



**IIT Palakkad**  
**Technology IHub Foundation**  
Driving automation for energy and safety



Vol 2, Issue 1

# Kaleidoscope

The year 2022 was truly a phenomenal year for us in which we made an unwavering commitment towards progress and nurtured our organisation with a lot of phenomenal projects. We made great strides forward with several outstanding activities and contributed to embellishing the knowledge sector of India. We are excited to bring you the highlights of the year in the form of the second edition of our newsletter 'Kaleidoscope'. Take a glance at our activities, innovations, and collaborations.

**Vol 2, Issue 1, Q3**



Thematic Areas

# *Energy & Safety*



## Chairman's Message



### Prof. A. Seshadri Sekhar

Director, IIT Palakkad

In my capacity as the Director of IIT Palakkad, I have the honour of being the Chairman of IPTIF, which aims to establish India as a world leader in technology and innovation. We created programmes and activities to help those who aspire to be entrepreneurs develop their entrepreneurial skills.

Our focuses on research and development, especially in energy and safety domains, to help India lead the energy production and conservation sectors. Despite a few difficulties, our team had a good year in 2022. Our team is working on technologies for producing green energy, efficient energy conversion, transportation and distribution. We have been sponsoring initiatives for predictive interventions to enhance road safety by focusing on traffic safety modelling, traffic simulators, trajectory forecasts, etc.

IPTIF will launch Samarth Maha Utsav and other projects in 2023 to ramp up research and development efforts by focusing on cross-domain policies, security solutions, vehicle-to-vehicle communication, and data privacy. In 2023, we want to improve cross-border cooperation with businesses and governments. I am sure that 2023 will help us identify our unique skills and future areas of focus while supporting our ongoing endeavours.

## CEO's Message



### Mr. Harilal Bhaskar

CEO, IPTIF

I am glad to see the growth of IPTIF being one of the highly respected hubs in India acting as a networked platform for all the stakeholders of the innovation ecosystem, be it researchers, start-ups, corporates, and policymakers. Our mission is to nurture the talented youth who are set to explore the roads not taken and revolutionise the world. Inspired by innovation and technology, we are committed to transforming young minds into expert leaders who can lead the world in the future.

As the CEO of IPTIF, a government-funded company, I am proud to spearhead the introduction of cutting-edge technology, entrepreneurship, and skill development programs to our fellow citizens. Our mission is to elevate India to a global leader in energy and safety within the next 5 years.

We are dedicated to providing individuals with the skills and knowledge needed to effectively utilize and develop ICS-based, high-tech systems, as the world moves towards more efficient and technologically advanced planning and execution.

