Systems for Prevention and Treatment of Candidiasis; 201841034939.

3. Suhash Ranjan Dey; Single Step Electrochemical Synthesis of Nanocrystalline Multicomponent Alloy Thin Films/Coatings in an Aqueous Medium; 201941013178.

Books:

1. Mudrika Khandelwal, Chandra Shekhar Sharma, Garima; (2023). Co-authored Book titled: Demystify the Nature; published by Vigyan Prasar Launched by the then Vice President Venkaiah Naidu, foreword by Prof HC Verma. ISBN: 978-81-7480-320-7.

2. Ranjith Ramadurai and Saswata Bhattacharyya; (2023). Strain Engineering in Functional Materials and Devices; AIP Publishing LLC DOI:10.1063/9780735425590 ISBN electronic: 978-0-7354-2559-0 ISBN print: 978-0-7354-2556-9.

Book Chapters

1. Ranjith Ramadurai and Saswata Bhattacharyya; (2023). Strain engineering in crystalline solids in Strain Engineering in Functional Materials and Devices; (AIP Publishing, Melville, New York, 2023), pp. 1-1–1- 22. DOI: 10.1063/9780735425590_001.

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91. Ozer E, Garlapati S K, et al (2023). Malodour classification with low-cost flexible electronics. In Nature Communications (Vol. 14, Issue 1). https://doi.org/10.1038/s41467-023-36104-z.

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Funded Research Projects:

1. Anuj Goyal; Developing a Computational Approach to Accelerate Point Defects Characterization in Materials; 30 L. [SG166].

2. Anuj Goyal; Harnessing charged defects electronic entropy of solar thermochemical water splitting oxides for high H2 yield; 20.46 L. [G683].

3. Ashok Kamaraj; Mineralogical and Microstructural studies of High Alumina Iron Ore fines and their effect on pelletizing; 30.94 L. [S278].

4. Ashok Kamaraj; Investigation on direct reduction using Ammonia: A Novel Green Alternate Ironmaking Process; 235.44 L. [G668].

5. Ashok Kamaraj; modelling and simulation of hot metal desulphurization unit; 13.8 L. [S289].

6. Atul Suresh Deshpande; Pressureless fabrication of carbon foam using bituminous coal for ablative applications; 54.36 L. [G353].

7. Chandrasekhar Murapaka; Ferrimagnet-based artificial synaptic device for neuromorphic computing; 64.84 L. [SERB/MSME/F206/2022-23/G520].

8. Chandrasekhar Murapaka; Spintronics-based digital logic architecture design for AI applications; 60 L. [SERB/CRG/2022/004336/G546].

9. Chandrasekhar Murapaka; Development of novel spin Hall materials for spin-orbit torque based memory and logic devices; 22 L. [AC2023-7].

10. Deepu J Babu; Post-synthetic modification of porous organic polymers for improved CO2 capture and its utilization for the synthesis of acrylic acid and its derivatives; 35 L. [G604].

11. Deepu J Babu; Electric Swing Adsorption for Carbon Capture and Lithium Recovery; 110 L. [yet to receive].

12. Deepu J Babu; Development of Low-Cost Organic Porous Solids for CO2 Capture; 100 L. [yet to receive].

13. Deepu J Babu; Development of an optimized green Synthesis method for MOF-801; 9.96 L. [S312].

14. Janaki Ram G D; Optimization of Electron Beam AM Process of Ti-6AI-4V to minimise the anisotropy in high-temperature mechanical properties, creep, fatigue, and fatigue crack growth and demonstrate printing of real-time component with optimized process parameters; 489.85 L. [G679].

15. Janaki Ram G D; Electron beam powder-bed fusion of nickel-base superalloys CM247LC and BZL12Y; 1829.96 L. [G678].

16. Mayur Vaidya; Sophisticated Analytical and Technical Help Institute (SATHI); 0 L. [G650].

17. Mayur Vaidya; Development of Borated Stainless Steel as per ASTM A887SS304 B5; 21.6 L. [VOLT/MSME/F235/2022-23/S227].

18. Mayur Vaidya; Development of oxidation resistant nanocrystalline medium entropy alloys through diffusion analysis; 1.35 L. [G466].

19. Mayur Vaidya; Thermodynamic assessment towards the design of high-temperature alloys; 0 L. [CRG/2023/007881].

20. Mudrika Khandelwal; Microbial cellulose-based magnetically responsive fluid for environmental remediation and hazard prevention; 0.7 L. [S313].

21. Mudrika Khandelwal; Biodegradable self-sanitizing bacterial nano cellulose fabric for air and water filtration; 50 L. [G638].

22. Mudrika Khandelwal; Bacterial Cellulose-based Microfluidic Point-of-Care Device for Antibiotic Susceptibility Testing; 55 L. [SERB/MSME/F125/2024-2025/G692].

23. Mudrika Khandelwal; Modulated drug release from nanocellular for medicated dressing; 18 L. [SERB/MSME/F125/2022-23/G475].

24. Mudrika Khandelwal; Circular Agrotech for nutritional security agricultural waste derived materials for active and smart fresh food packaging for enhanced shelf life; 0 L. [sanctioned].

25. Pinaki Prasad Bhattacharjee; Design and Development of High Entropy Alloys, Purchase Order No: A001210221 Dt:27/06/2022; 9.6 L. [Honeywell/MSME/F034/2022-23/S233].

26. Pinaki Prasad Bhattacharjee; Development of novel high entropy alloys with outstanding strength-ductility synergy for advanced manufacturing; 36.17 L. [G595].

27. Pinaki Prasad Bhattacharjee; Recycled High Entropy Alloys (HEAs) for Bolstering Circular Economy; 20 L. [JICA FRIENDSHIP 2.0].

28. Rajesh Korla; Optimization of Electron Beam AM Process of Ti-6AI-4V to minimise the anisotropy in high-temperature mechanical properties, creep, fatigue and fatigue crack growth and demonstrate printing of real-time component with optimized process parameters; 552.5 L. [G679].

29. Rajesh Korla; Numerical simulations of process modelling and experimental validation of selective laser melted FAN inlet guide vanes and fuel atomizer body components for aero engine and end-use applications; 213.7 L. [G616].

30. Rajesh Korla; Electron beam powder-bed fusion of nickel-base superalloys CM247LC and BZL12Y; 1823 L. [G678].

31. Ranjith Ramadurai; Utilization of synchrotron studies to examine the local structure & associated distortions of high Tc Layered perovskite Nd2Ti2O7 for high temp pyroelectric applications; 0.45 L. [G639].

32. Sai Rama Krishna Malladi; Tailoring microstructure and magnetic properties of high entropy alloys by advanced microscopy studies; 44.17 L. [G658].

33. Sai Rama Krishna Malladi; Self-healing Non-linear Optical Crystals as New Materials for All-Organic Photonic Integrated Circuits; 0 L. [recommended for sanction (awaiting final sanction order)].

34. Sai Rama Krishna Malladi; Sophisticated Analytical and Technical Help Institute (SATHI) - CISCoM; 8000 L. [G650].

35. Sai Rama Krishna Malladi; Geometrical Shaping of Organic Crystals via Ion Beam Milling for Industrial Scale Production of Photonic Integrated Circuit Components; 60 L. [yet to open (sanctioned)].

36. Sai Rama Krishna Malladi; Electron beam powder-bed fusion of nickel-base superalloys CM247LC and BZL12Y; 1829.96 L. [G678].

37. Sai Rama Krishna Malladi; Development of Transmission Electron Microscopy Holder and Laser Integrated Electron Microscopy Platforms for In-Situ Experiments; 119.25 L. [recommended for sanction (awaiting final sanction order)].

38. Saswata Bhattacharya; Computational approach using machine learning, CALPHD and first principal calculations for accelerated development of complex concentrated alloys; 29.9 L. [DMRL/MSME/2022-23/S258].

39. Saswata Bhattacharya; Through-process modelling of DS/SC superalloy turbine blades processed using modified Bridgman route-validation with CMSX-4 alloy; 135.99 L. [ARDB(DRDO)/MSME/2022-23/G479].

40. Saswata Bhattacharya; Process Modelling of the manufacturing processes leading to turbine blades of single crystal nickel-base superalloys and titanium alloy components; 134 L. [DRDO/MSME/F119/2023-24/G573].

41. Shourya Dutta Gupta; Development of transmission electron microscopy holder and laser integrated electron microscopy platforms for in-situ experiments; 119 L. [Approval order received].

42. Shourya Dutta Gupta; Surface and cross-section analysis of hair samples; 8.52 L. [S288].

43. Shourya Dutta Gupta; Sophisticated Analytical and Technical Help Institute (SATHI); 8000 L. [G650].

44. Shourya Dutta Gupta; Hybrid transition metal redox catalyst nanocomposite platform for plasmon-enhanced electrochemical/photochemical reduction of CO2; 61.64 L. [G652].

45. Subhradeep Chatterjee; Electron beam powder-bed fusion of nickel-base superalloys CM247LC and BZL12Y; 552.5 L. [G678].

46. Subhradeep Chatterjee; National Center for Clean Coal Research & Development WP8 Welding; 6.2 L. [G158].

47. Subhradeep Chatterjee; Optimization of Electron Beam AM Process of Ti-6AI-4V to minimise the anisotropy in high-temperature mechanical properties, creep, fatigue, and fatigue crack growth and demonstrate printing of real-time component with optimized process parameters; 1829.96 L. [G679].

48. Suhash Ranjan Dey; Fundamental understanding of electrochemical deposition of new quinary alloy system of transition elements deposited from aqueous electrolytes; 26.92 L. [G594].

49. Suresh Kumar Garlapati; Printed, wearable sensor array for non-invasive monitoring of diabetic complications and chronic kidney diseases; 40 L. [G621].

50. Suresh Kumar Garlapati; Development of a complete authentication system using printed RRAM-based PUFs; 20 L. [G560].

51. Suresh Perumal; Microstructural Engineering in Higher Manganese Silicide: Novel approaches for Eco-friendly and High-performance Thermoelectric Power Generation (MEET); 160 L. [CSRP Project no. 7108-1].

52. Suresh Perumal; Development of Nanostructured Higher Manganese Silicide based Thermoelectric Power Generators to Harvest the waste-heat from car exhausters; 30 L. [SG-167].

Awards & Recognitions:

1. Ashok Kamaraj was inducted as an Editor of IIM Metal News in May 2023 and Editor of Trans IIM journal since August 2023. An idea proposed has been shortlisted under "Thinking for Our Planet 75 Ideas (among 2800 entries) to promote LiFE" by NITIYAOG, June 2023; Young Engineers Award 2023-24 by the Institution of Engineers (India), Feb 2024.

2. Chandrasekhar Murapaka received the Faculty Teaching Excellence Award 2024 from IITH.

3. Mayur Vaidya was listed in the Top 2% Scientist – 2023 Stanford List Research Excellence Award – 2023 (below 40 years' age category), Teaching Excellence Award – 2023 from IIT Hyderabad, INSA Young Scientist Award – 2022 Indian National Science Academy.

4. Rishitha Mudunuri (BTech), working under the guidance of Mayur Vaidya, received the Best Paper Award in ICAM5-2023.

5. Krishna Chaitanya Nuli (PhD Scholar), working under the guidance of Mayur Vaidya & Pinaki Prasad Bhattacharjee, received the Best Poster Award during NMD-ATM 2023.

6. Mudrika Khandelwal has been inducted as an INSA associate fellow in 2023.

7. Pinaki Prasad Bhattacharjee received the Faculty Research Excellence Award from IIT Hyderabad (2023); and was listed in the Top 2% of researchers in the Materials Science and Engineering Area compiled by Stanford University.

8. Narayanswamy (PhD), who worked under the guidance of Pinaki Prasad Bhattacharjee, was selected as an Assistant Professor at IIT BHU.

9. Sai Rama Krishna Malladi received the Excellence in Microscopy Award for the year 2023 from the Electron Microscope Society of India.

10. Saswata Bhattacharya has been the Lead Collaborator at the ICME National Hub @ IIT Kanpur.

11. Shourya Dutta Gupta received the INAE Young Associate 2023 - Journal Citation from JALCOM, Elsevier 2024.

12. Suhash Ranjan Dey was selected as an Executive Council Member in the Electron Microscopy Society of India, selected as a Member of the IIM Publications Committee, and Selected as an Associate Editor in the Editorial Board of Bulletin of Materials Science (Impact Factor 1.9), Got selected for the DAAD Faculty Exchange Fellow Program.

13. Suresh Perumal was listed in the Top 2% Most Cited and Influential Scientists, Standford University List-2023; Youth Editorial Board Member – Journal of Materiomics -2023.

Research Highlights:

In the fiscal year 2023-2024, the Department of Materials Science and Metallurgical Engineering at IIT Hyderabad has continued to excel across a broad spectrum of research areas, including advanced alloy development, functional and energy materials research, spintronics, computational materials science, green metallurgical processes, and development of sustainable materials. The department's faculty have made significant contributions that have advanced theoretical understanding and practical applications in these fields. Key highlights include:

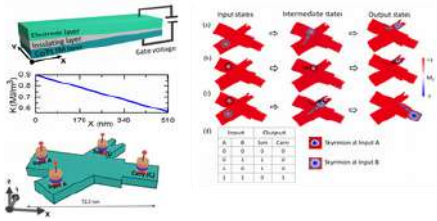
1. **Computational Predictions for Oxide Reduction:**
   Anuj Goyal developed a cutting-edge computational approach to simulate water-splitting redox processes in oxides, particularly addressing the challenge of interacting defects at high concentrations. This work is pivotal for advancing Solar Thermochemical Hydrogen (STCH) production, a promising route for green hydrogen. The findings were published in PRX Energy.

2. **Green Ironmaking Processes:**
   Ashok Kamaraj led research on the direct reduction process using ammonia, a novel and sustainable ironmaking method. This project, funded by the steel ministry and industrial partners, aims to revolutionize traditional ironmaking. Kamaraj also received the IEI Young Engineers Award 2023-24 for his contributions to the field.

3. **Innovations in Quantum Capacitance and Supercapacitors**
   Atul Deshpande has made significant contributions to the understanding of quantum capacitance in supercapacitors, a hidden but crucial component that can greatly enhance energy storage capabilities. His research, published in Carbon Trends, provides new insights into the design and optimization of supercapacitors, which are essential for next-generation energy storage solutions. Additionally, Dr Deshpande's work on high-temperature elemental segregation in high-entropy fluorite oxides and the improvement of chemiresistor gas sensors further demonstrates his versatility and impact across different materials science domains.

4. **Quantum Capacitance in Supercapacitors**
   Atul Deshpande contributed significantly to the understanding of quantum capacitance in supercapacitors, an often-overlooked component that can greatly enhance energy storage capabilities. His research, published in Carbon Trends, provides new insights into the design and optimization of supercapacitors, which are essential for next-generation energy storage solutions. Dr. Deshpande's work on high-temperature elemental segregation in high-entropy fluorite oxides and chemiresistor gas sensors further demonstrates his impact across different materials science domains.

5. **Spintronics and Material Interfaces:**
   Chandrasekhar Murapaka made substantial contributions to the field of spintronics, particularly through his work on spin-orbit torque and spin-Hall angle modulation. His research, published in leading journals such as Journal of Physical Chemistry C, ACS Applied Electronic Materials, and Nanoscale, focuses on the effects of deposition pressure and interface chemistry in materials like W phase and BiSb/NiFe bilayers. This research is crucial for optimizing spintronic devices and developing advanced logic architectures.



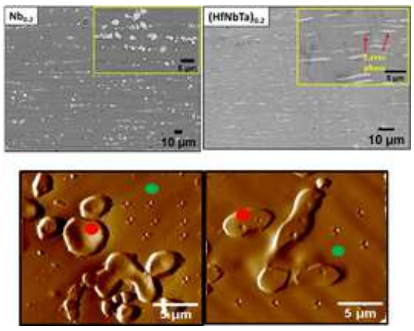
Half-adder & Full adder architectures driven by VCMA gradient

6. **Sustainable Material Solutions**

Mudrika Khandelwal has made significant contributions to the development and optimization of sustainable functional materials and nanocomposites. Her research has resulted in eight published papers, one granted patent, and two additional patents filed, showcasing her innovative approach to material design and technology development. Her work emphasizes sustainability, focusing on creating high-performing, environmentally friendly materials. Khandelwal's achievements have been recognized with the prestigious INSA Young Associateship, and her team's success in reaching the top 8 of the TATANEXT challenge further underscores her leadership and impact in the field.

7. **High-Entropy Alloys and Advanced Manufacturing**

Pinaki Prasad Bhattacharjee continued his groundbreaking research on high-entropy alloys, focusing on their mechanical properties and applications in advanced manufacturing. His work on the deformability of Laves phases and the microstructural evolution during additive friction stir deposition of super duplex stainless steel, published in Scripta Materialia and Additive Manufacturing Letters, showcases the potential of these alloys for industrial applications. His contributions were recognized with the IITH Faculty Research Excellence Award 2023, and he ranked in the top 2% in Materials Science and Engineering as per Stanford University compilations.



Highly Deformable Laves Phase in High Entropy Alloys

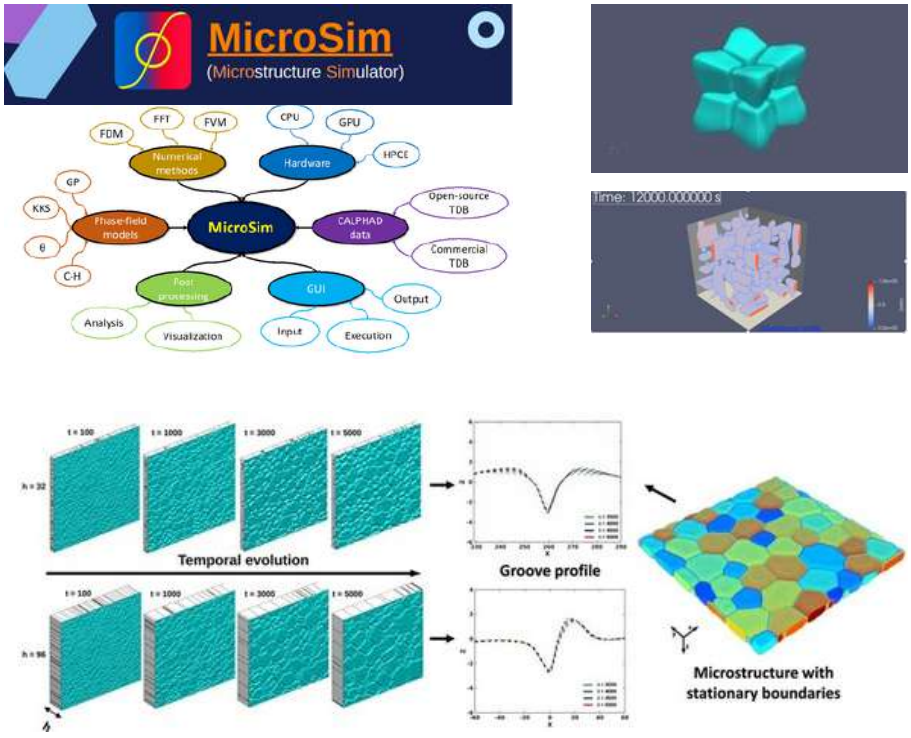
8. **Multiferroic nanocomposites for energy storage and gas sensing**

Ranjith Ramadurai has made significant advancements in developing nanocomposites, particularly for applications in energy storage and gas sensing. His research on the structural and electrical conductivity of Polyaniline-WO3 hybrid nanocomposites, published in the Journal of Physics: Conference Series, demonstrates the potential of these materials in enhancing the efficiency and sensitivity of gas sensors. Moreover, his work on magnetoelectric nanocomposites and pyroelectric ceramics, as evidenced by publications in ACS Applied Electronic Materials and IEEE Sensors Journal, highlights their utility in advanced energy applications. Prof Ramadurai's contributions are further recognized by the patents granted for his work on BCZT/CFO superlattice structures, showcasing his role in translating research into practical technologies.

BCZT / CFO polycrystalline superlattice structures with optimum strain gradient for strong electromechanical Coupling – IITH-DRDO patent granted in March 2024.

9. **Phase field models for microstructure simulations, Diffusion studies, and Software development**

Saswata Bhattacharya's group has been instrumental in extending the capabilities of MicroSim by developing GPU-based modules, an open-source software developed under the National Supercomputing Mission through a consortium that includes researchers from IISc, IIT Hyderabad, IIT Madras, IIT Bombay, CDAC Pune and Savitribai Phule Pune University. This software is crucial for simulating microstructural evolution in alloys, providing researchers with a powerful tool to design and optimize materials at the mesoscale. Bhattacharya's work, which includes publications in Scripta Materialia, Acta Materialia, and Physical Review B, as well as the co-editing of a book on strain engineering with Prof. Ranjith Ramadurai, showcases his commitment to advancing both the theoretical and practical aspects of materials science. He has also initiated collaborations with IISc, through which he has developed novel numerical inverse methods to obtain diffusivity data of multi-principal element alloys from experimental diffusion profiles.



Phase field software: MicroSim CUDA modules; Concurrent thermal grooving and grain grow

10. **Flexible Electronics, Biosensors and Memory devices:**
    Suresh Kumar Garlapati made significant contributions to the fields of flexible electronics, biosensors, and memory devices through several impactful publications. He developed a biocompatible cellulose acetate substrate for flexible electrochemical biosensors, published in IEEE Journal on Flexible Electronics (2024), and advanced the understanding of compliance-free, analog RRAM devices based on SnOx, published in Scientific Reports (2024). Garlapati also introduced a flexible smart sensor system integrating organic and metal oxide transistors in the IEEE Sensors Journal (2024) and explored low-cost printed sensors for therapeutic ultrasound. His research on malodor classification using flexible electronics appeared in Nature Communications (2023), and he delved into perovskite-based emerging memories in Perovskite Ceramics (2023), further expanding his impact on cutting-edge memory technologies. His work reflects a focus on scalability, cost-efficiency, and real-world applications.

The department also attracted significant grants-in-aid in the year 2023-24. These include grants from DST, DRDO-DIA, ARDB GTMAP, and the Ministry of Steel. Also, the faculty of our Department, Sai Rama Krishna Malladi and Shourya Dutta Gupta, under the leadership of our Director, B S Murty, have played a significant role in establishing the SATHI Centre on In-Situ and Correlative Microscopy (SATHI-CISCoM) facility in IIT Hyderabad. These highlights reflect the department's robust research environment and its commitment to advancing both fundamental and applied materials science, positioning IIT Hyderabad as a leader in the field.

Department of Mathematics

The Department of Mathematics, founded along with the Institute in 2008, aspires to evolve into an internationally acclaimed centre 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 of 42.5 Lakhs per annum, which is far exceeding any of the top institution's salary across India. We congratulate each of these pioneers who have placed their faith in us and have made us proud.

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

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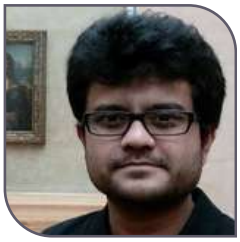

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Publications:

1. Aiyappan S, Cardone G, & Perugia C. (2023). Optimal control problem stated in a locally periodic rough domain: a homogenization study Applicable Analysis. https://doi.org/10.1080/00036811.2023.2265967.

2. Lindstrom S, Wang L, Feng H, Majumdar A, Kraft P, et al. (2023). Genome-wide analyses characterize shared heritability among cancers and identify novel cancer susceptibility regions. In Journal of the National Cancer Institute (Vol. 115, Issue 6, pp. 712–732). https://doi.org/10.1093/jnci/djad043.