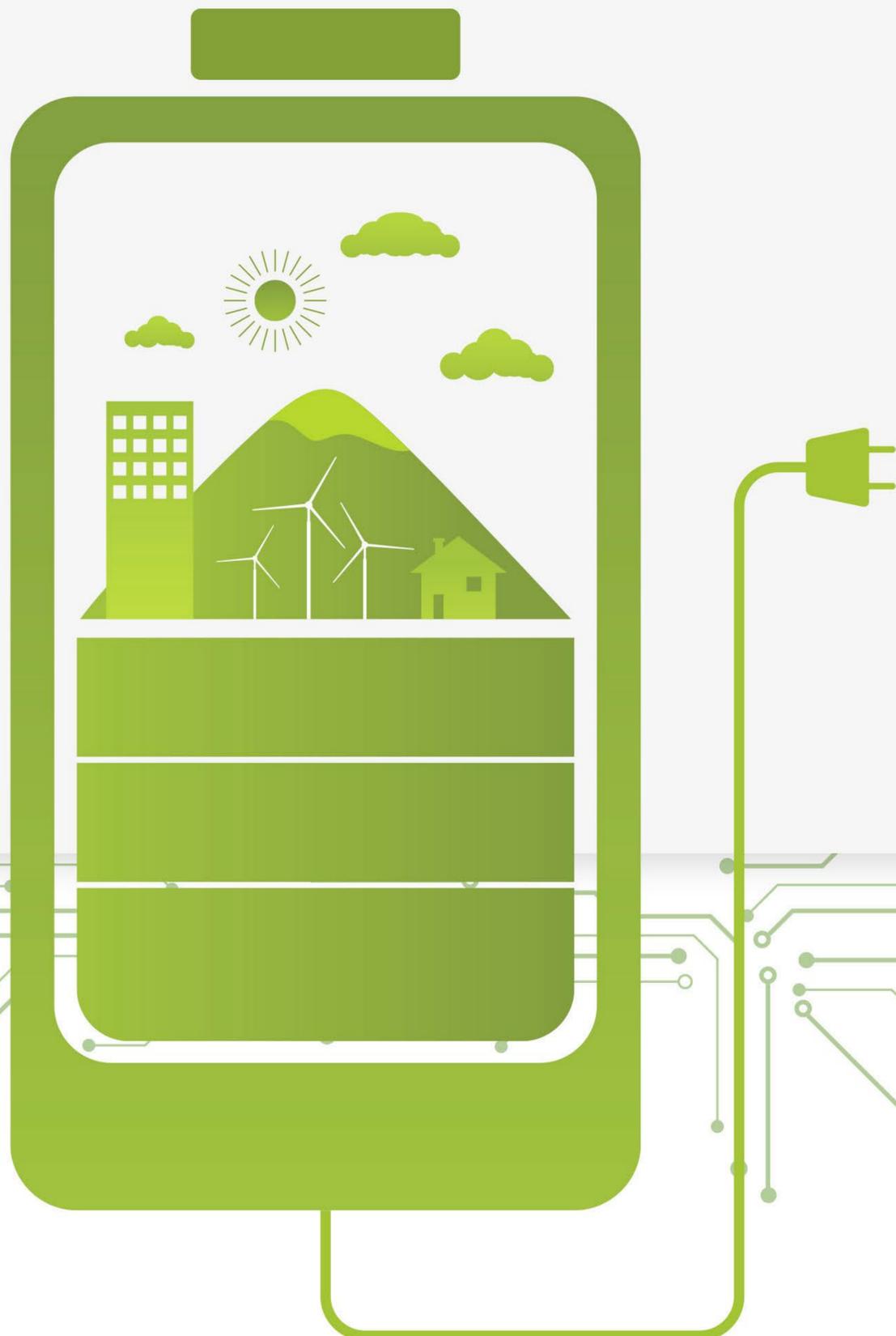
Our team strives to accomplish the vision of DST to enhance Research and Development, Start-up support, enrichment of young minds, and revolutionize CPS technology in India to help our country stand tall. We are honoured to pursue the research and development activities that will help the country grow as an energy-efficient leader by creating novel CPS technologies.

We are committed to promoting innovation and supporting the growth of aspiring entrepreneurs. As such, we are proud to offer comprehensive assistance, including fellowships for students, to aid in the development and enhancement of their skills. Additionally, we are dedicated to learning from global leaders and implementing best practices within our organisation.

We are honoured to join team India in its mission of transforming the industrial sector. Entrepreneur-in-Residence (EIR) programmes, along with a set of skill-development courses, webinars, and programmes, are a few of our initiatives to support the community to grow beyond borders. We provide our stakeholders with the perfect platform not only for their enrichment but also for the nation in the long run.

## Pillars of Success

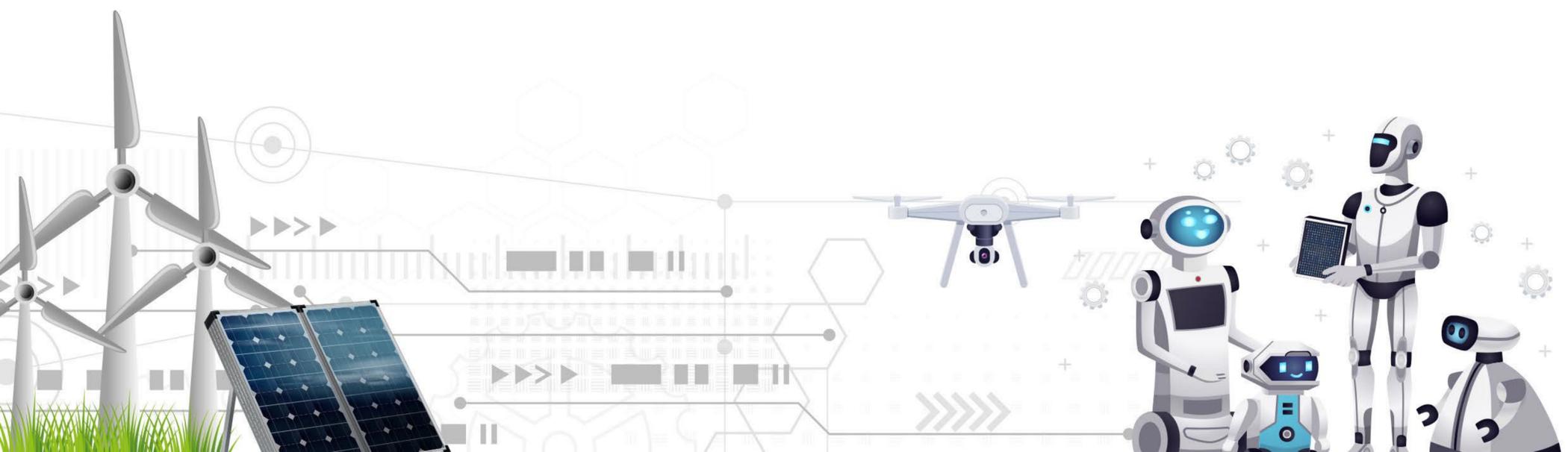
We focus on translational research and development, entrepreneurship, skill development, and international collaboration to extend support to different segments of society. We are honoured to present the projects and innovations undertaken by our three verticals during the period.



## Research & Development

We are actively involved in promoting and implementing technological innovations in our country and significantly growing India as a technology-based Research & Development hub. A set of 12 prestigious projects are in progress under the Research and Development vertical of IPTIF.

- 1 Design, Development, and Control of a Multi-purpose Mobile Manipulator for Intelligent and Collaborative Manipulation Tasks.
- 2 Design and Development of an Intervention-class Underwater Robotic Vehicle with Tilting Thrusters for Marine Applications.
- 3 Development of Low-altitude Microsatellites Using Long-endurance Glider Plane Collaboration.
- 4 Motion Capture System to develop a real-time optical motion tracking system.
- 5 Aerial Dexterous Manipulators, Grasping and Transportation.
- 6 Real-time Monitoring and Control of Road Bridge Structure.
- 7 Cyber-Physical Systems in Collaboration with Artificial Intelligence for Smart Agriculture Improving Energy Efficiency and Environment Safety.
- 8 Unified Framework for Collaborative Intelligent Systems.
- 9 Energy Efficient Distributed Estimation and Control of Networked Robots and their Implementation Architectures.
- 10 High Power Density Reluctance Motor and Drives.
- 11 Convai Health.
- 12 Explainable AI through weight space characterization.



## Research & Development

- We collaborated with the Government of Kerala for AI-based technological intervention in mental hospitals. We plan to create a holistic system to improve the quality of life of mental health patients. One of the crucial components of this system will be a patient monitoring system that enables doctors and hospital staff to monitor patients around the clock and receive alerts if they perform any suspicious activities.
- Collaborated with Indian Telephone Industries (ITI), Palakkad to promote innovations and initiate relevant technical projects in the domain of Battery Management Systems.
- Development of a power and speed metering device for battery-operated vehicles to support the RTO, Government of Kerala.
- Our team partnered with the Centre for Computational Imaging at IIT Palakkad. The Centre for Computational Imaging(CCI) is the first research centre covering the whole spectrum of computational imaging and engineering in India.







## Samarth Maha Utsav

We aim to encourage innovation in Renewable Energy and Safety by launching our flagship national contest Samarth Maha Utsav. Through this programme, we are offering up to Rs 2 crore to motivate innovators, entrepreneurs and start-ups in the renewable energy and safety sector. The funding will be provided to candidates with a viable prototype and business plan for large-scale commercialization. The competition is open to all innovators and start-ups in India with a working prototype in the energy or safety sector. The last date for application is 30<sup>th</sup> June 2023.