3. Majumdar A & Pasaniuc B. (2023). A Bayesian method for estimating gene-level polygenicity under the framework of transcriptome-wide association study. In Statistics in Medicine (Vol. 42, Issue 26, pp. 4867–4885). https://doi.org/10.1002/sim.9892.

4. Fernandez-Peralta R, Massanet S, Gupta M, Nanavati K, & Jayaram B. (2023). Subgroup Discovery Through Sharp Transitions Using Implicative Type Rules. In IEEE International Conference on Fuzzy Systems. https://doi.org/10.1109/FUZZ52849.2023.10309697.

5. Gupta M, Nanavati K, & Jayaram B. (2023). Monometrics on Lattice Betweenness Using Fuzzy Implications. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 14069 LNCS (pp. 667–678). https://doi.org/10.1007/978-3-031-39965-7_55.

6. Gupta V K & Jayaram B. (2023). Clifford's order was obtained from uninorms on bounded lattices. In Fuzzy Sets and Systems (Vol. 462). https://doi.org/10.1016/j.fss.2022.08.016.

7. Gupta V K & Jayaram B. (2023). On the Pecking Order between Those of Mitsch and Clifford. In Mathematica Slovaca (Vol. 73, Issue 3, pp. 565–582). https://doi.org/10.1515/ms-2023-0042.

8. Mandal S & Jayaram B. (2023). BKS Fuzzy Inference Employing h-Implications. In Forum for Interdisciplinary Mathematics (pp. 123–138). https://doi.org/10.1007/978-981-19-7014-6_9.

9. Nanavati K, Gupta M, & Jayaram B. (2023). A Study of Monometrics from Fuzzy Logic Connectives. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 14069 LNCS (pp. 657–666). https://doi.org/10.1007/978-3-031-39965-7_54.

10. Nanavati K, Gupta M, & Jayaram B. (2023). Pseudo-monometrics from fuzzy implications. In Fuzzy Sets and Systems (Vol. 466). https://doi.org/10.1016/j.fss.2022.11.001.

11. Nanavati K & Jayaram B. (2023). Order from non-associative operations. In Fuzzy Sets and Systems (Vol. 467). https://doi.org/10.1016/j.fss.2023.02.005.

12. Subrahmanyam P V, Vijesh V A, Jayaram B, & Veeraraghavan P. (2023). Preface. In Forum for Interdisciplinary Mathematics (p. v).

13. Vemuri N R, Jayaram B, & Mesiar R. (2023). Generation of continuous T-norms through latticial operations. In Fuzzy Sets and Systems (Vol. 462). https://doi.org/10.1016/j.fss.2022.09.005.

14. Sahoo A K & Manna B B. (2023). Existence of sign-changing solutions to a Hamiltonian elliptic system in RN. In Journal of Mathematical Analysis and Applications (Vol. 517, Issue 2). https://doi.org/10.1016/j.jmaa.2022.126655.

15. Bhattacharyya A, Patra D S, & Tarafdar M. (2023). Certain Almost Kenmotsu Metrics Satisfying The Vacuum Static Equation. In Publications de l'Institut Mathematique (Vol. 113, Issue 127, pp. 109–119). https://doi.org/10.2298/PIM2327109B.

16. Li Y, Patra D S, Alluhaibi N, Mofarreh F, & Ali A. (2023). Geometric classifications of k-almost Ricci solitons admitting paracontact metrices. In Open Mathematics (Vol. 21, Issue 1). https://doi.org/10.1515/math-2022-0610.

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Funded Research Projects

1. Bhakti Bhusan Manna; Existence and Qualitative behaviour for solutions for nonlinear elliptic systems; 6.60 L. [SERB/MATH/F189/2024-25/G703].

2. Balasubramaniam Jayaram; Monotone Metric Spaces in Machine Learning; 6.6 L. [MTR/2020/000506].

3. Deepak Kumar Pradhan; INTERPOLATION PROBLEMS; 35 L. [DST/MATH/F316/2022-23/G529].

4. Dhriti Sundar Patra; The Fischer-Marsden and the CPE conjectures on Riemannian manifolds; 24.90 L. [SG/IITH/F295/2022-23/SG-133].

5. Dhriti Sundar Patra; Week contact structure and Einstein-type manifolds; 15.20 L. [G655].

6. Jyotirmoy Rana; Solute dispersion in two-phase blood flow with the electrokinetic effect of endothelial glycocalyx layer; 24.01 L. [SG/IITH/F275/2022-23/SG-113].

7. Jyotirmoy Rana; Magnetic drug delivery in cancer treatment; 15.76 L. [SERB/MATH/F275/2023-24/G635].

8. Narasimha Kumar; On the structure of Drinfeld modular forms of arbitrary level and the Atkin-Lehner Theory; [SERB-CRG].

9. Neeraj Kumar; Koszul Algebras and Diagonal Subalgebras; 1.5 L. [SERB/MA/F216/2022-23/G316].

10. Neeraj Kumar; Conference on Commutative Algebra and Algebraic Geometry; 3.5 L. [SERB/MA/F216/2022-23/G538].

11. Neeraj Kumar; Conference on Commutative Algebra and Algebraic Geometry; 2.9 L. [NBHM/MA/F216/2022-23/G550].

12. Neeraj Kumar; Sequences and bigraded Betti numbers of symmetric and Rees algebra: Theoretical, Algorithmic, and Coding Aspects; 21.35 L. [SERB-CRG].

13. Sayantee Jana; Modelling skewed and heavy-tailed financial data encountered during catastrophes such as economic recessions, cyclones and pandemics, using Generalized Multivariate Analysis of Variance (GMANOVA) models, under Multivariate Skew t (MST) distribution.; 1 L. [SICI/MATH/F281/2022-23/TG-11].

14. Sayantee Jana; Data mining and Machine Learning modelling to reduce Unclaimed deposits in banks under private sector Banks Category; 10 L. [RBI/MATH/F281/2024-25/S320].

15. Subrahmanya Sastry Challa; Sparse Approximations with Prior Support Constraint and Application to Interior Tomography; 15.16 L. [G404].

16. Sukumar D; A study on the exponential spectrum; 6.60 L; [SERB- MATRICS].

17. Rajesh Kannan M; Spectral theory of signed graphs; 27.19 L. [SERB-CRG].

18. Venku Naidu Doggu; Boundedness of Integral Operators on Reproducing Kernel Hilbert spaces; 6.60L. [SERB-MATRICS].

19. Vikas Krishnamurthy; A study of vortex sheets as limiting cases of point vortex equilibria; 12.68 L. [SRG/2023/001855].

Awards and Recognitions:

1. Neeraj Kumar received the Best Oral Presenter Award during the 2023 International Algebra Conference in the Philippines.

2. Neeraj Kumar received the SERB Core Research Grant.

3. P Mohan (student) received the "Dr K V Rao Scientific Society Certificate award" in 2024.

4. Ramesh G received the Best Paper award for the paper, "On operators which attain their norm on every reducing subspace. Ann. Funct. Anal. 13, 19 (2022)", jointly written with H. Osaka (Japan) for the year 2024 in January 2024.

5. Sayantee Jana received the Do Bui Family Travel Award of 1000 USD.

6. Sayantee Jana was inducted as a member of the Editorial Board of Statistica Neerlandica Journal.

7. Shanola S Sequeira (student) was selected for the KVRSS Award for 2023.

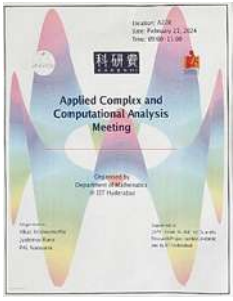
Highlights:

1. Applied Complex and Computational Analysis Meeting Workshop

The Department of Mathematics at IIT Hyderabad organized the Applied Complex and Computational Analysis Meeting on February 21st, 2024, in room A220. The workshop featured a variety of insightful talks on topics such as:

- Blowups of stagnation points in 2D potential flows
- The Backus problem in geophysics
- Fractional Fourier transform and its applications
- Analytic models of nematic cell alignment
- Numerical computation for multiple solutions to the Plateau problem
- Quadrilateral geometries of four-vortex relative equilibria

This event gathered experts to explore the latest advancements in applied mathematics and computational analysis across multiple fields.

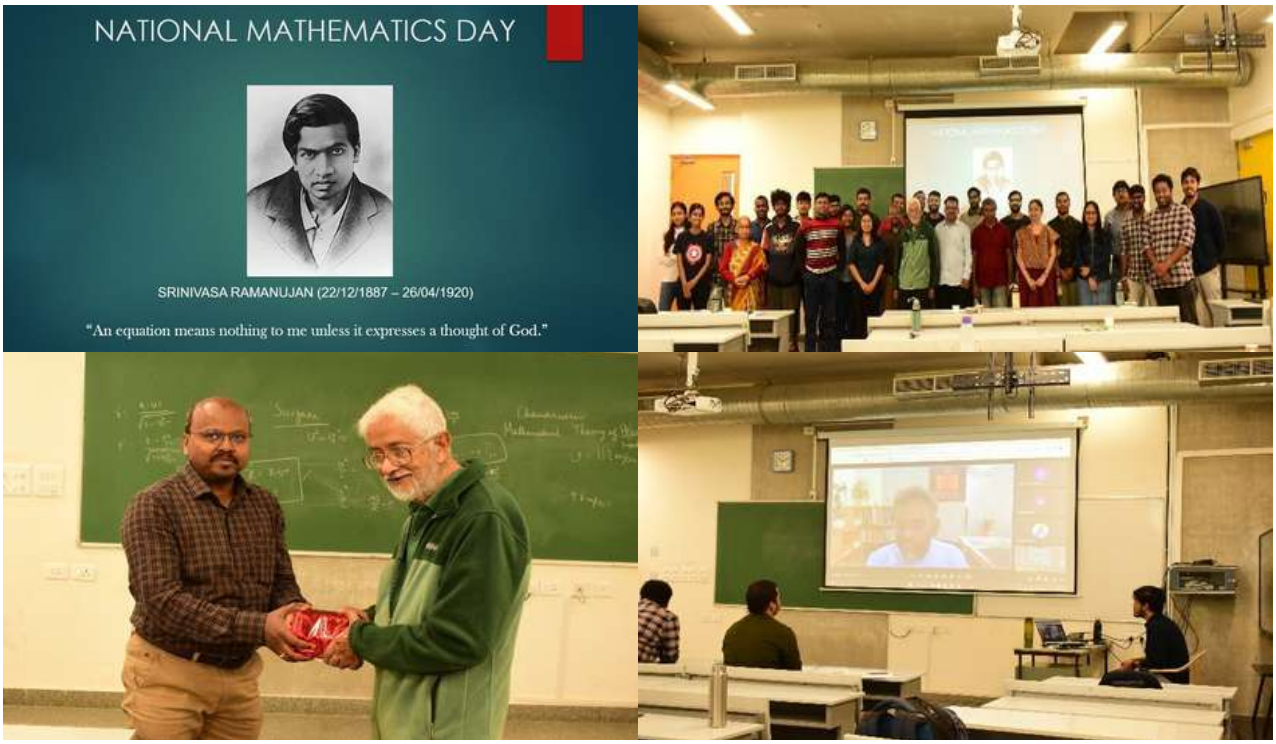



2. **Mathematical Science Public Outreach Program**

Dr Amit and Dr Neeraj organized an outreach event on mathematical sciences on December 17, 2023. This program was held with an aim to foster research culture by motivating school students to pursue higher studies by raising awareness about science through interaction session, and public outreach and knowledge dissemination by delivering public lectures on mathematical sciences to enhance the basic understanding of mathematics.

3. **Ramanujan Day Celebrations on 22nd December 2023**

The Department of Mathematics, IIT Hyderabad, celebrated National Mathematics Day on December 22nd,2023, as we commemorate the birth anniversary of the legendary mathematician Srinivasa Ramanujan.



Department of Mechanical and Aerospace Engineering

The Mechanical and Aerospace Engineering (MAE) Department at IIT Hyderabad has been focusing on many basic and applied areas under Mechanics and Design (MAD), Thermo-Fluid Engineering (TFE), Integrated Design and Manufacturing (IDM), and Aerospace Engineering (AE) streams with the support of 35 faculty members, 15 staff, and more than 450 students. This year, the Department welcomed Dr S K Karthick as an Assistant Professor in the area of hypersonic flow and four staff members. Apart from offering undergraduate (UG) programs in Mechanical Engineering, UG Minor in Aerospace Engineering, MTech, and PhD in the above streams, faculties of MAE have taken the lead in coordinating and participating in several interdisciplinary programs such as UG program in Computational Engineering, PG Programs in Electric Vehicle Technology, Climate Change, Sustainability, Smart Mobility, Integrated Circuits and Microsystem Packaging.
This year, the MAE Department also signed MOUs with MRF Tyres, Mahindra & Mahindra, and Ultraviolette Automotive. Honeywell, Hyundai, etc., for collaborating research and teaching in the area of Vehicle and Tire Dynamics. The faculties of the Department also visited industries such as ASL, DRDO, ZF, Ashok Leyland, Hyundai, DMSRDE, Honeywell, Sundaram Clayton, ISRO, LPSC, and Sandvik. Several new facilities, like moment of inertia measuring, wind tunnel facility, and hydrogen combustion lab, were developed in the Department.

To promote the interaction with students, staff and faculty, MAE organized the first-ever Department Day with wide participation from students, staff, and faculty. Similarly, interaction with Alumni was organized during the Alumni Day. Industrial visits of the students in courses were organized. The department also organized several Industrial and research talks by speakers from India and Abroad. A five-day workshop titled "Fundamental and Advanced Skills for Futuristic Vehicles" was conducted in July 2023, focusing on training industry and academic personnel to upskill them for futuristic vehicles. Another event was the hands-on training program on Computational Fluid Dynamics (HOWTOCFD), held in June 2023. As part of our outreach efforts, we participated in the testing and modelling of Mokku used by farmers under the rural development program.
Prof Ashok Kumar Pandey took over as the Head of the Department after the successful tenure of Prof Ramji in August 2023. Dr Safvan Palathingal was appointed as the DPGC Convenor in January 2024, and Dr Sayak Banerjee took over as the DUGC Convenor in December 2023.

Overall, the MAE department continues to advance its mission of academic excellence and industry collaboration, making meaningful contributions to both the academic and industrial sectors with the Institute's vision of Innovating and Inventing in Technology for Humanity at IITH.
For more information, please visit: https://mae.iith.ac.in/

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Patents:

Filed:

1. Surya Kumar S; A Fluid Collection Device for Collecting Fluids; 202341005050.

Published:

1. Lakshmana Dora Chandrala; A System to Recreate Dynamic Weather Conditions; 202341038384.
2. Surya Kumar S; A Method for Reduction of Residual Stresses in Additive Manufactured Components Through Electropul; 202241020827.
3. Surya Kumar S; A Novel Area Filling Approach in Metal Additive Manufacturing for Reducing Substrate Distortion; 202241020913.
4. Venkatesham B; Extendable Socket Apparatus to Accommodate Oversized Adaptors; 202341039785.

Granted:

1. Prasanth Kumar R; A Stiffened Flexible Manipulator Arm; 974/DEL/2014.
2. Raja Banerjee; A System and Process for Segregation of Low Ash Clean Coal from Coal Tailings; 202031005007.

Publications:

1. Chandra Dash R, Pandey A K, et al. (2023). Parametric Tuning of Natural Frequencies of Tuning Fork Gyroscope. In Mechanisms and Machine Science (Vol. 126, pp. 162–171). https://doi.org/10.1007/978-3-031-20353-4_12.
2. Devsoth L & Pandey A K. (2023). Hydrodynamic forces in non-uniform cantilever beam resonator. In International Journal of Mechanical Sciences (Vol. 244). https://doi.org/10.1016/j.ijmecsci.2022.108078.
3. Devsoth L & Pandey A K. (2023). Two-Dimensional Hydrodynamic Forces in an Array of Shape-Morphed Cantilever Beams. In Mechanisms and Machine Science (Vol. 126, pp. 232–243). https://doi.org/10.1007/978-3-031-20353-4_18.
4. Jani N, Pandey A K, et al. (2023). Different Beam Configurations for Compliant Mechanism-Based MEMS Accelerometer. In Mechanisms and Machine Science (Vol. 126, pp. 119–135). https://doi.org/10.1007/978-3-031-20353-4_8.
5. Jujjuvarapu S K, Erravelly I R, & Pandey A K. (2023). Frequency Analysis of Microbeam with Axial Pretension Using MSGT. In Mechanisms and Machine Science (Vol. 126, pp. 191–214). https://doi.org/10.1007/978-3-031-20353-4_15.
6. Kumar M, Menon P K, & Pandey A K. (2023). Study of Curved Beam Based Displacement Amplifying Compliant Mechanism for Accelerometer Design. In Mechanisms and Machine Science (Vol. 126, pp. 77–93). https://doi.org/10.1007/978-3-031-20353-4_6.

7. Pandey A K, Pal P, et al. (2023). Preface. In Mechanisms and Machine Science (Vol. 126, p. ix).

8. Ranjan P, & Pandey A K. (2023). Experimental characterization and parameter identification of bolted joints under vibratory loading. In Tribology International (Vol. 186). https://doi.org/10.1016/j.triboint.2023.108636.

9. Ranjan P, Sibivivek K P, & Pandey A K. (2023). Dynamic characterization of 3D printed bolted joints. In Tribology International (Vol. 187). https://doi.org/10.1016/j.triboint.2023.108762.

10. Shaik J, Tiwari S, & Vyasarayani C P. (2023). Floquet Theory for Linear Time-Periodic Delay Differential Equations Using Orthonormal History Functions. In Journal of Computational and Nonlinear Dynamics (Vol. 18, Issue 9). https://doi.org/10.1115/1.4062633.

11. Shaik J, Uchida T K, & Vyasarayani C P. (2023). Nonlinear dynamics near a double Hopf bifurcation for a ship model with time-delay control. In Nonlinear Dynamics (Vol. 111, Issue 23, pp. 21441–21460). https://doi.org/10.1007/s11071-023-08965-y.

12. Shaik J, Vyasarayani C P, & Chatterjee A. (2023). Linear Quadratic Regulator for Delayed Systems Using the Hamiltonian Approach and Exact Closed-Loop Poles for First-Order Systems. In Journal of Dynamic Systems, Measurement and Control, Transactions of the ASME (Vol. 145, Issue 7). https://doi.org/10.1115/1.4062439.

13. Andraju L B, & Raju G. (2023). Damage characterization of CFRP laminates using acoustic emission and digital image correlation: Clustering, damage identification and classification. In Engineering Fracture Mechanics (Vol. 277). https://doi.org/10.1016/j.engfracmech.2022.108993.

14. Pillarisetti L S S, Raju G, & Subramanian A. (2023). SECTORIAL PLANE WAVE IMAGING FOR WELD INSPECTION STUDIES. In Materials Evaluation (Vol. 81, Issue 9, pp. 42–49). https://doi.org/10.32548/2023.me-04312.

15. Potukuchi S, Chinthapenta V, & Raju G. (2023). A review of NDE techniques for hydrogels. In Nondestructive Testing and Evaluation (Vol. 38, Issue 1, pp. 1–33). https://doi.org/10.1080/10589759.2022.2144304.

16. Ravulapalli V, Raju G, & Narayanamurthy V. (2023). Experimental and numerical studies on the elastoplastic buckling response of cylindrical shells with spigot support under axial compression. In Thin-Walled Structures (Vol. 191). https://doi.org/10.1016/j.tws.2023.111095.

17. Gnanaprakash K, Lim D, & Yoh J J. (2023). Combustion characteristics of lithium perchlorate-based electrically controlled solid propellants at elevated pressures. In Thermochimica Acta (Vol. 720). https://doi.org/10.1016/j.tca.2022.179421.

18. Lim D, Gnanaprakash K, et al. (2023). Combustion behaviour of electrically controlled solid propellant with tungsten additive. In Thermochimica Acta (Vol. 727). https://doi.org/10.1016/j.tca.2023.179562.

19. Ade S S, Chandrala L D, & Sahu K C. (2023). Size distribution of a drop undergoing breakup at moderate Weber numbers. In Journal of Fluid Mechanics (Vol. 959). https://doi.org/10.1017/jfm.2023.164.

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Funded Research Projects:

1. Anirban Naskar; Experimentally validated multi-scale modelling framework for grinding-induced subsurface deformation of single Crystal Ni-base Superalloy (CMSX-4); 48.24 L. [G723].

2. 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].

3. Chandra Prakash; Real-time, In-situ, Microscale Experimental Thermo-Mechanical Behaviour Characterization of Composite Material under Shock Loading; 29.59 L. [G649].

4. Chandra Prakash; Experimentally Validated Computational Design Framework of a Multi-Material Multi-Layered Sandwich Panel for Impact Energy Absorption and Dissipation Casting Process; 82.27 L. [G645].

5. Gangadharan Raju; Development of finite element model for studying the ablation of rocket nozzle linear made of carbon phenolic composite material; 27.14 L. [DRDO/MAE/F153/2022-23/G543].

6. Gangadharan Raju; Failure analyses of the composite pressure vessels with cut-outs; 9.9 L. [S304].

7. Gangadharan Raju; Carbon fibre reinforced pthalonitrile composites for high-temperature applications (Up to 350 C); 75.88 L. [G613].

8. Gangadharan Raju; Studies on the effect of partially siliconized zones on the mechanical properties of C/SiC composites; 0 L. [S303].

9. Gnanaprakash Kanagaraj; Investigating the combustion dynamics of micron and nano-sized metal particles for energy and propulsion applications; 25 L. [SG136].

10. Gnanaprakash Kanagaraj; Industrial Energy Assessment as part of "Kotak-IITM Save Energy Mission(KISEM) – IIT Hyderabad"; 139.8 L. [S270].

11. Gnanaprakash Kanagaraj; Studies on combustion and hydrolysis of metal fuel particles for clean energy and hydrogen generation using recyclable metal fuels; 5 L. [Travel Grant to Japan].

12. Harish Nagaraj Dixit; Boundary layer and wind farm flow over heterogeneous terrain: Design-oriented model development using large-eddy simulations; 0 L. [G565].

13. Harish Nagaraj Dixit; Effect of Marangoni stresses and interfacial rheology on migration and deformation of surfactant-laden drops in viscous flow; 18.74 L. [NULL].

14. Karri Badarinath; 3D Printing of Conical Shape Charge Liners and Lattice Structure: Feasibility, Consistency and Production Scaling; 1676.34 L. [G680].

15. Karthick S K; Design and development of an arc jet plasma facility for erosion testing; 85.00 L. [G-711].

16. Karthick S K; Deep sub-cavity in an open cavity flow in a compressible flow regime; 20.00 L. [AC2024-7].

17. Karthick S K; Physical aspects of shock-shear layer interactions in a confined supersonic cavity flow; 25.00 L. [SG-174].

18. Mahesh M S; Prediction of noise from underwater non-cavitating propeller using CFD and acoustic analogy; 25 L. [S300].

19. Mahesh M S; Industrial Energy Assessment as part of "Kotak-IITM Save Energy Mission(KISEM) –IIT Hyderabad"; 0 L. [S270].

20. Mahesh M S; Prediction of flutter boundary of afin in hypersonic flow using semi-empirical aeroelastic models: 30% advance + 20% Milestone-I = 635558.40 + 423705.60 = 1059264 @18%GST =1249931.52-(Advance 30% Rs:635558.40) = 614373.12; 25 L. [S280].

21. Mahesh M S; Development of a numerical tool for predicting the internal ballistics of a gun; 95 L. [G646].

22. Muvvala Gopinath; Simulation capabilities for additive manufacturing processes; 316.36 L. [G670].

23. Muvvala Gopinath; 3D Printing of Conical Shape Charge Liners and Lattice Structure: Feasibility, Consistency and Production Scaling; 1676.34 L. [G680].

24. Muvvala Gopinath; Development of hybrid friction stir welding process and hard-faced tools for onsite joining of high strength materials through the assistance of a high-power laser and additive manufacturing route; 43.06 L. [G592].

25. N Venkata Reddy; Circular Manufacturing Research and Education collaboration with India and japan-CIRMAN-322275 Funded: The Research Council of Norway (NOK 2000000); 164.15 L. [CIRMAN/MAE/F099/2022-23/S228].

26. N Venkata Reddy; Integrated Product and Process Design for Hybrid Incremental Sheet Forming and Non-Planar Metal Additive Manufacturing; 36.63 L. [G605].

27. Niranjan Shrinivas Ghaisas; Boundary layer and wind farm flow over heterogeneous terrain: Design-oriented

model development using large-eddy simulations; 0 L. [G565].

28. Pankaj Sharadchandra Kolhe; Simulation of Homing System of Naval Torpedo; 34.72 L. [G637].

29. Pankaj Sharadchandra Kolhe; Fuel flexible novel flow burring injector based swirl stabilized burner; 43.83 L. [G713].

30. Prabhat Kumar; Experimentally Validated Computational Design Framework of a Multi-Material Multi-Layered Sandwich panel for Impact Energy Absorption and Dissipation Casting Process; 82.26 L. [G645].

31. Prabhat Kumar; Topology optimization of pneumatically activated soft grippers; 6.00 L. [G689].

32. Raja Banerjee; Application of Deep learning techniques for Robust Optimal Design of Integrated Water networks towards sustainable water management in Petroleum Refineries; 63 L. [G644].

33. Ramji M; Artificial Neural Network Based Predictions of the SIF for a FSAPDS Penetrator Under Static Loading Conditions; 57.56 L. [G593].

34. Ramji M; Critical crack size estimation of a given C/SiC composite laminate at room temperature; 0 L. [S301].

35. Ramji M; Modeling and design of an integration scheme of carbon fibre-reinforced silicon carbide composite panels to the metallic bulkhead using suitable insulation and fasteners; 26.92 L. [S262].

36. Ramji M; Failure Analysis of the Composite Pressure Vessels with Cut-outs; 9.99 L. [S304].

37. Ramji M; Evaluating the Ramberg-Osgood Parameters from localized zones in a superalloy weldment by image mapping technique; 9.95 L. [NULL].

38. Ramji M; Acceptance criterion of the composite pressure vessels involving progressive damage modelling; 0 L. [S302].

39. Ranabir Dey; Ultrasound-triggered active drug delivery (uADD) system for triple-negative breast cancer therapy; 58.42 L. [G698].

40. Safvan Palathingal; Design and Development of an Experimental Setup for Measurement of 10 InertialParameters of Slender Flights/Projectiles; 88.83 L. [ARB/MAE/F090/2022-23/G537].

41. Sai Sidharth; Optimization of Disc Vane patterns with improved thermal deformation using GANs; 20 L. [C1427].

42. Sai Sidharth; Thermo-structural analysis of Carbon-Carbon brake disc; 20 L. [S297].

43. Sai Sidhardh; Simulation of SAARC container cases; 1.5 L. [C1107].

44. Sai Sidharth; Modeling and design of an integration scheme of carbon fibre reinforced silicon carbide composite panels to the metallic bulkhead using suitable insulation and fasteners; 27 L. [S262].

45. Sai Sidharth; Artificial Neural Network Based Predictions of the SIF for an FSAPDS Penetrator Under Static Loading Conditions; 63 L. [G593].

46. Saravanan Balusamy; Thermoacoustic characteristics of 3D printed LPG/H_2 fueled triple-swirl turbulent burners using optical diagnostics; 65.34 L. [G716].

47. Saravanan Balusamy; Laser Driven Bright X Ray Sources for Imaging; 84.06 L. [G715].

48. Sayak Banerjee; The Experimental Investigation and Numerical Modelling of Heat Absorption Efficacy of Additive Enhanced Endothermic Rocket Fuels; 230.58 L. [S253].

49. Sayak Banerjee; Industrial Energy Assessment as part of "Kotak-IITM Save Energy Mission(KISEM) –IIT Hyderabad"; 0 L. [S270].

50. Surya Kumar S; 3D Printing of Conical Shape Charge Liners and Lattice Structure: Feasibility, Consistency and Production Scaling; 1676.34 L. [G680].

51. Surya Kumar S; Integrated Product and Process Design for Hybrid Incremental Sheet Forming and Non-Planar Metal Additive Manufacturing; 37.7 L. [G605].

52. Surya Kumar S; Simulation Capabilities for Additive Manufacturing Processes; 316.36 L. [G670].

53. Syed Nizamuddin Khaderi; Dynamic characterization of bird material using SHPB (P.O.NO: A001418438 & Date.03.03.2023); 32.73 L. [S271].

54. Syed Nizamuddin Khaderi; Dynamic characterization of bird material using impact and slicing(P.O.NO: A001420078 & Date.06.03.2023); 17.33 L. [S272].

55. Syed Nizamuddin Khaderi; Numerical simulation of process modelling and experimental validation of selective laser melted FAN inlet guide vanes and fuel atomizer body components for aero engine and end-use applications; 149 L. [G616].

56. Syed Nizamuddin Khaderi; 3D Printing of Conical Shape Charge Liners and Lattice Structure: Feasibility, Consistency and Production Scaling; 1676.3 L. [G680].

57. Venkatesham B; Overall Noise Estimation of On-Board Power plant equipment; 9.95 L. [BHEL/MAE/F057/2022-23/S242].

58. Viswanath R R S R Chinthapenta; Corneal Characterization under biaxial-loading in physiological conditions; 24.05 L. [SERB/MAE/F117/2022-23/G547].

59. Viswanath R R S R Chinthapenta; Optimization of Electron Beam AM Process of Ti-6AI-4V to minimise the anisotropy in high-temperature mechanical properties, creep, fatigue and fatigue crack growth and demonstrate printing of real-time component with optimized process parameters; 552.5 L. [G679].

60. 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].

61. Viswanath R R S R Chinthapenta; Numerical simulations of process modelling and experimental validation of selective laser melted FAN inlet guide vanes and fuel atomizer body components for aero engine and end-use applications; 213.6 L. [G616].

62. Viswanath R R S R Chinthapenta; Thermo-structural analysis of Carbon-Carbon brake disc; 19.96 L. [S297].

Awards and Recognitions:

1. Gunasekar N (PhDScholar), working under the guidance of Anurup Datta, received the Best Paper Award for the paper titled ''Laser Induced Forward Transfer (LIFT) of Copper Nano Paste: A study using continuous wave and nanosecond pulsed laser'' as the best paper in Session 4 - Functional Materials in the International Conference on ''Recent Innovation in Production Engineering'' (RIPE-2024) held during 30 and 31st May organized by Department of <production Technology, Madras Institute of Technology Campus, Anna University, Chennai.

2. Chandrika Prakash Vyasarayani was inducted into the ASME Journal of Mechanisms and Robotics.

3. Harish Nagaraj Dixit received the Excellence in Teaching Award, IIT Hyderabad, 2023; Article picked as Editors Suggestion in Physical Review Fluids; Article highlighted in European Physics Journal Special Topics; Former PhD student selected for a faculty position at IIT Bombay; Invited to organize and chair a session on "Multiphase Flows" at CompFlu-2023, IIT Madras; External PhD examiner, IISc Bengaluru; External PhD examiner, NIT Warangal; Invited research talk on 5th October 2023 at Leeds University.

4. Atul S Vivek (PhD Scholar), working under the guidance of Dr Ranabir Dey and Dr Harish N Dixit, was selected as the Editors' Suggestion in Physical Review Fluids (PRF). The PRF is the flagship journal in fluid mechanics of the American Physical Society (APS).

5. Karthick S K received the DRDO-ASL Research Grant (CARS Project) Jan 2024; IWSEPP - 2024 conference session chair; DRDO-DRDL Research Grant (DIA-CoE, IIT Bombay); JICA Friendship Grant 2.0 (MAE, IITH); Institute Research Grant (Seed grant, IIT Hyderabad); DST-SERB, International Travel Grant (76th APS-DFD, USA).

6. Muvvala Gopinath received four Best Paper Awards for papers: Laser Surface Polishing of Additively Manufactured Components through Laser Beam Shaping; A Study on the Effect of Modulated Mode Laser on Anisotropy in Laser-Directed Energy Deposition; Strategies to Control Porosity in Laser Directed Energy Deposition; Controlling waviness in additive manufacturing of thins walls by laser-directed energy deposition process.

7. Arkajyoti Jha, (PMRF-PhD Scholar), working under the supervision of Muvvala Gopinath, has won the best paper award and Raja Dharavathu (PMRF-PhD Scholar) and Jagdish Chandra Pandey (MTech) won the best poster awards at the International Conference on Material Processing Using Lasers, and Surface Engineering (IMPULSE-2023), which was organised by IIT Madras.

8. Kingshuk Mondal and Kethavath Naveen Naik (PhD Scholars), working under the guidance of Niranjan S Ghaisas, received the Best Paper Award at FMFP 2023.

9. Prabhat Kumr received the DST International travel grant.

10. Raja Banerjee was inducted as a Fellow of the International Society of Energy Environment & Sustainability.

11. Ranabir Dey received the Fluigent Faculty Oral Presentation Award at the 1st Indian Conference on Micro Nano Fluidics (ICOM 2023) at IIT Madras, Young Scientist Speaker Award at the workshop on Interfacial Engineering at Multiple Spatio-temporal Scales held at Indian Institute of Science (IISc), Bengaluru.

12. Safvan Palathingal was guided to first place in the Students Mechanism Design Contest (SMDC) at the 6th International and 21st National Conference on Machines and Mechanisms (iNaCoMM 2023) held at NIT Raipur.

13. B Umamaheshwar Reddy (BTech 2016) Bagged the All India Rank-270 position in UPSC 2022.

14. Viswanath R R S R Chinthapenta was inducted as the Guest Editor of the International Journal Fracture Special Issue and also as the Guest Editor for Material Today proceeding: SICE-2022.

Research Highlights:

(a)An event in Department day; (b) CFRP based manufacturing; (c) 3D Image correlation setup

Department of Physics

The Department of Physics at IIT Hyderabad 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. Ranked 501-550 in the world in 2024 for Physics & Astronomy and in FY 23-24, a unique accomplishment among all the departments of IIT Hyderabad, the department continues to soar to greater heights.

In the year 2024, the department launched a brand new MTech program in "Quantum and Solid State devices (QSSD)" responding to the need of the hour in creating a specialized workforce who can contribute to the "National Quantum Mission" of attaining global excellence in Quantum Computation, Quantum Information and Quantum Communication Technology sectors. This new program adds to the MSc program in Medical Physics and an MTech program in Ophthalmic Engineering launched in the previous academic year. The department has excellent faculties in five major research areas (Condensed Matter Physics, High Energy Physics, Astrophysics, Atomic, Molecular and Optical Physics, and Quantum Information, Computation & Communications). Apart from the core teaching of the department, four of our faculties are involved in cross-disciplinary MTech programs, one in ISS and one in EST. At present, the department has a total of 29 faculty members, 5 postdocs and 351 students (PhD, MSc, BTech Engineering Physics, MSc in Medical Physics, MTechs in Ophthalmic engineering and Quantum & Solid-state devices). FY 23 – 24 has been a fruitful year in terms of research and student achievements. Faculties of our department have published nearly 346 international journal articles and delivered numerous talks at various conferences/workshops as well as organized several national and international conferences, workshops and seminars-colloquia.

The Department is operating the Advanced Dark Sky Observatory (ADSO), a unique accomplishment among all MoE institutes (IITs, IISERs and IISc) in addition to the list of 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 (CEFIPRA, DAAD, JSPS). 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, DRDO, CSIR and DAE.

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

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Patents:

Filed:

1. Surya Narayana Jammalamadaka; A System and Method of Detection of Bovine Serum Albumin (BSA) Using Cantilever Beam Magnetometer; 202341079265.

Granted:

1. Arabinda Haldar; Skyrmion Based Majority Logic Gate in a Nanomagnetic Device; 202241010372.

2. Surya Narayana Jammalamadaka; Memristor Based Device and Method for Detecting Bovine Serum Albumin (BSA); 201941034084.

Publications:

1. Abhyoudai S S, Mukherjee S, & Pan A K. (2023). Robust certification of unsharp instruments through sequential quantum advantages in a prepare-measure communication game. In Physical Review A (Vol. 107, Issue 1). https://doi.org/10.1103/PhysRevA.107.012411.

2. Kumar R & Pan A K. (2023). Sharing nonlocality in a network using the quantum violation of chain network inequality. In Quantum Studies: Mathematics and Foundations (Vol. 10, Issue 3, pp. 353–372). https://doi.org/10.1007/s40509-023-00300-9.

3. Kumari A & Pan A K. (2023). Sharing preparation contextuality in a Bell experiment by an arbitrary pair of sequential observers. In Physical Review A (Vol. 107, Issue 1). https://doi.org/10.1103/PhysRevA.107.012615.

4. Kumari S, Naikoo J, Ghosh S, & Pan A K. (2023). The interplay of nonlocality and incompatibility breaking qubit channels. In Physical Review A (Vol. 107, Issue 2). https://doi.org/10.1103/PhysRevA.107.022201.

5. Munshi S & Pan A K. (2023). Optimal Quantum Violations of n-Locality Inequalities with Conditional Dependence on Inputs. In Annalen der Physik (Vol. 535, Issue 7). https://doi.org/10.1002/andp.202300060.

6. Munshi S & Pan A K. (2023). Self-testing of an unbounded number of mutually commuting local observables. In Physical Review A (Vol. 108, Issue 6). https://doi.org/10.1103/PhysRevA.108.062607.

7. Pan A K. (2023). Leggett-Garg test of macrorealism using indefinite causal order of measurements. In Physics Letters, Section A: General, Atomic and Solid State Physics (Vol. 478). https://doi.org/10.1016/j.physleta.2023.128898.

8. Roy P, Mahato S S, Mukherjee S, & Pan A K. (2023). Device-independent certification of degeneracy-breaking measurements. In Physical Review A (Vol. 107, Issue 2). https://doi.org/10.1103/PhysRevA.107.022204.

9. Roy P & Pan A K. (2023). Device-independent self-testing of unsharp measurements. In New Journal of Physics (Vol. 25, Issue 1). https://doi.org/10.1088/1367-2630/acb4b5.

10. Sasmal S, Mahato S S, & Pan A K. (2023). Nonlocal correlations in an asymmetric quantum network. In Physical Review A (Vol. 107, Issue 2). https://doi.org/10.1103/PhysRevA.107.022425.

11. Abed Abud A, Giri A K, Zwaska R, et al. (2023). Highly parallelised simulation of a pixelated LArTPC on a GPU. In Journal of Instrumentation (Vol. 18, Issue 4). https://doi.org/10.1088/17480221/18/04/P04034.

12. Abed Abud A, Giri A K, Zwaska R, et al. (2023).

Impact of cross-section uncertainties on supernova neutrino spectral parameter fitting in the Deep Underground Neutrino Experiment. In Physical Review D (Vol. 107, Issue 11). https://doi.org/10.1103/PhysRevD.107.112012.

13. Abud A A, Giri A K, Zwaska R, et al. (2023). Reconstruction of interactions in the ProtoDUNE-SP detector with Pandora. In European Physical Journal C (Vol. 83, Issue 7). https://doi.org/10.1140/epjc/s10052-023-11733-2.

14. Abud A A, Giri A K, Zwaska R, et al. (2023). Identification and reconstruction of low-energy electrons in the ProtoDUNE-SP detector. In Physical Review D (Vol. 107, Issue 9). https://doi.org/10.1103/PhysRevD.107.092012.

15. Abudinén F, Giri A K, Žlebčík R, et al. (2023). Measurement of the branching fraction and CP asymmetry of B0 →π0π0 decays using 198×106 B B ¯ pairs in Belle II data. In Physical Review D (Vol. 107, Issue 11). https://doi.org/10.1103/PhysRevD.107.112009.

16. Abudinén F, Giri A K, Žlebčík R, et al. (2023). Measurement of the B0 lifetime and flavor-oscillation frequency using hadronic decays reconstructed in 2019-2021 Belle II data. In Physical Review D (Vol. 107, Issue 9). https://doi.org/10.1103/PhysRevD.107.L091102.

17. Abudinén F, Giri A K Žlebčík R, et al. (2023). Measurement of the ωc0 lifetime at Belle II. In Physical Review D (Vol. 107, Issue 3). https://doi.org/10.1103/PhysRevD.107.L031103.

18. Abudinén F, Giri A K, Žlebčík R, et al. (2023). Search for a Dark Photon and an Invisible Dark Higgs Boson in μ+μ- and Missing Energy Final States with the Belle II Experiment. In Physical Review Letters (Vol. 130, Issue 7).https://doi.org/10.1103/PhysRevLett.130.071804.

19. Abudinén F, Giri A K, Žlebčík R, et al. (2023). Measurement of lepton mass squared moments in B →xc ℓ ν ¯ ℓ decays with the Belle II experiment. In Physical Review D (Vol. 107, Issue 7). https://doi.org/10.1103/PhysRevD.107.072002.

20. Abudinén F, Giri A K, Žlebčík R, et al. (2023). Measurement of the Λc+ Lifetime. In Physical Review Letters (Vol. 130, Issue 7). https://doi.org/10.1103/PhysRevLett.130.071802.

21. Acero M A, Giri A K, Zwaska R, et al. (2023). Measurement of νμ charged-current inclusive π0 production in the NOvA near detector. In Physical Review D (Vol. 107, Issue 11). https://doi.org/10.1103/PhysRevD.107.112008.

22. Acero M A, Giri A K, Zwaska R, et al. (2023). Measurement of the double-differential muon-neutrino charged-current inclusive cross section in the NOvA near detector. In Physical Review D (Vol. 107, Issue 5). https://doi.org/10.1103/PhysRevD.107.052011.

23. Acero M A, Giri A K, Zwaska R, et al. (2023). Measurement of the νe -Nucleus Charged-Current Double-Differential Cross Section at «eν »=2.4 GeV Using NOvA. In Physical Review Letters (Vol. 130, Issue 5).https://doi.org/10.1103/PhysRevLett.130.051802.

24. Adachi I, Giri A K, Žlebčík R, et al. (2023). Search for a τ+τ- Resonance in e+e- →μ+μ-τ+τ- Events with the Belle II Experiment. In Physical Review Letters (Vol. 131, Issue 12). https://doi.org/10.1103/PhysRevLett.131.121802.

25. Adachi I, Giri A K, Zhukova V I, et al. (2023). Measurement of CP asymmetries in B0 →φ Ks0 decays with Belle II. In Physical Review D (Vol. 108, Issue 7). https://doi.org/10.1103/PhysRevD.108.072012.

26. Adachi I, Giri A K, Zhukova V I, et al. (2023). Measurement of CP Violation in B0 → KS0 π0 Decays at Belle II. In Physical Review Letters (Vol. 131, Issue 11). https://doi.org/10.1103/PhysRevLett.131.111803.

27. Adachi I, Giri A K, Žlebčík R, et al. (2023). Measurement of the τ -lepton mass with the Belle II experiment. In Physical Review D (Vol. 108, Issue 3). https://doi.org/10.1103/PhysRevD.108.032006.

28. Adachi I, Giri A K, Žlebčík R, et al. (2023). Search for an Invisible Z′ in a Final State with Two Muons and Missing Energy at Belle II. In Physical Review Letters (Vol. 130, Issue 23). https://doi.org/10.1103/PhysRevLett.130.231801.

29. Adachi I, Giri A K, Žlebčík R, et al. (2023). Search for Lepton-Flavor-Violating τ Decays to a Lepton and an Invisible Boson at Belle II. In Physical Review Letters (Vol. 130, Issue 18). https://doi.org/10.1103/PhysRevLett.130.181803.

30. Adachi I, Girl A K, Žlebčík R, et al. (2023). Search for a long-lived spin-0 mediator in b →s transitions at the Belle II experiment. In Physical Review D (Vol. 108, Issue 11). https://doi.org/10.1103/PhysRevD.108.L111104.

31. Adachi I, Giri A K, Žlebčík R, et al. (2023). Tests of Light-Lepton Universality in Angular Asymmetries of B0 →d∗-ℓ ν Decays. In Physical Review Letters (Vol. 131, Issue 18). https://doi.org/10.1103/PhysRevLett.131.181801.

32. Adachi I, Giri A K, Zhukova V I, et al. (2023). Determination of |Vcb | using B ¯ 0 →D∗+ℓ- ν ¯ ℓ decays with Belle II. In Physical Review D (Vol. 108, Issue 9). https://doi.org/10.1103/PhysRevD.108.092013.

33. Adachi I, Giri A K, Zhukova V I, et al. (2023). A novel method for the identification of the production flavour of neutral charmed mesons. In Physical Review D (Vol. 107, Issue 11). https://doi.org/10.1103/PhysRevD.107.112010.

34. Adachi I, Giri A K, Žlebčík R, et al. (2023). Observation of e+e- →ωχbJ (1P) and Search for Xb →ω ϒ (1S) at s near 10.75 GeV. In Physical Review Letters (Vol. 130, Issue 9). https://doi.org/10.1103/PhysRevLett.130.091902.

35. Adachi I, Giri A K, Žlebčík R, et al. (2023). Precise Measurement of the Ds+ Lifetime at Belle II. In Physical Review Letters (Vol. 131, Issue 17). https://doi.org/10.1103/PhysRevLett.131.171803.