Registration link :  
<https://tinyurl.com/Samarth-Maha-Utsav>

Scan th QR

## Start-up Rendezvous

The start-up Rendezvous was an initiative intended to support ambitious and innovative start-ups in the ICS sector by enabling them to transform their entrepreneurship journey into a successful one. The primary objective is to strengthen entrepreneurship and foster innovation among the youth in India by encouraging creativity and innovation in a shared work environment amidst a healthy start-up community. The event guaranteed a significant leap to the participants by enacting the role of a springboard for innovative start-ups having the potential to shape the future. The first start-up Rendezvous event was conducted in Coimbatore.



## i-EIR 2.0

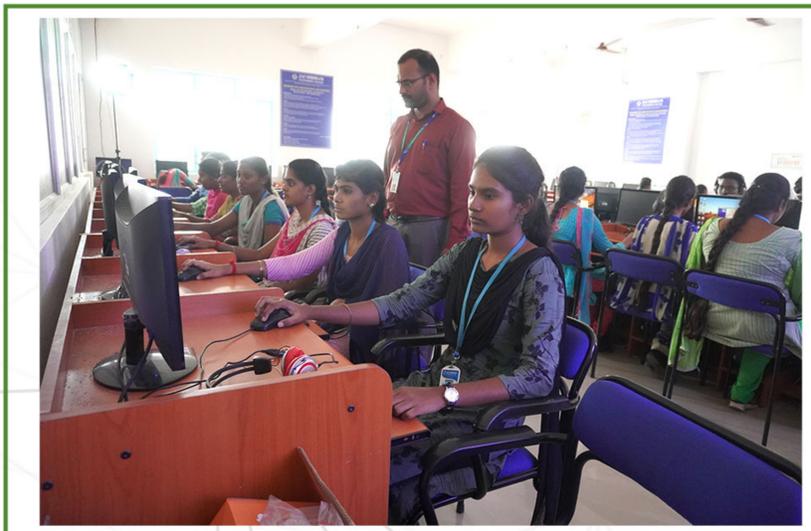
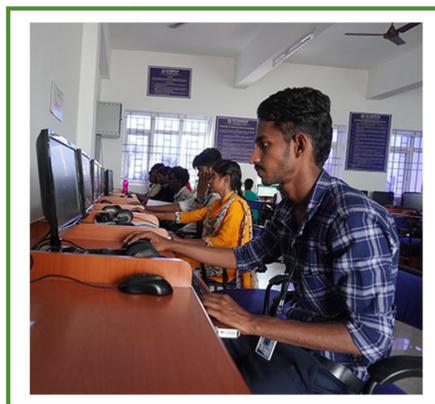
Our team has been striving to encourage more people to join start-up ventures. Helping them minimise the risk involved in launching a start-up and opening up fresh opportunities, we aim at encouraging the greatest talents in energy and safety to become entrepreneurs. The i-EIR program offers innovative entrepreneurs endless potential to strengthen their networks and get constructive feedback on their projects to fulfil career objectives and dreams.

## Skill Development

We played a critical role in supporting the rural community by introducing several amazing initiatives that have benefited society. Empowering women in technology has always been our priority. Technology skill development training for rural women from different parts of Kerala was organised in 2022 to equip them to face the world with confidence and to embrace technological advancements.

### Matlab Bootcamp

We organized a Bootcamp on MATLAB & Simulink at various i-Trend centres across South India. Around 200 students attended the boot camp held at prominent institutions, namely Jai Shriram Engineering College-Tirupur, Tamil Nadu, St. Joseph College of Engineering-Pala, and SSM Polytechnic College -Tirur, Kerala are few of them.



## TMDP Training program

Collaborating with the District Industries Centre Palakkad, we conducted a 12-day technical session for 27 selected youths on the premises of our office. Basics and advanced IoT, AI/ML, AR/VR, Python, Blender software installation and object creation and recent technological developments in the Aerospace Industry were the core themes covered. Interactive sessions with technical entrepreneurs all over India to promote aspiring youths to entrepreneurship by providing training to them were the highlight of the event.



# Skill Development

## Agri tech training

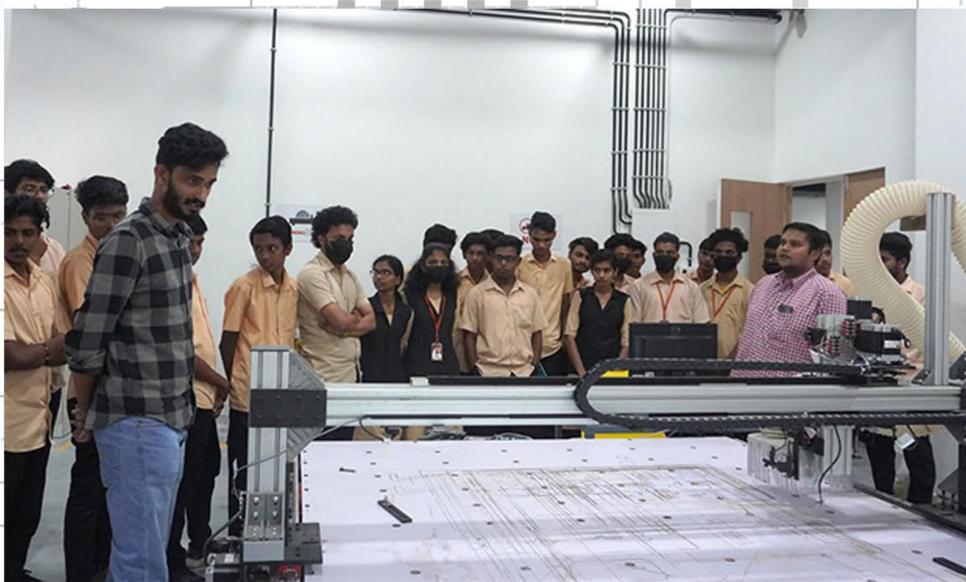
We conducted two-day technical skill development training for 20 rural women at Regional Agricultural Research Station (RARS) in Wayanad focussed on the empowerment of rural women. The initiative, launched by partnering with Kerala Agricultural University, Industrial Robotics Institute and Jet Aerospace, strived to transform women into fit candidates for employment and ensure their financial stability.

## PCB Designing workshop followed by PCB hackathon

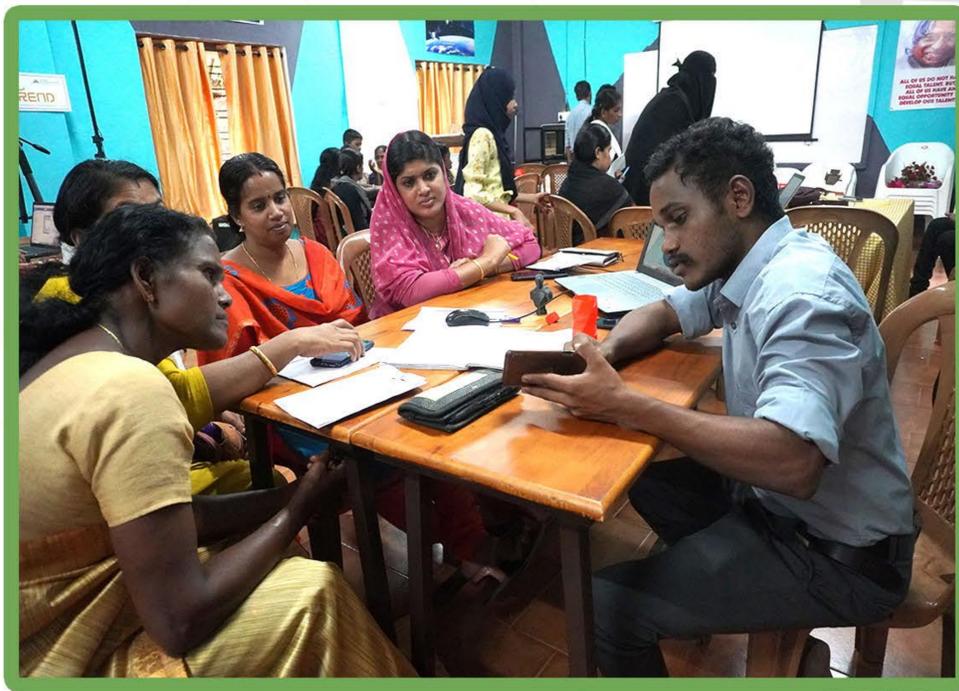
Our workshop provided an opportunity for Innovators and students to learn circuit designing and PCB engraving processes which will help them design better products. Dr Vijay Muralidharan, Asst. Prof. IIT Palakkad led the workshop on "Power electronics - PCB design" that aimed at offering an opportunity for Innovators and students.