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Funded Research Projects:

1. Alok Kumar Pan; Quantum Foundations to Quantum Technologies; 0 L. [G643].
2. Alok Kumar Pan; Probing multipartite non-local correlations in various quantum network configurations and randomness certification; 19.72 L. [SERB/PHY/F321/2022-23/G551].
3. Alok Kumar Pan; Information-Theoretic advantage from indefinite causal order of channels; 0 L. [G588].
4. Alok Kumar Pan; Device-independent quantum randomness certification using non-projective measurements; 6.6 L. [SERB/PHY/F321/2022-23/G548].
5. Anjan Kumar Giri; Indian Institution Fermilab Collaboration on neutrino Physics at Fermilab; 175 L. [G218].
6. Anupam Gupta; Mathematical modeling of tissue morphogenesis with viscoelastic extracellular matrix; 6.6 L. [SERB/PHY/F244/2022-23/G527].
7. Anupam Gupta; Matrix inhomogeneity and degradation regulate tissue organization and its morphogenesis; 34.6 L. [SERB-ANRF/PHY/2024-25/G720].
8. Arabinda Haldar; Development of self-biased magnetic materials for low loss bias-free passive microwave devices; 11.17 L. [ARDB/01/2032001/M/I].
9. Arabinda Haldar; Spin wave dispersions and nanoscale imaging of magnons using Brillouin light scattering spectro-microscopy; 49.47 L. [CRG/2022/004492].
10. Arabinda Haldar; Control of magnetic microwave properties using external electric current; 0.74 L. [59/20/05/2021-BRNS/57038].
11. Arabinda Haldar; Harnessing pure spin current by tailoring molecular spinterface; 1.43 L. [58/14/04/2022-BRNS/37004].
12. Arabinda Haldar; Spintronics-based Digital Logic Architecture Design for AI Applications; 8.47 L. [CRG/2022/004336].
13. Archak Purkayastha; Quantum thermodynamics for quantum engineering; 18.3 L. [FICORE grant].
14. Archak Purkayastha; Engineering effective non-Hermitian Hamiltonians for quantum technology; 20 L. [Friendship 2.0 Research Grant AC].
15. Archak Purkayastha; Simulating Noisy- Intermediate-Scale- Quantum (NISQ) devices; 30 L. [SG/IITH/F331/2023-24/SG-169].
16. Atanu Rajak; Floquet engineering, quantum chaos and thermalization in quantum many-body systems; 31.92 L. [SG/IITH/F337/2023-24/SG-175].
17. Bhuvanesh Ramakrishna; Laser driven proton sources for cancer therapy; 90 L. [G255].
18. Bhuvanesh Ramakrishna; Biodegradable Lipo-Polymeric Nanoprobes for Cancer Theranostics; 40 L. [G676].
19. Bhuvanesh Ramakrishna; Bright Radiation Sources from Intense Laser Matter Interaction; 22 L. [G312].
20. Bhuvanesh Ramakrishna; Laser Driven Bright X Ray Sources for Imaging; 90 L. [G715].
21. Jyoti Ranjan Mohanty; Magnetization Dynamics in Ferrimagnetic Heterostructure with Domain Wall Junctions; 0.04 L. [IEEE/PHY/F103/2022-23/S245].
22. Jyoti Ranjan Mohanty; Micromagnetic simulations and Experimental validation of Heusler alloy thin film Magnetic properties; 63.47 L. [S294].
23. Jyoti Ranjan Mohanty; Micromagnetic simulations for Dy-free/lean high coercivity NdFeB magnets; 59.9 L. [S305].
24. Jyoti Ranjan Mohanty; Predicting magnetic properties of critical element free permanent magnets for space applications through multi-scale modelling approach; 20.14 L. [G566].
25. Kanchana V; Exploring Quantum Materials with Topological Electrons and Phonons- Roadmap to Novel Applications; 33.15 L. [G-526].
26. Kanchana V; Exploring Quantum Materials from First Principles for Spintronic Applications; 79.02 L. [G-704].
27. Mahesh Peddigari; A Feasible route towards designing high breakdown strength and high polarization dielectric ceramic thick films for energy storage applications; 33.11 L. [G631].
28. Manish Kumar Niranjan; Micromagnetic simulations for Dy-free/lean high coercivity NdFeB magnets; 55 L. [S305].
29. Manish Kumar Niranjan; Theoretical and Structural investigations on Antiferroelectric materials for energy storage devices; 26 L. [SURE/2022/004508].
30. Nithyanandan Kanagaraj; Towards Multifunctional Two-micron Ultrafast fibre laser for high precision biomedical applications; 84.3 L. [G699].
31. Nithyanandan Kanagaraj; Development of Next Generation of Spatio-Temporal Multimode Broadband Amplifiers for Fiber Optic Communication; 44.3 L. [Fund Released].
32. Nithyanandan Kanagaraj; KeraEyeFATE: Tensor-based Machine Learning for Early Detection of Keratoconus; 40.07 L. [G682].
33. Nithyanandan Kanagaraj; A Proof-of-Concept study on laser additive manufacturing of single crystal superalloys through spatiotemporally tailored laser

beam; 22 L. [NULL].

34. Priyotosh Bandyopadhyay; Research grant and Travel; 1.00 L. [RDF &Travel].

35. Priyotosh Bandyopadhyay; Phoenix 2023; 3.00 L. [SSY/2023/001078].

36. Sai Santosh Kumar Raavi; Bandgap Engineered Lead-free Halide Double perovskites with enhanced emission properties; 31.45 L. [S274].

37. Saket Asthana; Investigation of the structure-property relationship in lead-free relaxor ferroelectric to optimize recoverable energy storage density; 1.35 L. [CRS/2021-22/03/553 G465 from R and D, Its ongoing project].

38. 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].

39. Shantanu Desai; Explorations in astrophysical data mining, astrostatistics and astroinformatics; 45 L. [G207].

40. Shantanu Desai; Precise Observation of pulsars; 51 L. [G728].

41. Shantanu Desai; Searches for astrophysical neutrinos from pulsars; 6 L. [G664].

42. Shubho Ranjan Roy; MANY FACETS OF COMPLEXITY: FROM CHAOS TO THERMALIZATION; 0 L. [CRG/2023/001120].

43. Suryanarayana Jammalamadaka; Micromagnetic simulations and Experimental validation of Heusler alloy thin film Magnetic properties; 63.47 L. [S294].

44. Yogesh Kumar Srivastava; Harnessing Out-of-Equilibrium Materials for Ultrafast Actively Tunable Photonic Devices; 24.79 L. [G633].

45. Yogesh Kumar Srivastava; Ultrafast Terahertz Super-Spintronics; 99.87 L. [G717].

Awards & Recognitions:

1. Alok Kumar Pan was selected for a Short Research Trip to France (SRTF) in 2023 through a funding programme of the French Institute in India (IFI) / the Embassy of France in India.

2. Piyush Saklani (MSc), working under the supervision of Alok Kumar Pan, received the Chanakya Post Graduate Fellowship from the I-HUB Quantum Technology Foundation (I-HUB QTF).

3. Anjan Kumar Giri was invited as a visitor to Giri Gordon Godfrey in June 2023 at University of Sydney, Australia.

4. Soni Dayashankar Prajapati (PhD Scholar), working under the guidance of Anupam Gupta, received the Best Paper Award at Frontier in Active and Soft Matters 2023, jointly organized by the University of Hyderabad & TIFR Hyderabad.

5. Arabinda Haldar received the 'Research Excellence Award' from IIT Hyderabad, 2024; Session Chair for ICMAGMA 2023, Hyderabad, India Dec 4-6, 2023; Session Chair for ICONN 2023, SRM Institute of Science and Technology, Chennai, Mar 27-29, 2023; Session Chair for INTERMAG 2023, Sendai, Japan, May 15-19, 2023.

6. Sudeep Singh (PhD student), working under the supervision of Arabinda Haldar and Manivel Raja (DMRL, Hyderabad), received the best poster award at the International Conference on Magnetic Material and Applications (ICMAGMA -2023) organized by the Magnetic Society of India in association with DMRL from 4-6 December at Ramoji Film City Hyderabad.

7. Archak Purkayastha was chosen as a Faculty Associate of the International Center for Theoretical Sciences, Tata Institute of Fundamental Research (ICTS-TIFR), Bengaluru, India.

8. Kanchana V received a Bronze medal in the Society for Material Chemistry (SMC) 2023.

9. Mayukh Pahari Using a joint collaboration with TIFR Mumbai, MIT, USA, a 3-day observation window has been awarded by NASA, USA, using the space-based X-ray polarimetric satellite Imaging X-ray Polarimetric Explorer (IXPE). NASA GSFC will bear the expenditure of the observation.

10. Nithyanandan Kanagaraj was inducted as the Founding General Secretary of the Indian Society of Nonlinear and Complex Systems"; and has been a part of the 3-Members Committee of the Bureau of Indian Standards (BIS) in the Optics Section for the years 2021-23, 2024-26; was the Vice-Chair of the OSA Technical Group "Lasers in Manufacturing" (Jan 2023 – Dec. 2025); Elected as the Editor of the Optical Society of India Newsletter; OPTICA Awarded our TG – Lasers in Manufacturing "Greatest Growth in Activity" prize by the Board of Directors under his leadership; received the Teaching Excellence Award for the Year 2024 by IIT Hyderabad; Events Officer of the OSA Technical Group "Ultrafast Phenomena" (Jan 2023 – Dec 2025).

11. Priyanka (PhD Scholar), working under the guidance of Prem Pal, received the Best Poster Presentation Award at the ICACMP 2023 conference.

12. Prem Pal received the Teaching Excellence Award 2024 and received the JSPS Invitation Fellowship for Research in Japan.

13. Apan Dinda, Ms Mrinmoyee Saha, & Mr Pitambar Bagui (MSc), working under the supervision of Prem Pal & Archak Purkayastha, received the Chanakya Post-Graduate Fellowship from the I-HUB Quantum Technology Foundation (I-HUB QTF).

14. Priyotosh Bandyopadhyay was Awarded a visiting professor position at Korea Institute for Advanced Study, Seoul, South Korea, for 1 year with international travel support; received INR 300000 towards Phoenix workshop from SERB; Invited to teach at Sangam workshop held at HRI.

15. Sai Santosh Kumar Raavi was inducted as the Associate Editor of Elsevier's journal (OPTICAL MATERIALS); and was elected as A Fellow of the Royal Society of Chemistry(FRSC); inducted as a Fellow Telangana Academy of Sciences (FTAS); a Member of the National Academy of Science India (NASI); an Associate Editor of Optical Materials (Elsevier); a Fellow of the Royal Society of Chemistry (FRSC).

16. MD Soif Ahmed (PhD Scholar), working under the guidance of Sai Santosh Kumar Raavi, was selected for a Swiss Government Excellence Scholarship for the period of one year.

17. Lavadiya Sireesha (PhD Scholar), working under the guidance of Sai Santosh Kumar Ravi, received the Best Oral Presentation Award.

18. Swarna Prabha Maharana (PhD Scholar), working under the guidance of Saurabh Sandilya, received the best poster prize at the 16th International Conference on Heavy Quarks and Leptons (HQL 2023), which was held from Nov 28 to Dec 2, 2023, at Tata Institute of Fundamental Research (TIFR), Mumbai.

19. Rajesh Kumar Roul (PhD Scholar), working under the guidance of Suryanarayana Jammalamadaka, received the best poster award at the International Conference on Magnetic Material and Applications (ICMAGMA -2023) organized by the Magnetic Society of India in association with DMRL from 4-6 December at Ramoji Film City Hyderabad.

20. Vandana Sharma attended the International Technical Program Committee of CLEO-2024 and received the Young Scientist Award for the development of medical devices in National Physicists Conclave-2024 (NPC-2024), and she was inducted as the Guest Editor for a Special issue in the Journal of Physics B (https://iopscience.iop.org/collections/jpb-230809-313).

21. Prasanth Tata (BTech-EP 4th year), working under the guidance of Vandana Sharma, received the Best Poster Award for "A Highly Efficient Novel Camera Calibration Method for NIR-based Rigid Stereo Vision Setup" at the SCOP-23 conference, hosted at the Physical Research Laboratory in Ahmedabad.

22. Shubham Makwana (Junior Research Fellow), working under the guidance of Vandana Sharma, received the Best Poster Award for "AI-Based Novel Background Subtraction Method for NIR Imaging System" at the SCOP-23 conference hosted at the Physical Research Laboratory in Ahmedabad.

Research Highlights:

Condensed Matter Physics (Experiment):

Over the past year, the Magnonics lab has focused on investigating magnetization dynamics in various nanostructures and thin films for memory and logic applications. We have shown a giant tunability of microwave response in tapered nanostructures for current-driven skyrmions through micromagnetic simulations [J Phys D: Appl. Phys 56, 335001 (2023)]. We developed a binary adder utilizing skyrmions, which are topologically protected nanosized spin textures and demonstrated the functionalities of both half-adder and full-adder by driving skyrmions through a voltage-controlled magnetic anisotropy gradient [Nanoscale 16, 1843-1852 (2024)].

Another research focus is on tuning anisotropy in rare earth and transition materials (RE-TM) with high perpendicular magnetic anisotropy (PMA) for future data storage device applications. This material system is extremely interesting because it is a soft magnetic material with controllable PMA influenced by thickness, composition, deposition methods, stress, and external factors like annealing and ion beam irradiation. As shown in Fig. 1, we examine PMA formation and magnetic stripe domains in a 45 nm GdFe film. We also investigate magnetic skyrmion creation and manipulation in RE-TM alloys using ultrafast laser pulses, as depicted in Fig. 2. Additionally, we explore skyrmion core and chirality switching through laser pulses [Syam Prasad]. Our research extends to two-dimensional transition metal dichalcogenides (TMDs), focusing on the growth, characterization, and tuning of their electronic, optical, magnetic, and transport properties [Anagha G et. al., Physica E: Low-dimensional Systems and Nanostructures, 116065]. Fig. 3 shows atomic microscopy images of MoS2 flakes.

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, 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.

The Functional Ceramics Laboratory group primarily focused on improving the energy storage properties of lead-based and lead-free ceramics. We have proposed a novel nanograin engineering approach based upon high kinetic energy deposition for mechanically inducing the relaxor ferroelectric behaviour in a normal ferroelectric system to realize a giant energy storage density of 124 J/cm3 [Adv. Mater. 2023, 35, 2302554]. The list of publications can be found at: https://scholar.google.co.kr/citations?hl=en&user=ST7W7cAAAAAJ&view_op=list_works&sortby=pubdate

The Nanophotonic and Energy Materials group mainly works in the fields of nano-/quantum- photonics, plasmonics/thermo-plasmonics, optical spectroscopy, and 2D materials for energy harvesting. In the past year, we have been exploring 2D materials for hydrogen generation. More details of our group publications can be found here. https://scholar.google.co.in/citations?user=s3TZ-asAAAAJ&hl=en

Advanced Functional Materials lab is one of the active groups and deals with several research projects aligned with our core

areas of expertise. These projects cover a wide range of scientific disciplines and aim to address significant challenges in the field of ferroic materials for different applications. Our researchers conducted in-depth investigations, collected data, and collaborated with external partners to generate novel insights and contribute to the advancement of knowledge in their respective domains. We have achieved good energy storage parameters for pulse power applications. Our lab placed a strong emphasis on spreading our research findings to the scientific community and beyond. As a result, we published several research papers in reputable peer-reviewed journals. As we move forward, our lab remains committed to pushing the boundaries of knowledge, pursuing innovative research, and making meaningful contributions to our field. Therefore, we are currently involved in developing flexible ferroelectric smart material via the addition of the polymer to enhance better sustainability of our materials.
https://scholar.google.co.in/citations?user=9GPKaOwAAAAJ&hl=en

Development of various magnetic thin films for the study of physics and different device applications. Some of the important results are highlighted below. Remote detection of bovine serum albumin (BSA) using cantilever beam magnetometer [Journal ref: Journal of Magnetism and Magnetic Materials 589, 171537 (2024)] Detection of bovine serum albumin (BSA) is important to comprehend the severity of certain diseases. We tried to detect bovine serum albumin (BSA) using modified cantilever beam magnetometry (CBM). A magnetostrictive Fe70Ga30 cantilever, in combination with an optical detection technique, allowed us to detect BSA concentrations up to 1 mg/mL in a remote way. Essentially, a position-sensitive detector (PSD) is used to detect reflected light from a cantilever without any optical mirrors. Apart from the above, the magnetostriction of Fe70Ga30 cantilever is estimated as 80 ppm at 180 mT. We ascertain that our method is easy and efficient in estimating the magnetostriction of thin films up to 10-6 orders. We believe that the CBM technique that we developed would be helpful in estimating the magnetostriction of bulk and thin films apart from the detection of biomolecules.

Condensed Matter Theory:

The group is dedicated to unravelling the complexities of crystalline materials and predicting their diverse thermal, electronic, magnetic, and topological properties using first-principles calculations. A central focus of our current work is the investigation of electronic structures, particularly the topological characteristics of various quantum materials. Topological features in both electronic and phononic bands are rare in magnetic compounds like MnYZ (Y=Ga, Zn; Z=Ge, Sb), making these materials particularly intriguing when combined with quantum transport modelling at the atomic scale [Journal of Physics: Condensed Matter, 36, 155501 (2024)]. ThAs2 exhibits significant topological properties in its phonon spectrum and electronic band structure, with Fermi surface nesting suggesting a potential charge density wave. This is corroborated by Lindhard susceptibility calculations, which display maxima at the same wave vector in both the real and imaginary parts. Combined with its negative magnetoresistance, these features make ThAs2 an exceptional compound [Phys. Rev. B 109, 035151, (2024)]. Exploring the domains of thermoelectric compounds, we investigated the thermoelectric properties of the quaternary oxypnictide YZnAsO, which, due to its layered structure, shows a promising figure of merit (ZT) of 1.07 at T=800K [Physica B: Condensed Matter 657, 414811(2023)]. The investigation of Li2CaX (X = Sn, Pb) reveals topological phonons with Dirac-like crossings and low lattice thermal conductivity, with Li2CaPb showing a ZT of 0.15 for holes and 0.2 for electrons at 500 K [Materials Today Communications 35,106289(2023)]. The unique features of these diverse materials significantly expand the possibilities for exploring their structure-property relationships, opening new avenues for developing advanced device applications.

The “Non-equilibrium many body dynamics” group focuses on two important aspects of systems out-of-equilibrium. For the first case, we aim to provide an efficient quantum annealing algorithm for the quantum Sherrington-Kirkpatrick (SK) spin glass model compared to the existing ones. Quantum annealing is a generic tool to find the solutions to optimization problems more efficiently than the simulated annealing using quantum tunnelling. We have developed a modified algorithm by tuning the longitudinal field in addition to the transverse field that indeed converges to the actual ground state of the classical spin glass with a higher configuration averaged probability. In our work, using the concept of waiting time distribution, we have shown the existence of the prethermal behaviour for a many-body classical system with unbounded chaotic diffusion. A complete list of publications can be found in
https://scholar.google.co.in/citations?user=RJhUov4AAAAJ&hl=en

The soft matter group is mainly focusing on developmental bio-physics and active matter in turbulent environments. We closely collaborate with experimental colleagues, and based on the observations, we develop mathematical models to simulate this system and help in scanning the full parameter space that is challenging for experimentalists. One of the aims of our group is to guide the experimentalists in the right parameter space to conduct the experiments. Our group focuses on developing new theoretical and computational methods. This year we published two of our works related to viscoelastic flows in complex geometries such as porous medium (Phys. Fluids., 35, 093108 (2023), Phys. Fluids, 35, 023105 (2023)), and the other work focussed on a very fundamental aspect of the non-equilibrium system, i.e., is bacterial turbulence irreversible (Phys. Rev. F, 8, 023102 (2023).

Optics, Laser and Plasma group:

In the Ultrafast Fiber Optics & Smart Photonic Technologies Lab, we lead pioneering research at the intersection of

fundamental and applied photonics. Our work focuses on developing next-generation laser sources, including advanced ultrafast fibre lasers and smart photonic systems. A key area of our research is Coherent Beam Combining, which holds significant potential for directed energy applications such as Directed Energy Weapons (DEW), high-precision additive manufacturing, and secure communication systems.

Another group is dedicated to imaging fundamental reactions in atomic, molecular, and condensed systems, with a focus on translating this research into societal benefits. Over the past academic year, we made significant strides in understanding the ionization and fragmentation dynamics of camphor molecules and camphor-doped helium nanodroplets exposed to extreme ultraviolet and soft x-ray photons. Remarkably, we observed minimal fragmentation in Penning ionization within helium nanodroplets, a discovery that opens new pathways for exploring photoionization in organic molecules. (DOI: 10.1088/1361-6455/ad1d37)

In parallel, we developed a highly portable and affordable whole slide imaging (WSI) scanner that integrates advanced control software and wireless functionality. This device delivers high-resolution scans in just five minutes, making it ideal for rural medical centers and versatile enough for applications beyond medicine, including plasma science. (DOI:10.1109/TIM.2023.3265763). Furthermore, we are pioneering a novel 3D Vein Viewer module that not only maps peripheral veins beneath the skin but also measures vein depth with micrometre accuracy. By simulating vein imaging through a multi-layer skin model at various near-infrared wavelengths using Zemax OpticStudio, we identified the optimal wavelength and angle for effective vein illumination, providing key insights into NIR light penetration dynamics. (https://doi.org/10.1117/12.2670866)

Terahertz Photonics Laboratory (UTPL) focuses on terahertz spectroscopy of quantum materials, perovskites and superconductors. We use light to drive strongly correlated materials, high-Tc superconductors, quantum materials, chalcogenide, and topological insulators to the out-of-equilibrium states and investigate them using a terahertz probe. We also focus on silicon metasurface cavities for photonic integrated circuits (Nature Communications, 14, 2811 (2023)), offering potential applications in next-generation ultrafast communication systems and nonlinear devices. A complete list of publications can be found at https://scholar.google.com/citations?user=xe8IutUAAAAJ&hl=en.

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 is leading 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”. The group has published results in various high-impact journals. Plasma Physics and Controlled Fusion 65 (4), 045005 (2024)

Plasma Theory and Computation Lab explored characteristics of sub-ion kinetic range turbulence in the solar wind. Using 2.5D kinetic particle-in-cell simulations we showed that kinetic Alfven waves cascade energy to sub-ion scales via local nonlinear interactions [Plasma Physics Reports 49(6), 759-771 (2023)]. This shows the viability of KAWs to explain the observed sub-ion power law in solar wind observations. We also analyzed magnetometer data of Magnetosphere Multiscale Mission (NASA-MMS) in the solar wind. The removal of noise from data allows intermittency to appear. We showed that three different methods of intermittency measurement produce equivalent results. The scale of intermittency was determined to be below the ion scales, indicating the possibility of electron-scale intermittency [Astrophys. Space Sci. 369, 7 (2024)].

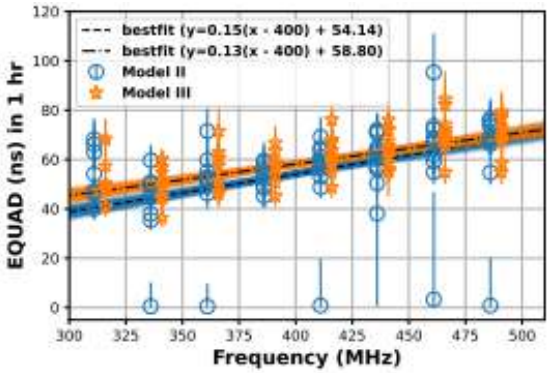
Quantum Technologies and Dissipative Systems:

This 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, such as 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. 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

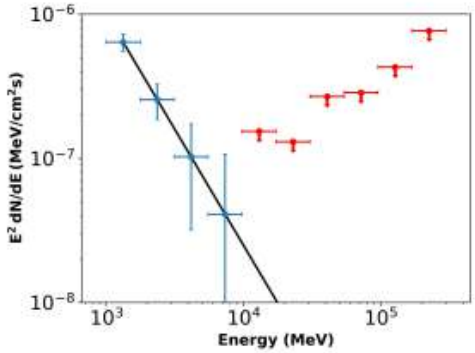
Over the last year, our group, Driven Dissipative Quantum systems, have focussed on quantum transport in low dimensional systems, phenomena induced by noises in small systems, and the effect of measurements of quantum systems. We have established several fundamental drawbacks of standard formalisms used to describe driven systems under temperature and voltage biases [Phys. Rev. A 107, 062216 (2023)], and developed new numerical and analytical techniques that go beyond them and can describe the thermodynamics of driven systems under temperature and voltage biases [Phys. Rev. B 107, 195117 (2023). We have developed the new concept of quantum many-body detection probability and used this to show that certain far-for-equilibrium transitions in quantum many-body systems can be observed via single-shot measurements rather than requiring measurement of expectation values [Phys. Rev. A 109, L020202 (2024) [Letters]]. We have also made collaborations with Kyoto University, Japan (through the JICA program), and with Aalto University, Finland (through the FICORE program).

Astrophysics and Cosmology

As part of the Indian pulsar timing array consortium, this group works with other PTA collaborations in data combination and search for GWs. His group has analysed jitter noise in PSR J0437-4715. (PASA, 41, e036 (2024). His group also looked for gamma-ray emission from SPT-SZ selected galaxy clusters using Fermi-LAT at GeV energies as well as COMPTEL data at MeV energies and found 6σ from one cluster SPT-CL J2012-5649. His group also searched the public IceCube muon track data to check if pulsars contribute to the diffuse neutrino flux seen in IceCube. The DES collaboration (which includes the Desai lab) published its first cosmological analysis with Type Ia SN.

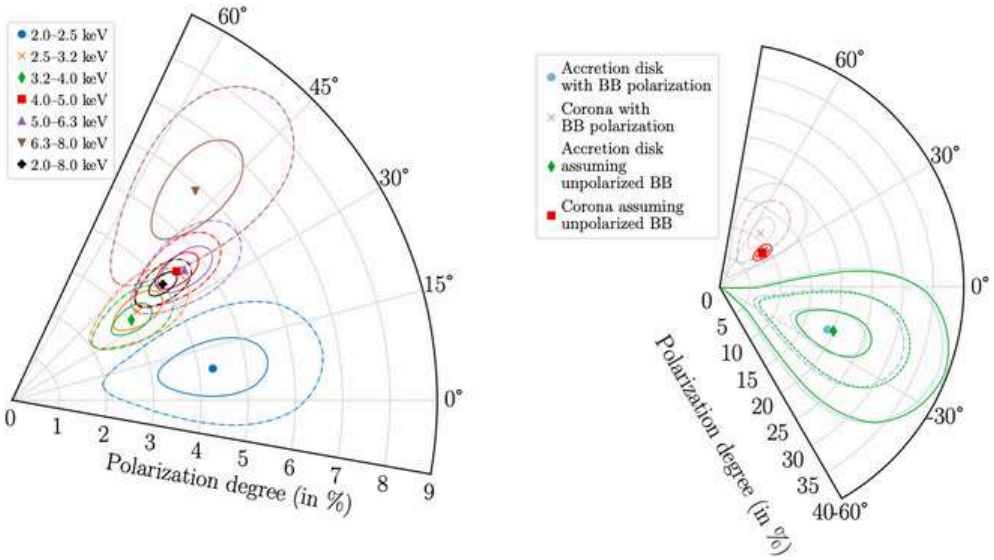


Kikunaga et al PASA 41, e036(2024)



Manna & Desai, JCAP, 01, 017(2024)

This group also investigated a wide range of astrophysical phenomena focussing on stars and compact objects like black holes and neutron stars, and in collaboration with TIFR, INAF, MIT, University of Oxford, Chinese Academy of Sciences and Eureka Scientific Inc., his lab worked on X-ray spectro-polarimetric measurements of a neutron star for the first time using data from IXPE, NICER missions from NASA, AstroSat mission from India.



X-ray Polarization measurements from a nearby neutron star X-ray binary GX 340+0 using NASA's first X-ray polarimetric mission IXPE. A published paper on the same source using AstroSat and NICER data can be found at Pahari et al., 2024, MNRAS, 528, 4125 https://doi.org/10.1093/mnras/stae309

High energy phenomenology

This group explores physics beyond the Standard Model to explain the origins of Dark Matter, and neutrino masses as well as scenarios to explain various anomalies observed at different experiments: such as g-2 of muon, anomalous W-boson mass, 95 GeV scalar excess at ATLAS, which can potentially be observed at future experiments. The group has shown that the self-interacting nature of DM can provide an explanation for the GRB event 221009A while being compatible with the sub-eV Dirac mass of light neutrinos. They also found that the Dirac nature of neutrinos can be realized through a discrete symmetry along with the self-interacting nature of dark matter. Using singlet-doublet fermion dark matter, his group found the origin of anomalous g-2 of the muon, W-mass anomaly, and observed 95 GeV excess.

They also investigated vector-like leptons and inert doublet scenarios, where their interplay led to the displaced decay signature of the vector-like leptons - such displaced leptonic signature is being studied at the LHC. This group also explored the feasibility of scalar leptoquarks in generating the Majorana neutrino mass and attempted to explain the neutrino observables along with some observed anomalies - all these scenarios are being tested at the LHC/FCC.

The group has worked on neutrino masses and lepton flavor violation, analyzing an A_4 symmetric model where neutrino masses and mixing were fit and the implication of this on the flavor violating decays in the lepton sector was worked out. The group also worked on the loop-induced decay in the lepton sector in a class of related models evaluating the decay rates of these processes and exploring if these models can be distinguished.

They have made substantial progress in deciphering colour building blocks of multi-parton scattering amplitudes at 4-loops and beyond. The group also published a mini monograph on the IR structure of perturbative gauge theories in the prestigious journal Physics Reports.

The high energy theory research group's research highlight was the identification of specific degrees of freedom in a CFT to be (holographically) dual to conformally coupled excitations in "half-Minkowski" spacetime, thereby offering a third independent/alternative approach to the holography in asymptotically flat spacetimes - the traditional approaches being that of Celestial Holography and Carrollian Holography.

The high energy experiment group (IITH CMS group), recently inducted to the India-CMS collab, the collaboration of Indian groups working on the Compact Muon Solenoid (CMS) experiment based at the CERN Large Hadron Collider experiment, supported by DST & DAE. His group worked on detector instrumentation looking for Dark Matter and supersymmetry-based new particles, as well as on calibration of the new High Granularity Calorimeter detector of the CMS experiment.

Inventing & Innovating in Technology for Humanity

VIRTUAL DEPARTMENTS

Department of Climate Change

The Department of Climate Change at IIT Hyderabad focuses on interdisciplinary research integrating climate sciences, technology, engineering, and policies. Key areas of research include climate resilience, carbon capture, sustainable waste management, hydrology, and renewable energy. Faculty members work on diverse topics such as air pollution governance, environmental health, waste-to-energy, biofuels, and satellite hydrometeorology. The department also explores advanced topics like AI/ML in climate modelling, sustainability assessment, and carbon-neutral technologies. In the past year, Pritha Chatterjee's group focused on CO2 sequestration, biodiesel generation, and pharmaceutical removal by employing biochemical systems for wastewater treatment. A 46% increase in lipid production (that can eventually be used as biofuels) was achieved when employed on certain industrial wastewater. Further, her group is undertaking new research, producing hydrogen from wastewater by employing dark fermentation and microbial electrolysis, to be soon tested at a pilot scale. Further research includes designing electric vehicle driving cycles for Indian roads and traffic conditions to reduce climate footprint and achieve sustainable mobility.

Sayak Banerjee has taken up the challenge of decarbonizing the automotive and energy sector, as this sector contributes tremendously to greenhouse gas emissions. Ammonia is being considered as an alternative fuel to diesel, which is used in compression-ignition engines and auxiliary power generators. Ammonia is safe to store, and its combustion is much cleaner. Banerjee is tackling some of the outstanding challenges of ammonia combustion, such as low flammability, high nitrogen oxide emissions and lower heat of combustion compared to hydrocarbon fuels such as diesel, through a series of kinetic studies of ammonia-diesel blends in compression-ignition engines to achieve efficient combustion and reduced nitrogen oxide emissions. Asif Qureshi's group focused on biogeochemical cycling of carbon and nitrogen in aquaculture systems, and agricultural soils. Computer modelling is being employed to quantify the changes in greenhouse gas emissions by deploying changes in aquaculture practices, such as fish species choice and nitrogen feed, and in agricultural practices, such as the application of soil enhancement materials such as biochar.

Satish Regonda's Rainfall-runoff Analysis and Forecasting Tools (RAFT) research group is working on different aspects of rainfall and runoff in both cities and riverine areas to better manage the challenges of hydroclimatological extremes. The multi-dimensional work pursued encompasses data collection, analysis, modelling, and development and dissemination of tools and products primarily in the context of rainfall and runoff. Apart from carrying out scientific work, his group has worked with different stakeholders in state departments to better inform policy decisions and enhance societal resilience against hydro climatological extremes. Shiva Ji's group worked on sustainability assessment methods to develop robust frameworks for design and construction in India. His group conducted field-based climate change impact analysis on heritage structures using structural health monitoring, Scanning Electron Microscopy analysis, and X-ray fluorescence analysis for material characterization to determine the extent of this impact to better understand changes that have been observed and that could potentially occur, on the Indian cultural heritage structures over time.
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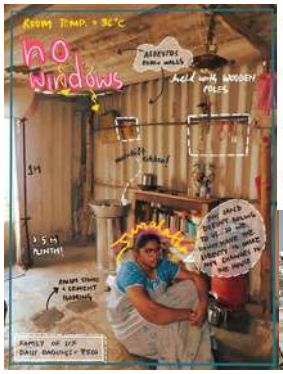
Research highlights:

1. **Climate Change adaptation - Aalok Khandekar**



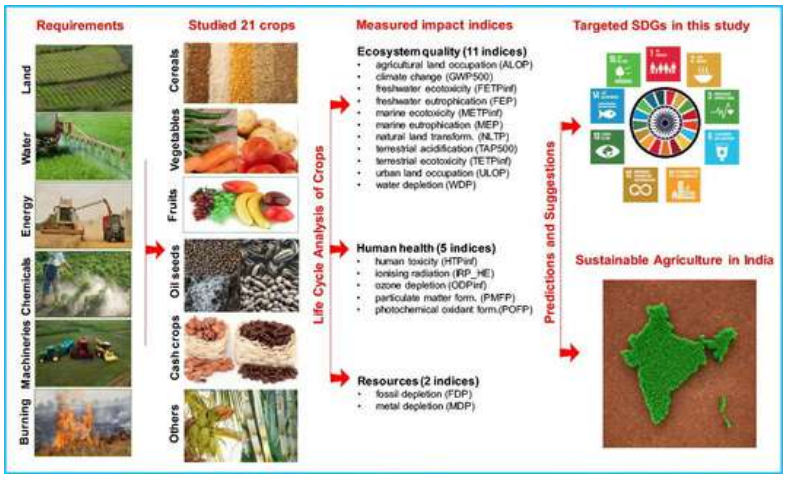
Aalok Khandekar's research focused on climate change adaptation among vulnerable population groups in cities of the global South. As part of an international collaborative project, his recent work has focused on understanding the impacts and adaptations to extreme heat in urban slums in Hyderabad. A key focus in his work has been to understand how official planning and governance measures often fail to recognize the particular nature of vulnerabilities to climate change-related disruptions among marginalized populations groups and are therefore ineffective in such contexts, even though these groups comprise a significant proportion of the urban population and are integral to the culture, politics, and economics of cities.

In his work, therefore, Aalok's group seeks to develop climate adaptation and governance approaches from the perspective of particularly vulnerable populations that can complement existing climate policies.

2. **Sustainability Assessment - Ambika**

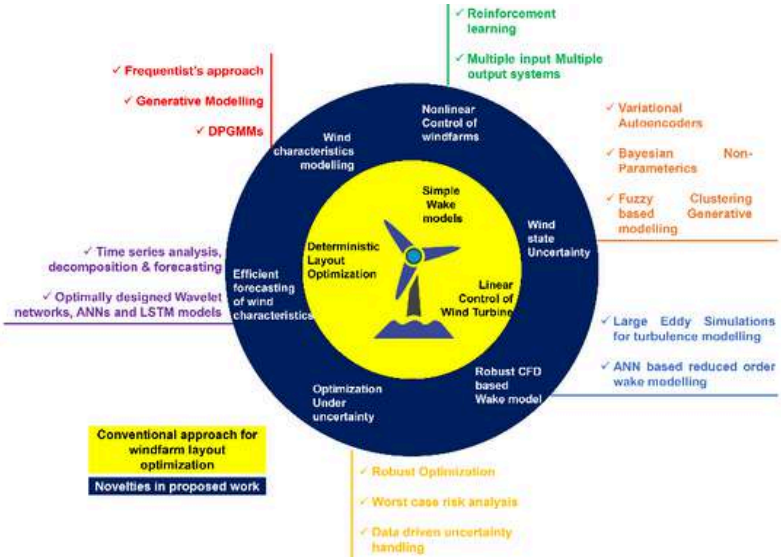
Ambika's research group focused on a sustainable future through their diversity and impactful research areas.

Her group is working towards life cycle analysis for sustainability assessment, which will help informed decision-making towards resource allocation and environmental preservation to favour climate change mitigation and adaptation strategies. Her group is investigating climate-smart agriculture incorporating various farming systems and approaches, crops and agri-products, fostering efficient and responsible agricultural practices.



By exploring the keen connections between climate change, pollution, and health, the group sheds light on pressing global challenges. Additionally, the research on the physicochemical processes and application of biochar offers innovative solutions for mitigating climate change.

3. Wind-AI @GOKUL (Global Optimization and Knowledge Unearthing Lab) - Kishalay Mitra



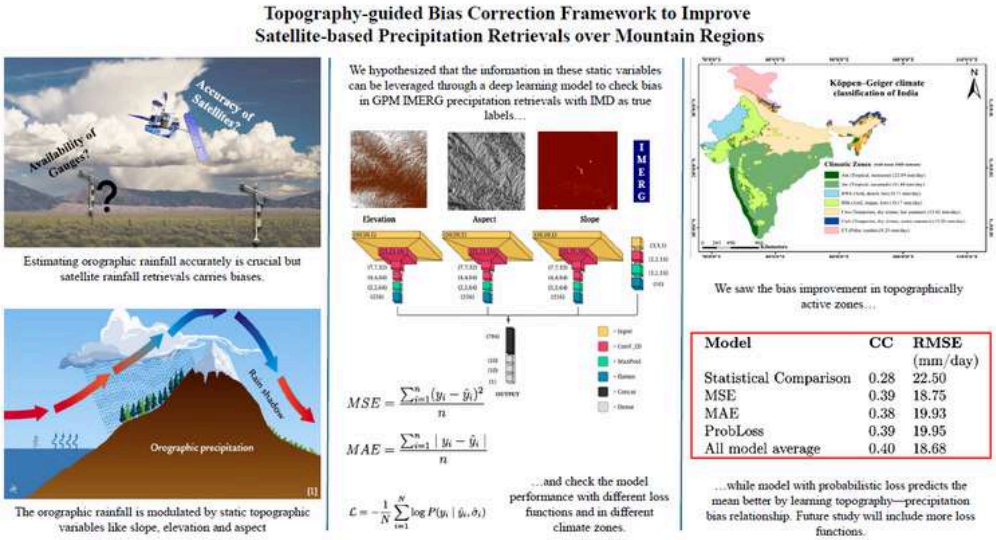
Wind energy is now the second fastest-growing source of energy in the world. To harness wind energy, turbines are placed in certain locations, and together, they constitute a wind farm. Designing the optimum layout of the wind farm is a challenge due to nonlinear objectives and constraint functions with integral (number of turbines) and real (location of turbines) decision variables. Such multi-objective mixed integer nonlinear programming (MINLP) are generally hard to solve. The proposed Wind-AI @ GOKUL, at Kishalay Mitra's lab, aims at enabling users to handle variable wind speed conditions, as opposed to the persisting assumption of constant wind speed, using machine learning for the evolution of probability density of wind speed occurrence and then solving the problem of wind farm layout optimization, under uncertainty using robust Bayesian Optimization techniques.The AI-based novel components in this package consist of (i) Auto-tuning of Long Short-Term Memory network to decode the wind behaviour forecasting, (ii) Hybrid wake modelling considering wake physics as well as the power of data science, (iii) AI-enabled reformulation of robust wind farm layout optimization, (iv) Reinforcement learning-based wind farm control.

4. Hydrometeorology and Climate Change - Shruti Upadhayaya

In 2023-24, Shruti Upadhayaya's group has been deeply engaged in satellite hydrometeorology with a focus on climate change. Her group is advancing weather and surface water predictions by improving the observation and retrieval of hydrometeorological variables, particularly precipitation.

This work is crucial in understanding and mitigating the impacts of climate change, as it directly addresses the challenges posed by changing precipitation patterns, extreme weather events, and water resource management.

Key projects include the development of precipitation type precipitation-type products for the INSAT series, which will enhance climate monitoring and forecasting in India, using AI/ML to improve satellite precipitation retrievals in mountainous regions, helping to better predict and manage climate-induced hazards like flash floods and landslides, investigating aerosol-precipitation interactions, analyzing the drivers and characteristics of tropical cyclones and flash droughts, and developing "PrecipCube," a geospatial tool for climate research and long-term monitoring of precipitation trends.



Department of Engineering Science

BTech in Engineering Science at IIT Hyderabad is a unique program being offered for the first time in India. It opens the doors to different specializations and provides a holistic engineering education. The basic structure is as follows: for the first 2 years (4 semesters) the student does basic courses in Mathematics, Physics, Chemistry, and different fields of engineering. In the last 2 years (4 semesters) the student then specializes in any field of his / her choice -- specialization is completely open: It could be any branch of engineering -- The final degree will read: BTech in Engineering Science and Specialisation in XXX. "This program is in tune with what the industry is demanding today. They would like students to be educated with what they call as a 'T' education."

Curriculum Development and Enhancement

We revised the curriculum with the help of faculty from each Department. Since this approach is interdisciplinary it requires regular updates corresponding to the changes by the regular Department. We have revised curriculums of ES-AI, ES-CS, ES-ES, ES-EP, ES-EE during the years 2021 and 2023. We are also planning to revise in 2024 as well. We worked closely with all faculty members to introduce new courses, update syllabi, and integrate interdisciplinary approaches, which enrich learning outcomes and equip students with modern, in-demand skills. We also took initiatives so that this ensures that the content remains relevant and aligns with current industry standards or academic advancements. We also now ensure that only 10% of the students are allowed for the branch change to each Department. This ensures the idea of the interdisciplinary approach of the ES Department.

Research and innovation support

IIT Hyderabad-born startup CRIOT™ strikes a collaboration with Technocorpus Inc., Japan The fully sponsored research collaboration is going to set the stage for the manufacturing of IoT-based smart home products. ES Department helped the students to build this startup.
Founders
Varun Perumalla - CEO & Co-founder - ES2021 Batch
Sai Mahidhar - CEO & Co-founder - ES2021 Batch

Student Engagement and Support

We organize regular mentorship programs, which the student can take advantage of for research internships. Many of our students have used the 6-month internship opportunity provided at IITH. The HoD ensures that students have access to the resources they need for academic and professional success, including scholarships, tutoring, and mental health support services. In my tenure, I have also made sure that we get an interaction space for students.

Collaborations and Partnerships

Building partnerships with industry, government bodies, and other academic institutions is an important initiative I have fostered during my tenure. These collaborations can lead to student internships, joint research projects, guest lectures, and curriculum input from industry professionals, all of which enrich the educational experience and make the department a hub for innovation and real-world relevance. We are in a plan to start a new MTech program in Systems Engineering under the aegis of DRDO labs.

In summary, the initiatives undertaken are crucial for fostering a dynamic and forward-thinking environment. Through curriculum updates, faculty and student support, research facilitation, and broader collaborations, I ensured in shaping the department's success. This reflects in the opening JEE rank of the Department.
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Department of Heritage Science and Technology

During the Academic Year 2023-24, the Department of Heritage Science and Technology took significant strides in forging deeper engagements with a variety of Heritage professionals, forging engagements for research, education and policy.

The year witnessed significant engagements with the Architecture & Archaeology communities. We organised the first-ever conclave that brought together Architects, Archaeologists, Historians and traditional Sthapatis to integrate Heritage with current professional practice. Association of luminaries like Archaeologist K K Muhammad lent weight to our efforts. We also forged deep connections with the Yoga community, with a daylong event in association with the Indian Yoga Association, where we discussed the possibilities for technology to further yoga. The event witnessed participation by all other major yoga schools including Isha Yoga and Sri Sri.

We engaged with the Ministries of Tourism in understanding the problems faced by local residents in Heritage zones and in crafting technology interventions for improving livelihoods. We worked with the collectorate of Mulugu near Warangal to study and propose methods for improving livelihoods in the UNESCO World Heritage Site of Ramappa Temple.
For more information, please visit: **https://www.hst.iith.ac.in/**

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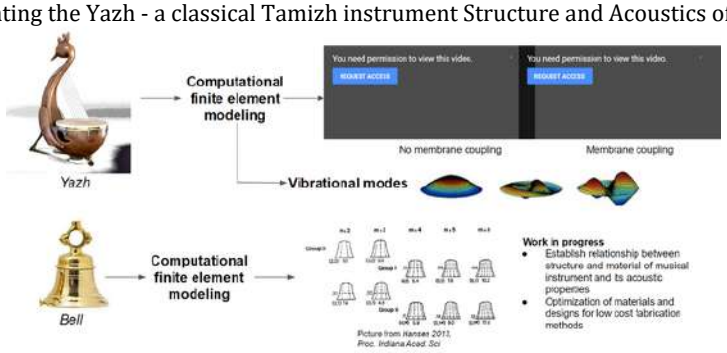
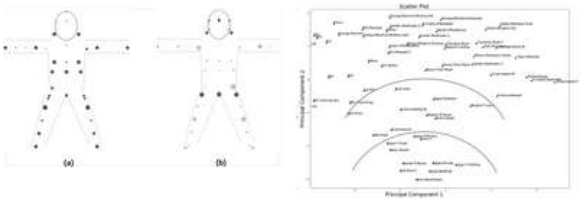
Research Highlights

1. **Title:** Mechanical and Acoustic analysis of musical instruments
   Description: Understand the connection between Structure of instruments, Mechanics of sound production and resultant acoustics;
   Faculty: Suhail Rizvi
   Keywords or Exemplars:
   Recreating the Yazh - a classical Tamizh instrument Structure and Acoustics of Bells



2. **Title:** Information retrieval & Data mining on Heritage text corpus
   Description:
   Create Indic knowledge system (IKS) datasets; Information Retrieval, Data mining, Retrieval Augmented Generation (RAG) for IKS; Systems and applications
   Faculty:
   Ramakrishna Upadrashta, Manish Singh, Mohan Raghavan, Surendra Somala
   Keywords or Exemplars:
   IKS Search;
   IKS Citation manager

3. **Title:** Computational Social Sciences
   Description: Mathematical Analysis of Indic Society, Life and Culture
   Faculty: Mohan Raghavan
   Keywords or Exemplars:
   Mathematical Analysis of Costumes; Modeling of Geopolitics in Itihasa and Strategies from Arthashastra



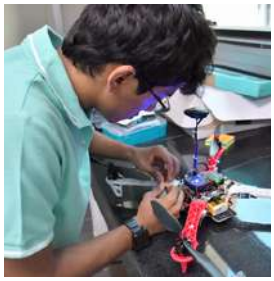
4. **Title:** Heritage Clay structures
   Description: Understanding structural properties of Heritage Structures;
   Faculty: Surendra Somala
   Keywords or Exemplars:
   3D printing Clay Structures; Shakers; Resilience to vibration

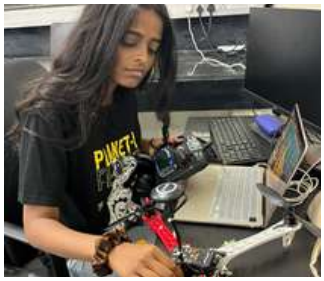
5. **Title:** AI for sculpture
   Description: AI / ML for understanding sculpture; Build sculpture datasets; Understand posture, provenance and paraphernalia in light of history and Agama shastra
   Faculty: Mohan Raghavan & Kousik Sarathy
   Keywords or Exemplars:
   Chola era Bronzes; Nataraja murtis; Mauryan females; Cambodian sculptural styles;
   Chatbots for museum visits;
   Apps for tour guide training;

6. **Title:** Hands-on Heritage experience and visualization
   Description: Gamification of Heritage Structures and associated knowledge; On-site visualization
   Faculty: Kousik Sarathy, Surya Kumar, Mohan Raghavan
   Keywords or Exemplars:
   Build-your-own-temple, Temple Craft with human-size Lego Blocks, 3D printing
   On-site viewers for giant Petroglyphs

7. **Title:** Digital Heritage Documentation and Reconstruction
   Description: Digital documentation of heritage structures; Digital Reconstruction
   Faculty: Shiva ji
   Keywords or Exemplars:
   AR/ VR/ Photogrammetry; Museum experience design

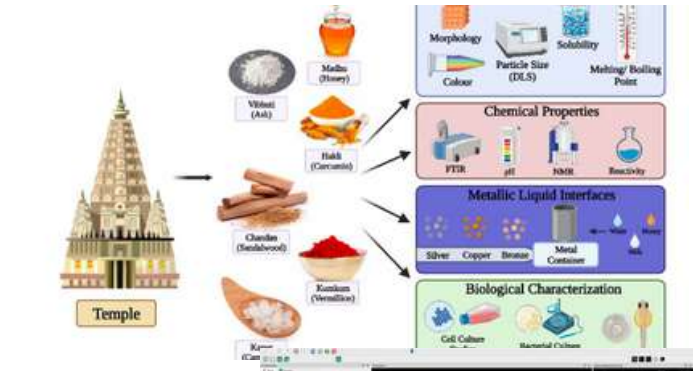
8. **Title:** Structural Health Monitoring
   Description: AI / ML-based algorithms and tools for monitoring structural defects; Drone video processing; Automated tools for defect documentation and monitoring
   Faculty: Surendra Somala
   Keywords or Exemplars:
   Identification of damp spots and cracks in a Heritage structure, Drones, Structural Health Monitors, AI for defect mapping



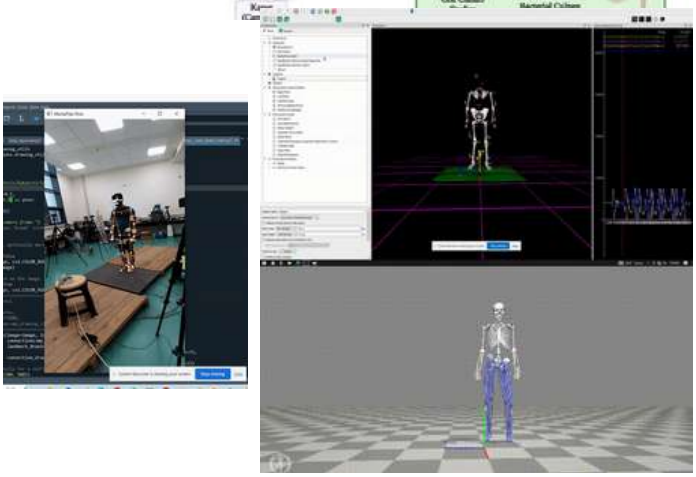


9. Title: 3DfyMaps
   Description: Convert pieces of maps into 3D models; Integration of Geospatial and Building Information;
   Faculty: Mohan Raghavan
   Keywords or Exemplars:
   Accelerated Game Development;
   AI / ML augmented pipelines for digital creators;
   Automated virtual tours;

10. **Title:** Heritage Biomaterials; Integrated medicinal systems
    Description: Characterization of biomaterials used in Heritage context; Properties of Medicinal Herbs
    Faculty: Aravind Rengan, Prabu Sankar Ganesan, Suresh Perumal
    Keywords or Exemplars: Characterization & Analysis of composition; in-vivo & in-ovo biocompatibility for medicinal uses.