## Fablab Training



In an initiative to offer technical training to students, FabLab carried out 3D printing training for over 500 students from various institutions across south India. Encouraging students to become creators and instilling artistic skills in them, our team imparted training to students from engineering colleges and higher secondary schools. The additional skill imparted by our team will help the participants mould their future in a better way.



## Training women in 3D printing skills

Under our i-Trend initiative, a group of women in Agali were offered training in Introduction to 3D printing to equip them for better jobs in the competitive world. The venture was launched for the empowerment of women in our society by enhancing their skills. Financial stability for women through skill empowerment was the focus of the training program attended by more than 50 rural women at Agali Government Vocational Higher Secondary School. By providing skill-based training to rural residents in occupations that are suitable for the workforce, The training's goal is to give the learners the ability to support sustainable means of livelihood.

## Skill Development

### Fellowship

Dedicated to encouraging youths to excel in their fields of expertise, IPTIF offers Agni Fellowship, Doctoral Fellowship, and Post-Doctoral Fellowship. Doctoral fellowship is offered to individuals pursuing full-time Ph.D. in CPS-ICS. We have offered 22 fellowships for Ph.D. scholars.

Agni UG fellowship aims to motivate students working on Intelligent Collaborative Systems, and IPTIF has 7 Agni UG fellows now. The post-doctoral fellowship aims at retaining talented young people in the country by offering them assistance for better research and development. 2 post-doctoral fellows have so far received the fellowship.

### International Collaboration

We enable a vibrant innovation ecosystem and provide a reliable platform for technology-based start-ups and entrepreneurs to engage in activities that create value for the local, national and international ecosystem. Building a cordial relationship with foreign countries, we are planning to commence projects and training programs on partnership bases. Our team has been holding discussions with industries and governments in Japan, Sweden, Canada, and the UK governments regarding the implementation of joint projects. IPTIF stresses international partnerships to promote Indian technology and products. Our mission is to enhance knowledge and technology transfer to Indian academia and industries by launching collaborative training. Intensive training for Indian youth in foreign technology and promotion of Indian technology to attract investment is on the card.

## Our initiatives

### **i-TREND (Technology, Research, and Entrepreneurship and Development) centre**

We conceptualised i-TREND (Technology, Research, Entrepreneurship, and Development) centres for people across the nation to access R&D, upskilling, and entrepreneurship all under one roof.

i-TREND centres will act as a hub and spoke model for Innovation, Research, Technology, Skill Development and Entrepreneurship by bridging the gap between Industry and Academia. These centres will operate ITI / Diploma/ Engineering colleges, making them easily accessible to the local community. They also aim to impart relevant training and help develop skill sets that are in tune with the needs of the industry and time. Further, these centres will increase jobs and internship opportunities for students by connecting with Industries and Corporations that need skilled talent.

With the ever-increasing demand for a skilled workforce in the technology arena, especially in the Cyber-Physical Systems (CPS) domain, we are confident that our i-TREND centres will not only bring out new technology innovations and skilled technocrats but will also create pioneering and enterprising attitude among India's youth.

The i-TREND centres work on a unique hybrid model introduced and developed by our team which includes providing training in a combination of both online and offline classes. Apart from training, the professors and students in i-TREND centres obtain a unique window of opportunities for getting involved in industrial projects and Entrepreneurship. Onboarded 30+ i-TREND Centers across India.



# UT KAR SH20 22

## Utkarsh

We intend to bridge the academia-industry gap by stimulating a crucial mechanism for innovation in the knowledge-based economy in our country through the UTKARSH event. Utkarsh is instrumental in establishing a symbiotic relationship with technological innovations, employment opportunities, breakthrough research, and skilled workforces. Moreover, it will enable ventures into new cogent partnerships with industries by forging effective relationships to foster communication and collaboration among academicians and industrialists driving a better future for youth and society. The primary goal is not only filling the gap between Industry and academia but identifying the issues faced by industries - be it business-related or purely technological. Partnering with Kanjikode Industry Forum, we conducted the first series of Utkarsh at IIT Palakkad.