11. **Title:** Neuro-biomechanics of Yoga and performing arts
    Description: Measurement, Characterisation of movement in Yoga and Dance; neuromuscular physiology, cardiac and respiratory correlates of exercise;
    Faculty: Kosik Sarathy, Nagarajan Ganapathy & Mohan Raghavan
    Keywords or Exemplars:
    Gait Lab; EMG / EEG / ECG / Gaze tracking / Respiration / Saturation / HRV
    Asana / Pranayama / Mudra;
    Neuroscience & Yoga

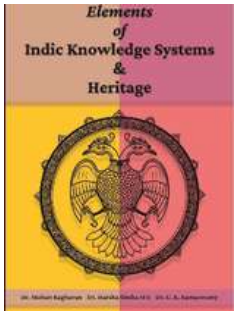


12. **Title:** Digital Yoga Studio
    Description: Yoga Studios with video calling solutions, Biomedical sensing, Computer Vision cameras, AI / ML.
    Faculty: Kousik Sarathy & Mohan Raghavan
    Keywords or Exemplars:
    Tech-enabled teacher-student experience design;
    Sensor Data convergence;
    Pose recognition; Cohort Analysis;
    Desktop and Mobile Apps

13. **Title:** Chemistry for Archaeology
    Description: Chemical Analysis of Archaeological specimens
    Faculty: Ch Subrahmanyam & Suresh Perumal
    Keywords or Exemplars:
    Chemical analysis of metal objects, ores, slag, tuyeres, potsherds, soil samples;
    Residual analysis of pottery; XRD, XRF

14. **Title:** Exploration of Panchadhatu / asthadhatu-making
Description: Understanding the compositions and combinations behind ancient Indian Metallurgy for modern-age application
Faculty: Suhash Ranjan Dey
Keywords or Exemplars:
Materials; Ancient Indian Metallurgy; Panchadhatu & Ashtadhatu

15. **Title:** Foundational concepts in Indian Knowledge Systems
Description: Connecting the foundational concepts of Indian Grammatical traditions, Phonetics, Etymology with relevant contemporary disciplines;
Faculty: Mohan Raghavan & Ramakrishna Upadrasta
Keywords or Exemplars:
Computational Linguistics; Compilers and Paninian Grammar; Foundations of IKS for teachers and students



Events

1. **Heritage Lecture Series - Shri K K Muhammed**
An enthralling talk by eminent Archaeologist and Padma Shri Awardee, Shri K K Muhammed, on the stunning story of the resurrection of "Chambal Valley Temples and Conservation Challenges" as part of the Heritage Lecture Series on Reconstruction of Indic Architecture.

2. **Indic Architecture Conclave**
Under the theme "Reviving the Practice of Indic Architecture from Libraries to Laboratories," the Indic Architecture Conclave organized by the Department of HST aims to create a design curriculum that brings the richness of Indic knowledge from the archives into practical application. This initiative is supported by the DST-SHRI (Science Heritage Research Initiative) of the Ministry of Education, Government of India.

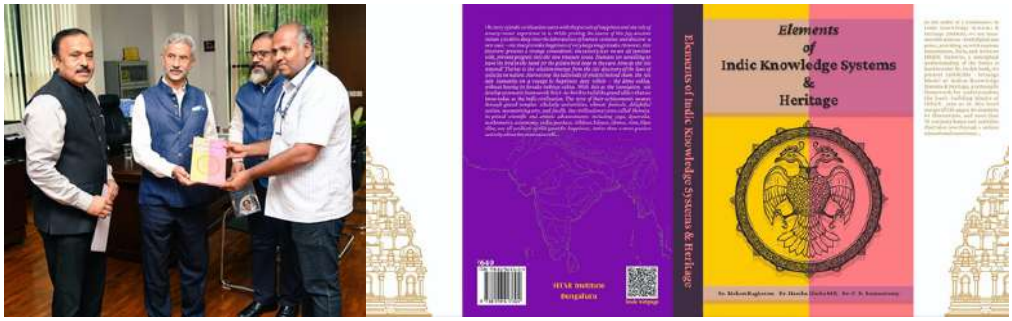
3. **Engagements with Ministry of Tourism: Visit to Ramappa-UNESCO Heritage Site**
The Ministry of Tourism invited the team from HST, IIT Hyderabad, to explore possibilities of technology infusion to better the livelihoods of people in the surroundings of the Ramappa Temple World Heritage Site at Warangal. During the visit, the Collector of Mulugu District interacted with the team, providing a brief overview of the district and the ongoing development work at Ramappa Temple following its designation as a UNESCO World Heritage Site. He also assured the necessary support for the study tour.
The team assessed the socio-economic conditions of the local communities and identified the challenges they face. Based on their findings, the IIT team offered recommendations aimed at supporting the sustainable development of the area around the Ramappa monument

4. **National Yoga Tech Conclave: Exploring Technology's Role in the Future of Yoga**
The Department of Heritage Science & Technology at IIT Hyderabad organized the National Yoga Tech Conclave in collaboration with the Indian Yoga Association (IYA) and our esteemed partners—Kathmandu University, Sri Visweswara Yoga Research Institute (SVYRI), and Yogavijnana. As technology continues to transform yoga practices, the conclave addressed how this evolution might disrupt traditional methods and open new opportunities. The Conclave aimed to:
   - Identify strategies for Indian yoga players to capture a significant share of the global market.
   - Develop a "Yoga Tech" roadmap to enhance the market presence of Indian yoga schools.
   - Leverage technology to influence the global yoga community.

   Discussions covered critical topics such as:
   - The pros and cons of online yoga pedagogy.
   - Challenges faced by small-scale yoga centers in adopting technology.
   - The coexistence of yoga philosophy and business practices.
   - Innovative revenue models for yoga.
   - Social media strategies for global expansion.
   - Tech-enabled strategies for the international growth of Indian yoga schools and instructors.

5. **IKS Book launch - Elements of Indic Knowledge Systems & Heritage**

On International Yoga Day, the book "Elements of Indic Knowledge Systems & Heritage," authored by Mohan Raghavan, Head of the Department of HST, along with Dr Harsha Simha and Dr C R Ramaswamy, was unveiled by the HTSR Institute, Bengaluru. This transformative work explores the core principles of ancient Indic wisdom, capturing the essence of Indic heritage. The book was presented to various dignitaries, including the Hon. Minister for External Affairs, Shri S Jaishankar and to the then Minister of State for Electronics and Information Technology Shri Rajeev Chandrashekhar.



6. **Samskrita Dinotsava - International Sanskrit Day Celebration**

IIT Hyderabad marked International Sanskrit Day with a vibrant celebration on Shravan Poornima, organized in collaboration with Samskrita Bharati, Dept. of Heritage Science & Technology, MOE-IKS Cell and the NFSE group. A highlight of the event was the quiz "विवक्षा" (The Desire to Speak), which tested participants' knowledge of Sanskrit.

7. **Student visits to Archaeological Survey of India: Vadnagar: HST Students Explore 2,750 Years of History**

HST started a prized engagement with Archaeological Survey of India as the MTech students (2023-25 batch) and PhD students from the Conservation and Reconstruction (C&R) stream of undertook a study tour to Vadnagar, a historic town in Gujarat, as part of the course on Principles of Town Planning. The excursion aimed to explore recent archaeological findings, where a 23-meter deep trench unearthed nearly 2,750 years of history, from the Pre-Mauryan era to the Gaekwad period. The students also visited Rani ki Vav, a UNESCO World Heritage Site, to conduct defect mapping analysis of the structure, further applying their skills in heritage preservation and technology.

8. **Student Exchanges with Vaastu Vidya Gurukulam, Kerala: Studying the traditional Architecture Techniques in Kerala**

In a unique hands-on workshop from November 28-30, 2023, MTech students from the Dept. of Heritage Science and Technology at IIT Hyderabad engaged in an immersive learning experience at the Vaastu-Vidya Gurukulam of Shri Kanippayyur Krishnan Namboodiripad in Kunnamkulam, Thrissur, Kerala.

Students toured significant temples like Vaddakanatham and Cherpu Bhagavathy, followed by a visit to a carpentry workshop in Thrissur. Here, they learned about different woods used in construction and traditional woodworking techniques. Students visited Kannur in North Kerala, where they examined regional differences in construction styles. Visits included the Muthappan Temple, the historically significant Shri Guruvayur Temple, and the Kerala Folklore Akademi, providing a comprehensive understanding of Kerala's cultural heritage.

9. **Dept. of HST, IIT Hyderabad Joins BharatGPT Consortium**
   Mohan Raghavan, Head, Dept. of Heritage Science & Technology at IIT Hyderabad, has proudly represented the institute in the BharatGPT consortium. This groundbreaking initiative focuses on developing India-centric Generative AI, with an emphasis on applications for human movement and Bharat Heritage.
   BharatGPT, a pioneering Public-Private Partnership led by IIT Bombay, aims to deliver multilingual and multi-modal Generative AI models tailored to India's unique cultural and linguistic landscape.
10. **Introducing BHeri (Bharat Heritage Stack) : Transforming Heritage with Cutting-Edge Tech**
    On January 9, the Department of Heritage Science & Technology at IIT Hyderabad proudly launched BHeri (Bharat Heritage Stack), a sophisticated tech stack with modular components designed to transform heritage experiences. BHeri aims to create immersive and cutting-edge heritage presentations, enhancing both edutainment and local employment.

    BHeri | Bharat Heritage Stack | Heritage Science & Tech | IIT Hyderabad | DST-SHRI | Min of Tourism
    Knowledge centers powered by BHeri offer high-quality educational experiences and provide job opportunities for local communities. Trusts and foundations managing heritage sites interested in ensuring sustainability are encouraged to connect with us.

    Following this launch, on February 5, Dept. of HST, in collaboration with the Ministry of Education's IKS Division and Bṛhat, hosted an engaging event to further explore Project BHeri. This initiative focuses on leveraging technology to enhance Indian Knowledge Systems (IKS) content. The event brought together content creators, educators, and entrepreneurs to discuss the project's potential and its impact on heritage & technology.

Inventing & Innovating in Technology for Humanity (IITH)

CAMPUS CHRONICLES

BUILD Project

BUILD (Bold and Unique Ideas Leading to Development) program provides a platform to all UG and PG students at IIT Hyderabad with financial support of up to Rs. 1 Lakh to enable their ideas into tangible prototypes. Various ideas which involved hardware, software, app, etc were supported. An internal faculty committee has thoroughly scrutinised all the applications received from students who have shown interest in the BUILD program FY2023-24.

Depending on the title of the project, students are encouraged to either work solo or in groups, with a mentor. Multiple review sessions were conducted to monitor the progress of projects. A budget of Rs.15,80,000/-has been approved for the shortlisted projects.

A few BUILD Projects for the Financial Year 2023-2024:

S. No.	Title of Project	Team Leader
1	Wireless Sensor Based Gait Analysis for evaluating Spatio-Temporal Parameters for Better Clinical Outcomes	Rohith
2	TEER Measurement for Cellular Barrier Integrity Assessment: A Cost-Effective and Customizable Device	Soham Ghosh
3	Microvascular (MCA) Anastomotic Coupler	Arsh Arora
4	BioGaurd	Aditya Gupta
5	Developing Sustainable Structural Lightweight Hollow Core Wall Panels for Affordable Housing in India	Chetharajupalli Veerendar
6	ASPECT (Aluminium foil waste-derived Solar driven Photo-Electrocatalytic membrane Technology) for Contaminated water remediation	Venkateshwaran G
7	AI Scheduler	Sohan Palghadmal
8	MentiB - Mental health app	Madhurima Chundu
9	Scalable Production of Anisotropic Colloidal Raw Materials	Tanikella Lakshmi Savitha
10	A novel method of synthesizing precursor for paracetamol	Sandeep Kumawat
11	3d scanned avatars of humans for ecommerce	Omkar Raut
12	Precision agriculture using iot and sensors	Thakkilapati Kalyana Chakravarthi
13	EcoPlast: plastic recycling made easy	Madhavi Indurkhya
14	Exploring Sustainability through Bio-material Innovation with Mycelium.	Devavrat Ramesh Shivadekar
15	RUSt- Rent Your Style	Rushikesh Dehankar
16	High Altitude Edema Suit: A Efficient and portable suit to prevent Pulmonary Oedema (PO) and Cerebral Oedema (CO)	Shinde Prakash Sakharam
17	Enhancing Oral Care: Affordable Advanced Imaging for Early detection of Oral Cancer & Caries	Debashish Saha
18	"Masticatory System Testing Device"	Pratik Patil
19	THREADS	Sreejith R R
20	Real-time UV-Visible spectroscopy platform with in-situ heating	Arka Jyoti Roy
21	Accident prevention (road safety)	Aashish Mandavi
22	ReSail - An AI driven flea marketplace	Jay Rajesh Bhanushali
23	"Intramaxillary Multiple Loop Wire Twisting & Tightening Device"	N Saiteja
24	Easily Cleanable Coating for Solar Panels	Aditya Syamala

Tinkerer's Lab

The year 2023-24 marked a significant phase of growth and innovation for Tinkerers' Lab at IIT Hyderabad. With a range of new initiatives, large-scale events, and technical projects, the lab became a focal point for students interested in hands-on technology. Through its activities, Tinkerers' Lab not only enhanced student involvement in tech-related fields but also cultivated a strong sense of community and collaboration among participants.

Tinker Fresh: Building a Foundation for Freshers

This year, Tinkerers' Lab introduced TinkerFresh, a program specifically designed to help first-year students develop key technical and soft skills early in their college journey. The workshops were tailored to provide foundational knowledge of various fields, ensuring that freshers were well-equipped for both academic and extracurricular challenges.

The topics covered ranged from 3D CAD Modelling and Python Programming to more specialised areas like Machine Learning, LaTeX, and Figma for design. These sessions aimed to instil confidence in new students, allowing them to approach technology with curiosity and creativity. The feedback was overwhelmingly positive, and TinkerFresh successfully laid the groundwork for a technically proficient and engaged freshman class.

Micro-mouse at Milan 2024: A First for IIT Hyderabad

For the first time, Tinkerers' Lab hosted the Micro-mouse competition in Milan in 2024. The competition was not only a test of students' programming and robotics skills but also an opportunity for them to receive guidance from Tinkerers' Lab.

The lab played a crucial role in mentoring participants, helping them fine-tune their designs and strategies for the competition. The success of Micro-mouse demonstrated the increasing enthusiasm for robotics and artificial intelligence on campus.

Thrust 2024

One of the year's major milestones was the launch of Thrust 2024, the first-ever edition of the lab's flagship tech fest. Spanning three days, Thrust was designed to ignite a passion for technology among students and encourage collaboration on innovative projects.

The fest featured several exciting competitions, most notably the Tri-Techathlon, a multifaceted challenge that tested participants' problem-solving abilities in both hardware and software domains. Another crowd-puller was the TinkerFresh All-Night Challenge, where teams worked through the night to develop a functional prototype of their chosen project idea. A highlight of Thrust was the Tech in Defence panel discussion, which brought together prominent figures from the defence sector. The panel included Lt. General Philip Campose, Vice Admiral Ramakant Pattanik, and Air Marshal Anil Khosla, who shared their insights on the role of technology in modern defence strategies.

Innovative Projects and Lab Usage

Apart from events and competitions, Tinkerers' Lab made significant strides in student-led projects this year. One notable achievement was the development of a smart door-locking system designed to track lab usage. This system not only improved security but also provided valuable data on how the lab was being used.

According to the data collected, the lab saw approximately 1,500 visits per month, with around 500 unique visitors—clear evidence of the lab's growing role as a hub of innovation at IIT Hyderabad.

Students also worked on several creative projects that pushed the boundaries of technology. These projects showcased the lab's role as a space where students can explore, experiment, and create solutions to real-world problems. Some projects are listed below :

1. 3-Axis Self-developed robotic arm
2. Autonomous drone using just an Arduino
3. Soft Robotic Arm
4. ECG Analysis Setup for a high data privacy-based system
5. Pressure Mapping Gloves

The academic year 2023-24 was a landmark year for Tinkerers' Lab, and as the lab continues to grow, it remains committed to providing students with the resources, guidance, and opportunities they need to bring their ideas to life.

Ek Bharat Shrestha Bharat

Onam Celebrations

Students enthusiastically adorned campus spaces with Athapookalam, using flower petals to create vibrant and eye-catching rangolis.

Sundarikku Pottuthodal, this unique traditional game from Kerala, made its debut on campus, sparking high levels of excitement and enjoyment among participants.

The classic games, Musical Chairs, Lemon-Spoon, & Tug of War, took centre stage.

- Students made Bathukammas, a traditional flower festival in Telangana. They were placed at the center, and people performed traditional dances in circles around them
- People showed up in traditional attires and captured memories.
- The vibrant Garba night decor brought a homely feel, earning high praise.
- These outstanding decorations were the highlight of the entire event and captured the festive spirit of Gujarat.

Dussehra - Bathukamma & Dandiya Celebrations

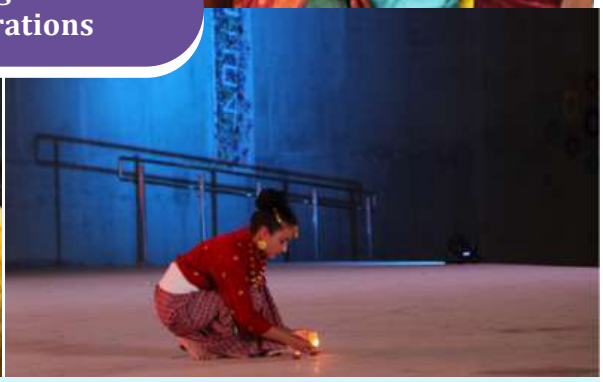
Diwali - Dia, Rangoli Competitions & Sky Lanterns

- Diya Painting: People participated in teams of 3-5 members to add vibrant colours to simple diyas.
- Origami Event: Participants crafted unique lanterns using charts, colourful paper, and more.
- Limbo: Respectful Director, sir, accompanied by his wife & other faculty, actively engaged in Limbo game.
- Mehandi: Beautiful Mehandi designs adorned the hands of many students.
- Illuminating Sky Lanterns have soared as a cultural spectacle inaugurated by the Director.

Sankranthi - Bonfire & Bhangra Celebrations

- The day began with electrifying sports, kabaddi, Ko-kho, and Dodgeball.
- That night, the Lohri bonfire set the stage for the DHOL band, whose vibrant tunes resonated across the campus, enticing everyone to join in the festivities.
- The Shuffle Group (dance club of IITH) kicked off the festivities with a captivating bhangra performance, igniting enthusiasm among the audience.
- On the last day of the event, the spotlight shifted to Makar Sankranti's main event – "KITE FLYING".
- Simultaneous with Kite flying, EBSB kicked off the Rangoli event.


Ethnic Night & Holi Celebrations

- EBSB boosted Ethnic Night by hosting Cultural Performances, classical dances, regional poetry, storytelling, and musical renditions, captivating the audience.
- At night's end, a screening of 'RRR,' an Oscar-winning film, drew over 500 students and families for a memorable cinematic experience.
- The interactive events like Ramp Walk and Saree Draping Challenge stole the spotlight.

Yuva Sangam


- Yuva Sangam is a flagship program of the Ek Bharat Shreshtha Bharat (EBSB) an initiative launched by the Government of India.
- Yuva Sangam was started to strengthen people-to-people connections and build empathy among youth nationwide.
- This initiative aims to strengthen the bonds between youth from diverse states, fostering unity and understanding among our Nation's vibrant young minds.

NSS Activities

Orphanage Visit

The NSS team visited "Shishu Mangal Orphanage Home for Girls and Boys" located at Nalagandla which had around 40 children. 23 NSS volunteers spent quality time helping children in art forms like drawing and dance.

Plantation Drive is an event which is organized inside the premises of the IIT Hyderabad campus by the NSS Team in collaboration with the Green Office IIT Hyderabad. This drive helps make our campus greener and healthier.

Plantation Drive

Clean India Drive

As a part of the CI101 course, Clean India Drive is conducted twice in every semester. This is a compulsory course for every student. It is a two hour event which is conducted in the early morning.

Fitness Walkathon

To encourage students to follow a healthy lifestyle and energize them, Walkathon is conducted several times a year. In this event, students walk from the Hostels to the Campus Main Gate which is a distance of 3 km

Vidyadaan is an attempt to share knowledge with the children of government schools. The main motto is to ensure that the children don't lack basic skills like self-introduction in English, simple math, etc; this works as a remedial class for the students.

Vidyadaan

Blood Donation Camp

NSS Team organized a blood donation camp on 15th Aug 2023 & 26th Jan, NSS Team Members and a large number of their friends and faculty donated blood on this day, where 153 & 118 units of blood has been collected.

Donation Campaigns

The books and clothes that students, faculty & other staff were willing to donate were collected from their doorstep with the help of NSS volunteers.

Swachh Bharat is an event which is organized inside the premises of the IIT Hyderabad campus by the NSS Team. The sole purpose of this event is to maintain a clean, healthy and beautiful campus, which may be why Swachh Bharat is conducted twice every month.

Swachh Bharat

Cleanliness Drive

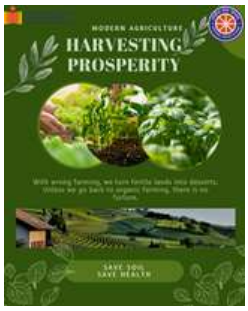
NSS team visited Kandi village for a cleanliness drive, aimed to improve the village's cleanliness and well-being.
Theme : "Ek Tareekh , Ek Ghanta"
Our enthusiastic student volunteers gathered in groups and cleaned various areas.

World Earth Day

On World Earth Day, NSS conducted various online events to promote environmental awareness, encourage sustainable practices, and inspire action towards protecting the planet based on this year's theme, Planet vs Plastic

World Health Day serves as a reminder of the importance of prioritizing health and well-being for all. On the occasion of this day, online events are conducted to celebrate and promote health and wellness awareness to mark this significant occasion.

World Health Day



Kisan Diwas

On the occasion of Kisan Diwas (23rd December 2023), NSS team expressed gratitude to the backbone of our nation – our hard working farmers, by conducting poster making, Infographics Design online events.

World Mental Health Day

The theme for this year was "Mental Health is a universal human right", to emphasize the necessity of assuring that everyone should have access to high quality mental health care and support.

On this occasion, NSS conducted various online events to promote and appreciate the virtues of millets. This celebration aims to highlight the nutritional value, resilience, and versatility of millets, as well as the importance of integrating them into our diets and agricultural practices.

International Year of Millets

National Suicide Prevention Day

On the occasion of National Suicide Prevention Day Volunteers were asked to write an appreciation letter to themselves expressing gratitude for having navigated through their toughest episode.

Prakriti Club

Prakriti deals with the study and preservation of biodiversity in the campus, curbing the wastage of resources & spreading awareness to conserve nature. And also the club works on nature betterment projects.

Publicity and PR:

Prakriti actively engages with students through its social media platforms via the Prakriti Vartha, a weekly series initiated to promote awareness and preservation of nature. This series shares valuable news and facts about recent events related to nature. Additionally, Prakriti consistently celebrates all achievements in the field of nature conservation.

Events:

Last tenure, Prakriti conducted various events to increase awareness regarding waste management, sustainability, awareness of nature, use of technology in real-life problems related to nature conservation, etc.,.

Waste to Wonder:

Our inaugural event, last tenure, was 'Waste to wonder'. This event was to make any recyclable art from any kind of waste materials.

These were the amazing winning art pieces of this competition:

Milan - nature tech quiz:

The 'Nature tech quiz' conducted by Prakriti for Milan'23 is a general quiz conducted in nature and technology to test the knowledge of the participants in nature and the way technology can help sustainability these days. The goal of this quiz was to increase awareness regarding current conditions in nature and nature conservation.

Plantation drive: Prakriti core members: The Prakriti core team has joined hands with the IITH community to achieve the goal of increasing greenery on our campus premises. As we know, every 1st Saturday of a month, the Green office, IIT Hyderabad, conducts a 'Plantation drive' on campus. On January 6th, 2024, our core team attended and participated in the drive and made their hands dirty for a more environmentally friendly campus.

Throughout the year, the Prakriti Club participated in several plantation drives and also collaborated with Green Office IIT Hyderabad to host one, demonstrating their commitment to improving the local environment.

A particularly notable collaboration with the Green Office at IIT Hyderabad, where the Prakriti Club joined forces for one of their monthly plantation drives, usually held on the first Saturday of every month.

These were few of team members who attended the plantation drive

Nature and wildlife photography contest :

In honour of Earth day, which comes on 22nd April every year, Prakriti has organised a 'Photography contest' with theme of "Nature and wildlife photography". We wanted all students of IITH to participate and showcase their talent in capturing the beauty of nature through their lenses. This event aimed to encourage the appreciation and gratitude towards nature and mother earth.

Following were few of the entries for the contest :

Hackathon on Environmental Problems
Date: Mid-Year

The Prakriti Club's second major event was a hackathon focused on finding solutions to some of the most critical environmental challenges. This event brought together students from various disciplines to collaborate and innovate, addressing issues such as pollution, waste management, water conservation, and renewable energy.

Participants worked in teams, developing practical and scalable solutions to these environmental problems. The hackathon emphasized the application of technical knowledge to real-world environmental issues, fostering a sense of responsibility and innovation among the participants.

Conclusion:

The Prakriti Club's activities over the last year have significantly contributed to raising environmental awareness and fostering a culture of sustainability on campus. From creative recycling initiatives to addressing environmental challenges through technology, celebrating biodiversity through photography, and actively participating in reforestation efforts, the club has made a lasting impact.

The collaboration with the Green Office at IIT Hyderabad for plantation drives further highlighted the club's commitment to environmental conservation. These events have not only engaged the campus community but have also laid the groundwork for continued environmental action in the future.

EML Series

We, 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.

"LEARN BEYOND THE FOUR WALLS OF CLASSROOM"

Extra Mural Lectures

A talk on
"Role of Cryogenic Engine in Chandrayaan-3 Mission"
by
Shri Nawal Kishore Gupta
Ex-Deputy Director, LPSC & Project Director (Cryogenics), ISRO

A talk on "Are failure pathways to success?"
by Prof Chennupati Jagadish,
President of the Australian Academy of Science And a Distinguished Professor of Physics at the Australian National Park University Research School of Physics.

A talk on "How Indians won the Silicon Valley"
by Prof Shivanand Kanavi
Adjunct Faculty at National Institute of Advanced Studies (NIAS), Bengaluru

A talk on "What Ails our Criminal Justice System?; "Remedying with Blue Ocean Strategy of Management Technique" by
Shri. E Damodar, IPS (Retd.)

DIESTA

DIESTA is a week-long Interdepartmental College Fest held at the Indian Institute of Technology Hyderabad (IIT Hyderabad) from January 21st to 28th, 2024. The event fostered interdepartmental interaction and showcased the diverse talents of the student body.

Opening Ceremony

The fest commenced with a grand opening ceremony graced by the esteemed presence of Prof. BS Murty (Director), Prof. Venkata Subbaiah (Dean Students), Prof. Prakhar Gupta (FIC Student Activities), and Prof. (Name) (FIC Sports). The ceremony began with a traditional lamp lighting followed by an inspiring speech by Prof. Murty emphasizing the importance of extracurricular activities in holistic student development. A torch relay, symbolizing the spirit of competition and unity, marked the official start of the fest.

Events

The week witnessed a thrilling array of events, categorized as sports and cultural.

Sports Events: The IIT Hyderabad sports grounds came alive with enthusiastic participation in various individual and team sports. Students displayed their athletic prowess in badminton, basketball, cricket, football, table tennis, volleyball, and other competitions.

Cultural Events: The cultural arena buzzed with creativity as students showcased theirtalents in a plethora of events. The stage was set for singing competitions, enthralling dance performances, a photography competition capturing the essence of campus life, a literary competition for budding poets and writers, and a challenging quiz competition testing knowledge across diverse fields.

DJ Night

A high-energy DJ Night on January 27th provided a welcome break from the competitive spirit and allowed students to unwind, celebrate their achievements, and bond over music.

Closing Ceremony

The week culminated in a grand closing ceremony on January 28th. Prizes were distributed to the winners of various events, and the overall departmental championship trophy was awarded.

Results

The combined departments of Computer Science and Mathematics(CSE/MnC/Maths) emerged victorious with a total of 2525 points. The Interdepartmental College Fest 2024 at IIT Hyderabad was a resounding success. It fostered a vibrant and competitive environment while celebrating the diverse talents of the student body. The camaraderie and sportsmanship displayed throughout the week were truly commendable. We look forward to building upon this success in the next edition of the fest.

ELAN & ηVision

Elan andηVision is the annual techno-cultural fest of IIT Hyderabad and is one of the largest fests in South India. It is entirely organized by IITH students. Elan refers to the cultural part and ηVisioncites the technological part of the fest. This festival features several professional and semi-professional crowd-pulling events and promises to be a grand event showcasing the best of cultural performances, technical solutions, and student community advances.

This year, we had a plethora of events being conducted on behalf of Elan and ηVision. We conducted various workshops on different technical aspects over the course of our tenure, which were highly successful in engaging participants from diverse backgrounds. In addition, the coordination teams and event heads took the initiative to engage with school students from Hyderabad through specialized workshops, fostering early interest in technology.

We also conducted an Open Mic event in collaboration with Diesta, wherein the stage was open for anyone to showcase their talents. Moreover, informal jamming sessions brought together students for spontaneous and creative musical expressions, further enhancing the vibrant atmosphere of the fest.

In addition to the main fest, this year marked the beginning of Elan and ηVision's Nexus (pre-fest week), which kicked off with our Theme Reveal, followed by DJ nights on the first two days. This was followed by a week of games conducted by the Informals and the Techydomains, along with movie screenings in the OAT, which received an overwhelming response from the student community.
This year, we offered accommodation for participants attending select workshops before the fest, as well as during the festival, for those taking part in competitions and workshops. The school workshops, particularly, were a highlight, with enthusiastic participation and a strong focus on practical learning experiences.

Our Theme for this year was – "Piecing it Together" - Step into our college festival, where every student, like a unique puzzle piece, celebrates diversity and collaborates to create a vibrant masterpiece of community spirit and creativity.
Our Social Cause Theme was – "Healing Little Hearts" – An initiative to help the countless children who succumb due to inadequate healthcare. Together, let us mend tiny hearts and nurture bright smiles.

Coming to the most important part, Elan and ηVision have successfully conducted its 15th edition of the fest. Title Sponsored by Greenko, this year's Fest went on for three days, from March 15th to 17th, with various events like Techy and Culti Competitions, Social Cause talks, Workshops, Informal games and mesmerizing Proshows to end the night. We conducted pro shows on Day 2 and Day 3. Some of the techy and culti competitions include – Nrityanjali, Breakfree, Glitz and Glamour, Drone Challenge, and Robo Soccer. We had various food stalls along with stalls of Greenko (Title Sponsor) and The Hindu (our Publication Partner).

The Pro shows were the main attractions of the fest, with the lineup being – The Yellow Diary and DJ Organic on Day 2, Navjot Ahuja and Tayla Moss on Day 3. We unfortunately had to cancel our headliner – The Yellow Diary due to unexpected rainfall on Day 2, leading to the entire arena and the stage being wet, making it unsuitable for a performance.

MILAN 2023

The fourth edition of Milan, the general championship of IIT Hyderabad, consisted of sports, cultural, and sci-tech events kick-started from 22nd September to 1st October. It consisted of 24 cultural, 13 sports, 11 sci-tech and 5 collaborative club events, making a total of 53 events. There are 5 trophies, out of which one is the grand Overall Championship crowned to the all-round performers. A high-voltage competition between 18 hostels has been witnessed.

The opening ceremony of Milan '23 was held on the auspicious morning of the 22nd of September 2023 in the Auditorium. The event has been graced by the Hon'ble Director, Prof B S Murty, respected Dean (Students) Prof K Venkatasubbaiah, and respected Faculty In-charge (Student Activities) Prof Prakhar Gupta.

The website of Milan '23, which included live & personalized updates has been demonstrated by the Web Team of Milan in the opening ceremony. The promo video of this season has also been released. Marking the start of the events, the lamps were lit up by the guests, and the Hostel Representatives rallied the torch to the football ground.

Cultural Events

Milan has been celebrated flawlessly by increasing the number of cultural events from 18 to 24 in this edition. Various cultural clubs & literary societies of IIT Hyderabad came up with exciting competitions which brought the art out of everyone. We received maximum participation in almost every event, and the audiences rejoiced by witnessing the cultural prowess of their hostels. From dances that made us shake a leg to the songs & bands that made us tap our fingers, the crowd was houseful. From brainstorming quizzes to passionate photography & movie making, the participation was high and healthy. The duo-trio dances & group dances have been organised at the Open-Air Auditorium for the first time which allowed us to accommodate more numbers of audience.

SCI-TECH EVENTS:

The big brains have come out to think for their hostel blocks in 11 different Sci-tech events & 4 collaborative events. The clubs of IIT Hyderabad have come up with different challenges and problem statements to test their brains. Covering all the aspects of Science & Technology, the Sci-tech events received good participation, especially from the enthusiastic freshmen & sophomores. Some events required extensions of deadlines as requested by most of the hostel blocks. Apart from these events, our innovation partner, TiHAN, came up with a Hackathon event and raised the bar of technology. The big brains of CHARAKA lifted the Sci-tech trophy this time.

Sports Events

Skill was celebrated, talents have been discovered and there was sweat all around the battlegrounds to get the Sports Championship this edition. The new and old hostels, which differ in the strength of hostelers, have been divided into two different pools.

Pronites

After the 10-day long events, the student community witnessed some stars performing live at the weekend. The Saturday night echoed with laughter as the pro-stand-up Comedian Rohit Swain owned the stage. It was a fun-filled night followed by the energetic Sunday performers. AIKYAM band has set the stage on fire with their electrifying music. As we know, there is no perfect ending to any event without a DJ Night, and Project 91 made the students dance & vibe to their Disco. Food stalls have also been set up near the mess lawns

Award Ceremony

The top 3 winners of every event were acknowledged with medals from the hands of the Dean (Students), Faculty in charge (Student Activities) and Faculty in charge (Sports). The Hon'ble Director presented the glorious Overall Championship Trophy to CHARAKA - who emerged as the winner of MILAN for the third time consecutively.

E-Cell

E-MERGE

E-MERGE is a premier networking event designed to bring together student entrepreneurship cells (E-cells) from colleges across India.

The event aims to foster collaboration, innovation, and knowledge exchange among the brightest young minds, industry leaders, and potential investors.

Event Highlights:

Keynote Session: Inspiring talks by mentors, entrepreneurs and industry leaders.

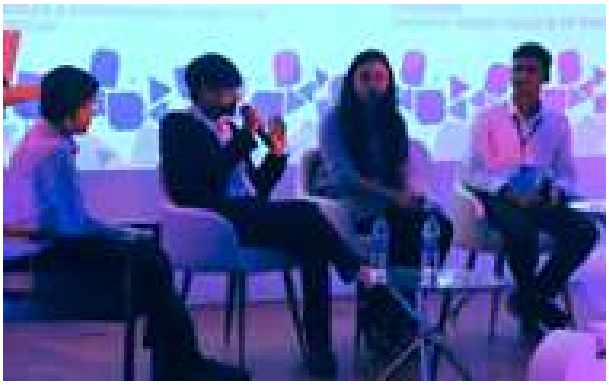
Panel Discussions: Insightful discussions on how to foster an entrepreneurial culture for your campus.

Networking Session: Opportunities for attendees to connect with peers and mentors.

Boardroom Competition: The highlighted event of last year's E-MERGE.

Boardroom: The Entrepreneurship Competition:

Last year, we hosted the highly successful "Boardroom" competition, which focuses on the problem-solving approach for a corporate company by assigning the students to different roles in the corporate world(like CEO, CFO, COO etc.) The competition provided a platform for students to showcase their talent and knowledge about entrepreneurship in front of the Entrepreneurial student community.



Key Highlights from Last Year:

Participation: Over 20 college's E-CELLs participated.

Prizes: Winners received cash prizes and mentorship opportunities.

The Boardroom competition not only showcased the entrepreneurial talent within our student community but also provided invaluable feedback and networking opportunities for the participants. This year, we aim to elevate the competition with more participants, higher stakes, and greater visibility for our sponsors.

E-SUMMIT

E-Cell IIT Hyderabad hosted the latest edition of one of Southern India's largest Entrepreneurship conclaves – the ESummit '24. In alignment with our overarching vision of 'Think | Build | Inspire', this event signified a new chapter in our journey. It is a conclave for all early-stage thinkers, students, corporate leaders, and startups hailing from various parts of the country.

Event Highlights

Keynote Session: Inspiring talks by mentors, entrepreneurs and industry leaders.

Panel Discussions: Insightful discussions on how to foster an entrepreneurial culture for your campus.

Alumni Networking: Opportunities for attendees to connect with IITH Alumni in the Entrepreneurial field.

Workshops, Competitions, and Food Festival.

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 to share their entrepreneurial ventures and wisdom. This summit provides a medium for healthy discussions and inculcates an entrepreneurial mindset into minds through a plethora of events like debates and panel discussions. E-Summit aims to provide a competitive environment for start-ups via events like Elevator Pitch, Pitch Showdown, and many more events to commemorate the spirit of entrepreneurship.

Startup Fair

In an unprecedented initiative, E-Cell IIT Hyderabad has successfully organised a Startup Fair, featuring over 60 startups from various regions of the country. This inaugural event provided an exclusive platform for aspiring entrepreneurs to present their innovative ideas and establish connections with potential investors and mentors.

With an impressive attendance of over 7000 participants, including more than 45 Venture Capitalists and Incubators, alongside the presence of prominent government officials, this three-day affair has emerged as the quintessential forum for networking, investment opportunities, and, above all, a means to augment exposure and outreach.

Food Festival

E-Cell IIT Hyderabad recently orchestrated a culinary extravaganza with its much-anticipated food festival, showcasing a diverse array of gastronomic delights from over 20 mid and newly-established food startups. This delectable gathering, characterised by innovative flavours and culinary craftsmanship, drew an enthusiastic turnout of 4,000 attendees. The event provided an unparalleled opportunity for food enthusiasts to savour the creations of emerging culinary talents and explore a myriad of gastronomic experiences.

Golden Bird Speaker Event

E-Cell IIT Hyderabad recently orchestrated an extraordinary event, the Golden Bird Speaker Event with Dr. Vijender Chauhan held at the picturesque Open Air Theater. The event drew a substantial footfall of over 3k, with an enthusiastic crowd of students eager to absorb insights from the distinguished speaker.

Fetching Fortunes

A platform just for gusty entrepreneurs to showcase their ideas and pitch to guests who themselves are industry leaders in their domains, waiting to spill the tea. Hustling the way through it, the startups won cash prizes over 3.5 Lakhs.

Standup Comedy: Karunesh Talwar

Karunesh Talwar's stand-up comedy performance at the Open Air Theatre proved to be a delightful evening, drawing a vibrant audience of 4,000 attendees.

Publicity through social media

The Instagram page of E-Cell IIT Hyderabad serves as a powerful platform for enhancing the visibility and outreach, reaching an audience exceeding 2 million. Through strategic content creation and engagement initiatives, the page effectively showcases products, sponsor brands, and services to a diverse and engaged community.

Publicity through Newspapers and Articles

https://startupstorymedia.com/insights-entrepreneurship-cell-iit-hyderabad-presents-e-summit-2024-aarohatiascent-to-the-summit/#google_vignette

https://theglobalhues.com/entrepreneurship-cell-iit-hyderabad-presents-e-summit-2024-aarohati/

Japan Day

Japan External Trade Organization (JETRO), Japan International Cooperation Agency (JICA), and IIT Hyderabad (IITH) co-hosted "Japan Career Fair 2023", the sixth edition of "JAPAN DAY" on September 24, 2023. 20 distinguished Japanese companies attended this career fair, which is the largest number of participants since the event started in 2018. The companies, comprising startups, SMEs, and large corporates, participated in promoting their businesses/cutting-edge technologies to attract students from IITH.

Expressing his delight on the occasion, Mr Toshihiro Mizutani, Director General, JETRO Bengaluru, said, "Interest in India's engineering and scientific talent is growing among Japanese companies; as a result, we are welcoming double the number of Japanese companies as compared to last year's Japan Day. Since there is a critical lack of IT engineers in Japan, several businesses there are eager to employ motivated Indian experts. The participating Japanese companies anticipate that IITH students will play key roles in emerging technological innovation and global strategies. Former "JAPAN DAY" has now expanded to "Japan Week" to showcase other aspects, including Japanese culture. We hope that the students explore a little about Japanese culture and also gain some essence of the Japanese corporate culture."

Participation of 20 distinguished Japanese companies at the career fair, underlining its growing importance in fostering collaboration between India and Japan.

The significance of the year-long collaboration for the Career Fair and week-long collaboration involving Japanese universities, organizations, and Indian-Japanese initiatives is a testament to the strength of global partnerships and technology exchange. We affirm our commitment to nurturing these connections for mutual innovation and growth.

In addition, IITH, with the support of the Japan International Cooperation Agency (JICA), Japanese universities, and Japanese organizations, co-hosted the first edition of the "IITH-Japan Week 2023" from 18-24 September 2023. 7 Japanese universities, 8 Japanese organizations, 1 Indo-Japan hub, and three companies participated in the various events to promote various aspects of IIT Hyderabad Japan collaboration.

JETRO, in association with IITH, has been conducting "JAPAN DAY" at IITH since 2018; 10 Japanese companies, primarily 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. In 2022, the event was held offline after two years, with 10 firms participating.

New Infra @Campus

IIT Hyderabad Campus

Honourable Prime Minister, Shri Narendra Modi Dedicated IIT Hyderabad Campus to the Nation.

Inauguration of DRDO Industry Academia Centre of Excellence at IIT Hyderabad.

DIA-CoE

Co-developmental Technology Innovation Centre

Inauguration of Co-developmental Technology Innovation Centre (CTIC) at IIT Hyderabad.

Hybrid Classrooms

Inauguration of Hybrid Classrooms in BT & BME and CHY Buildings

Inauguration of two state-of-the-art Hybrid Classrooms, made possible by the generous contribution of Infovision.

Hybrid Classrooms

Precision Center Metrology Lab

Precision Center Metrology Lab at The iTIC Incubator at IIT Hyderabad in partnership with Hexagon.

Phase II Campus Buildings


Technology Incubation Park


Technology Research Park


Admin Block


Convention Centre

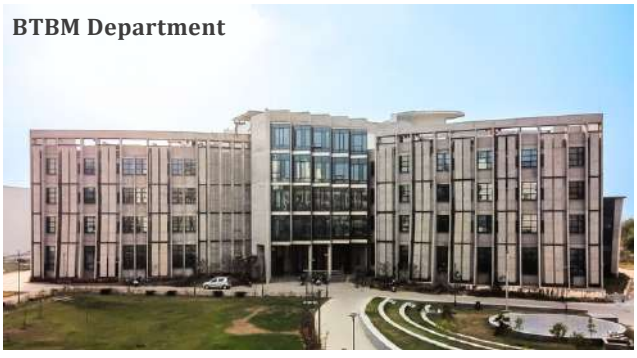

International Guest House


Knowledge Resource Center


Sports and Cultural Complex


Design Department


Chemistry Department


BTBM Department

MSME Department

Core Labs Building

DAV School

Health Care Center

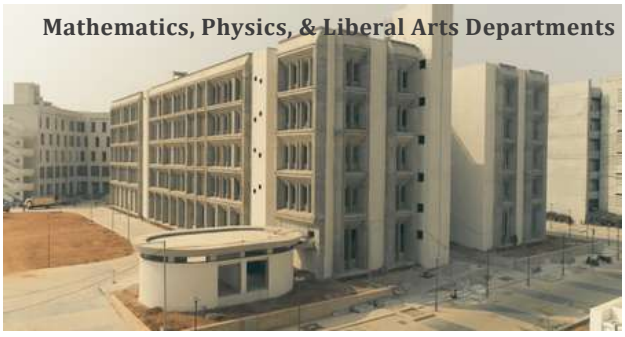
Married Students Housing

Students Hostel & Mess

Research Centre Complex

Lecture Hall Complex

Mathematics, Physics, & Liberal Arts Departments



Electrical Eng & Computer Science Engg. Department

Collaborations

By integrating diverse expertise, resources, and perspectives, collaborations drive innovation, accelerate problem-solving, and increase the societal relevance of research. In an era where complex global challenges require holistic and multifaceted solutions, such collaborative approaches are not just advantageous—they are essential for producing meaningful and impactful research.