## Tha Fabracation Lab

The fabrication lab is spread over an area of 1600 sq ft and supports metalworking, moulding, woodworking, prototyping, 3D printing, soldering stations, etc. Metalworking is supported by VMC milling, CNC Lathe and metal laser cutter technology. Those who want to employ the 3D printing and moulding facility will get training on resin preparation and degassing, mould making, and other printing activities. Our Fab Lab possesses an electronic assembly and test unit, PCB Oven, low-power electronic test tables, and ESD-safe soldering stations. Prototyping tools such as professional rotary drill, pressure washer, power supply support, high bandwidth oscilloscopes and other instruments help us offer comprehensive support to Industries, Entrepreneurs and institutions.





# Ananta Medha

A Webinar Series  
by accomplished Women in the field of  
Science, Engineering and Technology.



## Ananta Medha Webinar Series

On May 17, 2022, Dr Tessy Thomas, a renowned scientist, inaugurated our two-month webinar series "Ananta Medha", which will include prominent women in science, engineering, and technology from around the world. The webinar series highlighted the numerous research and job pathways open to students studying science and technology while focusing on their cutting-edge contributions to academia, science, and technology.

A proposal was presented to Harikishore IAS, Director of Industries, Government of Kerala, for the establishment of a Techno-Manufacturing Hub at Kanjikode aiming to make India a forerunner in the Techno-Manufacturing sphere.



## News and Events At a Glance

- Union Minister of State for Renewable Energy, Bhagawanth Khuba visited the IPTIF. Dr. Sheshadri Sekhar, Director of IIT Palakkad, Dr. Shanthakumar Mohan, Dean of IIT Palakkad, Project Directors Dr. Alber Sunny, Dr. Vijay Muraleedharan, CEO of IPTIF Mr. Harilal Bhaskar, IIT Palakkad adviser Mr. K. M. Unnikrishnan was present for the interaction with the minister. The minister also visited the Fabrication lab of the Technology hub.
- Dr. JBV Reddy, a Scientist in DST visited IPTIF and had a meeting with the IPTIF team. The meeting explored the possibilities of bringing into effective action various aspects of NM-ICPS missions along with clear-cut clarity on the potential of this mission and its impacts on our country. He stressed the spheres we should focus on to help us emerge as the best performer for both society and our nation.
- Mr. Harilal Bhaskar, CEO of IPTIF, Visited Mr Sandiaga Uno, the Honourable Minister of Tourism & Creative Economy of Indonesia to establish links between India and Indonesia for R&D collaboration.
- On June 17, 2022, the Oorja Grand Challenge's First Phase winners were announced. All the ten selected teams win Rs 1.5 lakh as assistance to perfect their prototyped design.
- We are glad that IITM Pravartak Technologies Foundation CEO, Mr. Shankar Raman visited IPTIF. It was a great pleasure for our team to interact with him and have him at our office.



## Goals set for 2023

2023 is an action-packed year for us, We have listed a series of events to collaborate with our stakeholders.

### Shared Labs

Shared Labs are an innovative concept that creates a coworking space with a suitable environment that can be accessed by Industries, Institutes, or Companies.

### Assistive Technology Portal

An assistive technology web portal in collaboration with ICMR is to be launched in March 2023.

### Metaverse training program

The App/Game development workshop will encourage students to harness potential skills for developing the futuristic platform, Metaverse. A cutting-edge technology suitable for creating 3D environments, Metaverse training assures vast emerging digital scopes in a multitude of spheres.

### More on card:

- Opensees structure training program
- Grand Challenge 2
- Rendezvous 2
- Utkarsh 2
- IoT and embedded system workshop.
- Embedded AI Workshop.
- Python for Machine Learning Workshop.

## Conclusion

2022 was an exciting year for us as we launched a series of remarkable programs in multiple verticals comprising R&D, Skill Development, Entrepreneurship and International Collaboration. We are ready to explore the scope of 2023 by launching Samarth Maha Utsav and other projects to intensify research and development initiatives. Our initiatives will significantly support the technological necessities in the energy and safety domains of the country.

We will continue our futuristic endeavours to extend comprehensive support to transform India into a global leader in the energy and safety sector by exploring the talents of the youth.