The collaborative partnerships of IIT Hyderabad with industry and other institutions have been strengthened, leading to significant interdisciplinary research outcomes.

IIT Hyderabad has partnered with the Information Technology, Electronics and Communications Department; Visvesvaraya National Institute Of Technology, Nagpur; National Institute of Technology Rourkela (NITR); Sree Chitra Tirunal Institute for Medical Sciences and Technology; National Institute of Technology Silchar, Assam; National Institute of Technology Warangal; Carelon Global Solutions India LLP; Neer Interactive Solutions Private Limited; DIRECTORATE GENERAL OF QUALITY ASSURANCE; NEER INTERACTIVE SOLUTIONS PRIVATE LIMITED; Mindanao State University at Naawan; Deutscher Akademischer Austa Uschdient (DAAD); Cyient Limited; Micron Technology Operations India LLP; Strata Geosystems (India) Private Limited; CSIR CENTRAL ROAD RESEARCH INSTITUTE, New Delhi; Yuan Ze University, Taiwan, R.O.C; Asia University, Taiwan; National Taipei University of Technology; Lunghwa University of Science and Technology; National Chi Nan University (NCNU); MRF Limited; Vet Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology; National Institute of Technology, Meghalaya; Mindanao State University at Naawan; University of Southern California; lntel Technology lndia Private Limited; Mazagon Dockship Builders LTD etc.

Non-Teaching Staff (FY 2023-2024)

S. No.	Name	Designation	Pay Level
Academic Section			
1	Devadevan V	Deputy Registrar(on Deputation)	12
2	V S Sastry	Senior Assistant Registrar	11
3	Suresh Narayanan Nair	Senior Assistant Registrar	11
4	Archana Singh	Assistant Registrar	10
5	R Meena Kumari	Section Officer	8
5	Rajashekhar Soudhari	Section Officer	8
6	Rongala Lakshmi Prasanna	Section officer	8
7	Mudavath Bahusingh	Executive Assistant	6
8	S Hemalatha	Executive Assistant	6
9	Naveed MA	Executive Assistant	6
10	T Lavanya	Executive Assistant	6
11	Janardhankumar Tolana	Executive Assistant	6
12	K Sreenivasa Reddy	Senior Assistant	5
13	J Rebekah	Assistant	4
14	Bhimaraju Hemalatha	Junior Assistant	3
15	S Samuel	Multi Skill Assistant Gr.II	2
Academics/ Students			
1	Pawar Chandra Prakash	Junior Technician	3
Administration			
1	V Venkat Rao	Registrar	14
Alumni and Corporate Relations			
1	Varun Kumar Sharma	Public Relations Officer	10
2	L Neeraja	Executive Assistant	6
3	Akarapu Chittaranjan	Multi Skill Assistant 1	1
4	Lalit Kishor Sharma	Multi Skill Assistant 1	1
Artificial Intelligence			
1	D Ravi Kumar	Technical Superintendent	8
2	Parimisetty Harinadha	Junior Technical Superintendent	6
Biomedical Engineering			
1	Chavan Sagar Babanrao	Veterinary Doctor	10
2	Anbumani D	Technical Officer	10
3	Saransh Khandelwal	Technical Superintendent	8
4	Krushna Chandra Hembram	Technical Superintendent	8
5	Sairam M	Technical Superintendent	8
6	Khandagale Sudarshan Baburao	Technical Superintendent	8
7	B Jayalakshmi	Senior Technician	5
8	Pulla Prashanth	JuniorTechnician	3
9	J Manikyam	Junior Technician	3
10	Rathod Rameshwar	Junior Technician	3
11	Bandari Pooja	Junior Technician	3

Biomedical Engineering & Biotechnology			
1	K Velmurugan	Senior Assistant	5
2	Rebba Vinod Kumar	Multi Skill Assistant I	1
Biotechnology			
1	Pulala Raghuveer Yadav	Technical Officer Gr I	10
2	N Ashwini	Senior Technician	5
3	M Jayavardhana Reddy	Technician	4
4	Venkata krishnaprasad SM	Technician	4
Center for Continuing Education			
1	Priyanka Patheparapu	Section Officer	8
2	D Sri Hari	Assistant	4
Central Workshop			
1	Malla Seetarami Naidu	Senior Technical Officer	11
2	Ajith Kanakambaran	Junior Technical Superintendent	6
3	Jeebanbandhu Mahanta	Junior Technical Superintendent	6
4	Vadla Brahma Chary	Senior Technician	5
5	A Praveen Kumar	Technician	4
6	M Srinivas	Technician	4
7	Lohakare Pramod Maroti	Technician	4
8	Lingamaiah B	Technician	4
9	Dhananjay Sahoo	Technician	4
10	G Prashanth	Junior Technician	3
11	Ajay Kumar Kar	Junior Technician	3
Chemical Engineering			
1	Suman A Gupta	Technical Officer Gr I	10
2	Nama Someshwar Rao	Technical Superintendent	8
3	P Gayathri	Technical Superintendent	8
4	V Bhadra Rao Koruprolu	Technical Superintendent	8
5	Ramireddi Hari Krishna	Technical Superintendent	8
6	P Nagarjuna	Senior Technician	5
7	T P Lalitha	Senior Technician	5
8	Ch Venkata Krishnaiah	Junior Technician	3
9	Kavvampalli Srinivas	Junior Technician	3
10	Parla Somasekhar	Junior Assistant	3
11	Shri V Ramasubbaiah	Junior Technician	3

Chemical Engineering & Materials Science and Metallurgical Engineering			
1	Cheemakurthi M Subhani	Multi Skill Assistant 1	1
Chemistry			
1	MD Samiuddin	Technical Officer Gr I	10
2	Kota Venkata Satya Girish	Technical Officer Gr I	10
3	Ashok Yeligeti	Technical Superintendent	8
4	Gottapu Naga Satish	Executive Assistant	6
5	Pentakota Sree Ramana Babu	Technician	4
6	Poondla Vijaya kumar	Technician	4
7	Patange Rooby Clarest Melody	Technician	4
8	Surender B	Technician	4
9	Srinivas Pulimamidi	Technician	4
10	Singam Sampath	Junior Technician	3
11	Papiya Sadhu	Junior Technician	3
12	Chintha Anjali	Multi Skill Assistant 1	1
Civil Engineering			
1	Yaseen Sherief Mohammed	Technical Superintendent	8
2	Jitendriya Raul	Technical Superintendent	8
3	Bhukya Ramakrishna	Technical Superintendent	8
4	Srikanth K	Technical Superintendent	8
5	Gourav	Technical Superintendent	8
6	Kaleeswaran P	Technical Superintendent	8
7	Moganraj M	Technical Superintendent	8
8	S Mani Kumar	Executive Assistant	6
9	Kandhukuri Sandeep Kumar	Technician	4
10	Vishwanath B J	Technician	4
11	Rajesh Kumar	Technician	4
12	Perumalla Nagarjun	Junior Technician	3
13	Raviteja Gajawelly	Junior Technician	3
14	Muthyalu Kumar	Multi Skill Assistant 2	2
Clinic			
1	Kanaparthi Anilkumar	Senior Medical Officer	11
2	T Raja Adharnath	Senior Medical Officer	11
3	Baishakhi Chandra	Medical Officer	10
4	Sonia Madhav Naik	Medical Officer	10
5	Avvari Vedavani	Physiotherapist	6
6	Buddala Venkata Satya Ramanamma	Staff Nurse	6
7	Lakkoji Manikanta	Multi Skill Assistant 1	1
8	Takkoli Sivakrishnareddy	Multi Skill Assistant 1	1
CMD			
1	K S Ravindra Babu	Superintending Engineer	13A
2	Mahankali Sateesh	Executive Engineer (Civil)	12
3	Sushant Vatsa	Executive Engineer (Electrical)	11
5	S Pramod Kumar	Assistant Executive Engineer(Civil)	10
4	P Srinivasulu Yadav	Assistant Executive Engineer(Electrical)	10

6	Menda Chiranjeevi	Executive Engineer (Civil)	10
7	Datla Praveen Kumar	Assistant Executive Engineer(Civil)	10
8	Devraj Venkata Subramanyam	Assistant Executive Engineer(Civil)	10
9	Ponna Satyanarayana	Section Officer	8
10	Patibandla Srikanth	Senior Assistant Engineer (Civil)	8
11	Vinay Kumar Beesa	Senior Assistant Engineer (Civil)	8
12	Altaf Hussain	Assistant Engineer (Electrical)	8
13	Nadiminti Nagaraju	Assistant Engineer (Electrical)	8
14	Vanam Aneesh	Assistant Engineer (Electrical)	8
15	Sivakrishna Reddy	Assistant Engineer (Electrical)	8
16	Surender Banoth	Assistant Engineer (Civil)	8
17	Narla Kalyan Kumar	Executive Assistant	6
18	M Yedukondalu	Executive Assistant	6
19	Viyyuri Raja Babu	Junior Engineer(Civil)	6
20	T Srinivas	Executive Assistant	6
21	Chityala Anand	Junior Engineer(Civil)	6
22	Gummadi Anil Kumar	Junior Engineer(Civil)	6
23	Amaraneni Sai Teja	Junior Engineer(Civil)	6
24	Saheli Saha	Junior Engineer(Civil)	6
25	Divakar Kumar	Junior Engineer(Electrical)	6
26	Rajana Sravanakumar	Junior Engineer(Electrical)	6
27	Tata Bapuji	Junior Engineer(Electrical)	6
28	Marmala Ranadeep Kumar	Junior Engineer(Civil)	6
29	Chandra Sekhar Reddi	Junior Engineer (Electrical)	6
30	GosuSreenivasu	Accountant	4
31	P Srinivas	Junior Assistant	3
32	K Arun Kumar	Junior Technician(Electrical Supervisor)	3
33	Jakka Jagadish Kumar	Junior Technician(Civil Supervisor)	3
34	Muthyala Satheesh	Junior Technician(Civil Supervisor)	3
35	Chakali Papaiah	Multi Skill Assistant 2	2
36	Bhoopal K	Multi Skill Assistant Gr.II(Plumber)	2
37	Nenavath Shiva Shankar	Multi Skill Assistant Gr.II	2
38	Begari Vinod	Multi Skill Assistant 1 (Carpenter)	1
39	Chinthala Satheesh	Multi Skill Assistant 1(Electrical)	1
Computer Centre			
1	Manivel R	Technical Officer	10

2	K Raguraman	Technical Superintendent	8
3	Bondla Jessy	Technical Superintendent	8
4	Sanju Kumar Chavan S	Technical Superintendent	8
5	Mandlipalli Anil Kumar Reddy	Technical Superintendent	8
6	Karn Choudhary	Technical Superintendent	8
7	Manukonda Rahulteja	Junior Technical Superintendent	6
8	Gandepalli Surya Prakash	Assistant	4
9	Bandam Ganesh	Junior Technician	3
10	Ramavath Ashok	Junior Technician	3
Counselling Cell			
1	Maria Josephine Susan Morris	Senior Psychological Counselor	10
2	D Phani Bhushan	Assistant Psychological Counselor	8
3	Yukti Rastogi	Assistant Psychological Counselor	8
CSE			
1	T Vijaya Chakravarthi	Technical Superintendent	8
2	Nakka Syamala Rao	Technical Superintendent	8
3	Nikith Reddy Peddasheri	Technician	4
4	Maloth Sunitha	Technician	4
5	Praveenkumar Gaddam	Junior Technician	3
6	Marepally Shivakumar Reddy	Junior Technician	3
CSE & Computer Centre			
1	Bollavaram Harshavardan Reddy Computer	Multi Skill Assistant 1	1
Design			
1	Kumawat Vijay Prakashchand	Technical Superintendent	8
2	Rajkumar B	Technical Superintendent	8
3	Satyendra Rajendraprasad Nishad	Junior Technical Superintendent	6
4	B Vivekananda chary	Technician	4
5	Raj Priyadarshan Jee B	Technician	4
Director office			
1	M Eswar Reddy	Assistant Registrar	10
2	A Srinivas Rao	Section Officer	8
3	N Pradeep Kumar	Executive Assistant	6
Electrical Engineering			
1	Chinmaya Panda	Technical Officer Gr I	10
2	R Thirumurugan	Technical Officer Gr I	10
3	Satheesh K Telagamsetti	Technical Officer Gr I	10
4	Aldhandi Suresh	Technical Superintendent	8
5	Rajasekhar Jala	Technical Superintendent	8
6	Simhadri Hari Prasad	Technical Superintendent	8
7	Suchismita Banerjee	Executive Assistant	6
8	Manne Prahaseeth	Junior Technical Superintendent	6
9	Kodavandlapalle N Rasool	Technician	5
10	S Velmurugan	Technician	5
11	Santu Kayal	Technician	5
12	Nagaraju Naddi	Technician	4
13	Manikanta PLG	Junior Technician	3
14	Anup Kumar Shahi	Junior Technician	3
15	Y Prem Kumar	Junior Technician	3
16	Kalinga Chandra Mohan	Multi Skill Assistant 1	1

Entrepreneurship and Management & Heritage Science and Technology			
1	Senivarapu A Archith Chandra	Junior Assistant	3
Engineering Science &Climate Change			
1	Palpanuri Madhu	Junior Assistant	3
Finance & Accounts			
1	Jagadeswara Rao B	Deputy Registrar	12
2	Manchambhotla Phanindra Kumar	Senior Assistant Registrar	11
3	V S P Hanumantha Krishna	Senior Assistant Registrar	11
4	Bala Prakash T	Section Officer	8
5	Potharlanka Sree Ramakrishna	Section Officer	8
6	Anapa Krishna Prasad	Section Officer	8
7	Sandolla Dasharath	Executive Assistant	6
8	Budeti Pradeep Babu	Executive Assistant	6
9	Racha Praveen	Senior Assistant	5
10	Ramreddy Bharath Reddy	Assistant	4
11	Attaluri Jeevani	Accountant	4
12	Chetty Nikhil Kumar	Accountant	4
13	Chandrika Sai Teja	Accountant	4
14	Jithesh A	Accountant	4
15	Chidruppa Thimothi	MSA II	2
GATE & JEE Office			
1	Ankamwar Satish	Executive Assistant	6
Green Office			
1	Golla Vamsi Krishna	MSA I	1
2	Mashetti Vamshi	Junior Horticulturist	3
Greenko School of Sustainability			
1	Attela Jagannatha	Junior Assistant	3
Guest House			
4	Kotamla Srikanth	Multi Skill Assistant Gr.II	2
Hindi Cell			
1	Naveen Srivastava	Junior Hindi Translator	6
Hostel office			
1	Palle Mohan Kumar	Assistant Registrar	10
2	Razia Begum	Executive Assistant	6
3	Nandyala Bheemeswara Reddy	Executive Assistant	6
4	George K T	Hospitality Management Assistant	6
5	K Satheesh	Senior Assistant	5
6	G Shyamala Kumari	Senior Assistant	5
7	G Vasantha Kumari	Senior Assistant	5
8	Banoth Deva	Accountant	4
9	S Swapna	Junior Assistant	3
10	CH Guru Prasad	Multi Skill Assistant Gr.II	2
11	Batti Raja Sekhar	Multi Skill Assistant 1	1
HR Section			
1	**Syed Ali Sabeer**	**Joint Registrar**	**13**
2	**Laxman Srigiri**	**Senior Assistant Registrar**	**11**
3	**Vayuvegula Surya Phani Kumari**	**Senior Assistant Registrar**	**11**
4	**S V Sree Devi**	**Section Officer**	**8**
5	**Naresh Kandrathi**	**Section Officer**	**8**

6	Venkanna Bolagani	Section Officer	8
7	Nagaraju	Executive Assistant	6
8	MD. Mirza Raza Ali Baig	Senior Assistant	5
9	Munganda Ramakesava	Assistant	4
10	Debarpita Parira	Assistant	4
11	Uppuleti Chandramouli	Accountant	4
12	M Sandeep	Junior Assistant	3
13	G Komala Priya	Junior Assistant	3
14	Velagandhula Karthik Kumar	Junior Assistant	3
15	Venkatesh Betha	Junior Assistant	3
Internal Audit			
1	G Vijay Kumar	Senior Assistant	5
2	Ramnaresh B	MSA I	1
IR			
1	A Pranitha	Section Officer	8
2	Azmath Ali SK	Executive Assistant	6
Liberal Arts & Design			
1	Abani Kumar Das	Executive Assistant	6
2	Anjaneyulu Botta	Technician	4
3	Maloth Harish Naik	Junior Technician	3
Library			
1	Dr Bhojaraju Gunjal	Chief Library Officer	13
2	C Mallikarjuna	Deputy Librarian	12
3	Kimidi Siva Shankar	Assistant Librarian	11
4	Haseena V K K M	Library Information Assistant	6
5	Jayanta Kumar Sahu	Library Information Assistant	6
6	Gajanand Kumar Kaushik	Library Information Assistant	6
7	Sajan C S	Junior Library Information Assistant	3
8	Suchita Sahoo	Junior Library Information Assistant	3
MAE			
1	Raju P	Technical Officer Grade I	10
2	Ramu G	Technical Officer Grade I	10
3	Vootla Srikanth	Technical Officer Grade I	10
4	Ajith A	Technical Superintendent	8
5	Pandicheri Madhu	Technical Superintendent	8
6	Rekhala Vikram	Junior Technical Superintendent	6
7	Munugala Dakaiah	Junior Technical Superintendent	6
8	Vallakonda Santhosh kumar	Executive Assistant	6
9	S Jagadeesan	Senior Technician	5
10	Mohd. Abdulla	Senior Technician	5
11	Marepally Praveen Kumar	Technician	4
12	Pillai Madhushankar Subramonia	Technician	4
13	A Dinesh Chakrapani	Junior Technician	3
14	Darelli Pullarao	Junior Technician	3
15	Erry Srikanth	Junior Technician	3
16	Vikram Singh Kanawat	Junior Technician	1
Mathematics			
1	Anand V	Technical Superintendent	8
2	Katam Santhosh Reddy	Junior Technical Superintendent	6
Math & AI			
1	B Vinod Kumar Raju	Junior Assistant	3

Materials Science and Metallurgical Engineering			
1	B Balavandhi Raju	Technical Officer Gr I	10
2	Upender Sunkari	Technical Officer Gr I	10
3	Yarajani Sravani	Technical Superintendent	8
4	Muriki Laxminarayana	Technical Superintendent	8
5	Mohammad Abdul Junaid	Technica Superintendent	8
6	Paramita Maiti	Technical Superintendent	8
7	Harish Ramineni	Executive Assistant	6
8	Manche Venkata Srinivas	Senior Technician	5
9	E Rangaiah	Senior Technician	5
10	Nalam Divakar	Technician	4
11	Saimatha Gannabathula	Junior Technician	3
12	Mohammed Salman	Junior Technician	3
MS Section			
1	Muniganti Badrinath	Joint Registrar	13
2	Md Jameel	Senior Assistant Registrar	11
3	T Vijay Anand	Section officer	8
4	Gogula S L Vanama Raju	Executive Assistant	6
5	NallaSrinivas	Executive Assistant	6
6	Dhananjay K	Hospitality Management Assistant	6
7	Guntur Vimala	Junior Assistant	3
8	A Pushpalatha	Junior Assistant	3
9	B Rajander	MultiSkill Assistant Gr.II	2
10	Mohammed Faheem Khan	Multi Skill Assistant 1	1
Physics			
1	T Naaraayanan	Technical Officer Grade I	10
2	Kanchugantla Rameshyadav	Technical Superintendent	8
3	Ranjit Kumar	Technical Superintendent	8
4	T Chengappa	Technical Superintendent	8
5	Vadla Anjaiah	Technician	4
6	Samaresh Basani	Technician	4
7	Vasudevarao Pavuluri	Junior Technician	3
8	Karthik Bhat	Junior Technician	3
9	Shivaram Lakum	Junior Technician	3
10	Guhan K	Junior Technician	3
11	Kuntla Reddy Sekhar	Junior Technician	3
12	Sunnam Goutham Raj	Junior Assistant	3
13	Maatla Vishal	Multi Skill Assistant Gr.II	2
Placement Cell /OCS			
1	K Malini	Section Officer	8
2	Vetrivel M	Executive Assistant	6
Registrar Office			
1	Beera Suresh Kumar	Executive Assistant	6
2	Samala Rajashekar	Junior Assistant	3

Security Office			
1	M Sreejith	Chief Security Officer	13
2	Pyaram Purushotham	Security Officer	11
3	Prasad Boppa	MSA I	1
Sports Department			
1	Vikram Pratap Singh Bundela	Sports Officer Gr I	10
2	Md. Akbar	Sports Officer Gr I	10
3	Baba Aditya Varma P	Sports Officer Gr I	10
4	Ruchi Yadav	Sports Officer Gr I	10
5	Hardeep	Sports Officer Gr I	10
6	Kherkar Purva Ganeshrao	Physical Training Instructor	6
7	Anil Kumar Kushwaha	Physical Training Instructor	6
8	Mallikarjun	Physical Training Instructor	6
9	Rohit Pathariya	Physical Training Instructor	6
SRC/R&D Section			
1	Gajula Ashok	Deputy Registrar	12
2	N Srisailam	Senior Assistant Registrar	11
3	Saikiran K	Assistant Registrar	10
4	Syed Sadique Ali	Section officer	8
5	Mahaboob Moonavath	Executive Assistant	6
6	K Shiva	Senior Assistant	5
7	Narayana Ramanjaneyulu	Senior Assistant	5
8	Gollapalli Nagesh	Accountant	4
9	Santosh Kumar Sahoo	Accountant	4
10	Thakkar Nihit Deep	Accountant	4
11	Pradeep Kumar Jada	Multi Skill Assistant 1	1
Stores & Purchase			
1	Doddi Chanchala Devi	Deputy Registrar	12
2	M Venkatesh	Senior Assistant Registrar	11
3	K Ramesh Kumar	Assistant Registrar	10
4	Sady Sarala	Section officer	8
5	Vijaya Lakshmi A	Executive Assistant	6
6	Sonawane Gunavant Narayan	Executive Assistant	6
7	Sankarreddy A	Executive Assistant	6
8	Dinakar Pyla	Executive Assistant	6
9	N Aruna	Assistant	4
10	N Shivakumar	Assistant	4
11	S Thirunavukkarasu	Junior Assistant	3
12	Arun Kumar Chidruppa	Junior Assistant	3
Students Office			
1	Mohsin Mohammed	Section officer	8
2	L Dinesh	Assistant	4
Students Office & Internal Audit			
1	Rajnesh MP	Deputy Registrar	12

12th Convocation

Indian Institute of Technology Hyderabad has celebrated the 12th Convocation in the gracious presence of Shri S Somanath, Secretary - Department of Space, Chairman - ISRO, and Chairman - Space Commission, as Chief Guest of the event. A total of 966 students got 980 degrees, with 4 Gold Medals & 38 Silver Medals. For the first time 500+ MTech Graduates received the degrees. Shri S Somanath delivered the Chief Guest address and said, "Strive to bring benefits of your learning for the betterment of society and the Nation"

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