



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



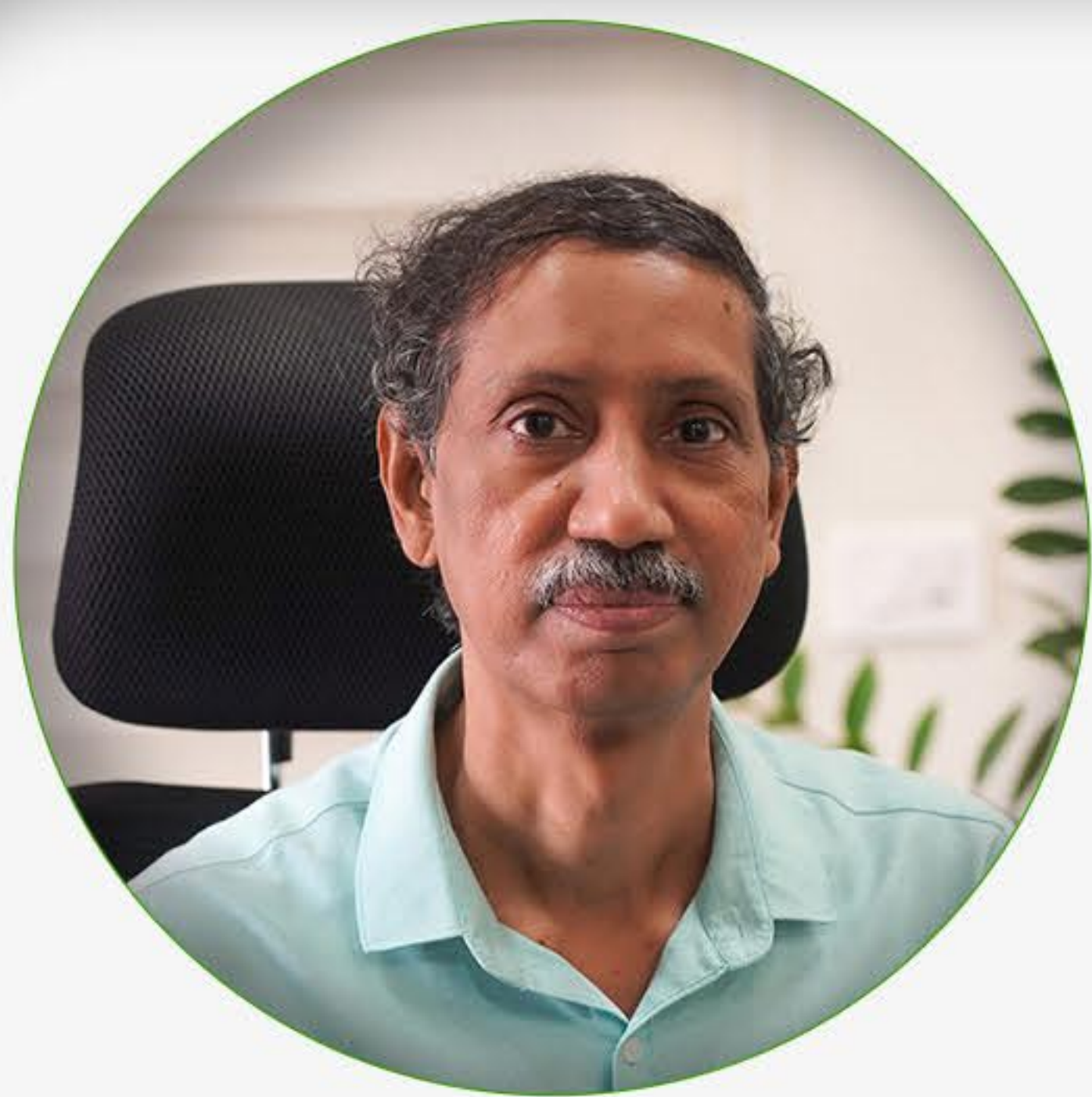
# Kaleidoscope

As IPTIF entered its third year of operations, progressing from Covid-19-impacted first couple of years, we have some amazing outputs from the initiatives we started during the past years. Year 2023 has proven to be a landmark transition phase for IPTIF in its journey towards excellence in technology innovation, entrepreneurship & skill development and industry collaborations. This gives us confidence to scale up and accelerate activities under various verticals and venture into new ways of supporting the deep-tech innovation ecosystem for taking IPTIF to new heights. We are very excited to bring you the highlights of this year in the form of this third edition of our newsletter 'Kaleidoscope'. We also extend a warm welcome to all the relevant stakeholders to reachout to us and join hands in our efforts in national building. Take a glance at our activities, innovations, and collaborations.

Volume 3, Issue 1



## Chairman's Message



### Prof. A. Seshadri Sekhar

Director, IIT Palakkad & Chairman, IPTIF

I am very pleased to know that IPTIF is launching its 3<sup>rd</sup> volume of newsletter "Kaleidoscope". I have the honor of being the Chairman of IPTIF for over an year now to witness the organization excelling in its efforts to establish a world-class technology innovation ecosystem in this region, especially in the realm of Cyber Physical Systems (CPS). With this larger vision, IPTIF's present mission is to facilitate technology development, entrepreneurship and upskilling in the field of Intelligent Collaborative Systems (ICS) with a special focus on energy and safety verticals. Our team of faculties, engineers, research fellows, entrepreneurs and startup founders associated with IPTIF are developing innovative & indigenous technologies and products in the areas of green energy, robotics, automation, structural safety etc. I am very proud to state that each of the technologies under development with IPTIF funding and mentoring support are addressing very relevant problems and challenges of today and tomorrow.

IPTIF had many landmark achievements in the year 2023 with many events, R&D outcomes, workshops and programs. IPTIF launched Samarth Maha Utsav early this year for attracting and fuelling startups for developing technologies in the area of energy & safety; conducted a stakeholder meeting at MNIT, Jaipur on "Green Powered Future"; co-sponsored a summer school on "High Performance Computing & AI Continuum"; and, very recently, launched its flagship technology funding program namely "IMPACT".

I also understand that many of the technology products supported by IPTIF have crossed the prototype stage leading to few high-value patents, few top-class research publications and award-winning conference presentations in this period. I am very proud that IPTIF has forged several notable collaborations for Industry R&D consultancy, entrepreneurship development and skill development. Few notable ones are with Bosch Automotive Electronics, Grid India Ltd and Swinburne University, Australia. IPTIF's mentoring support to its startups, Entrepreneurs in Residence (EIRs) and upskilling programs on a variety of trending technology areas for students and faculties in the region are other commendable achievements.

This issue onwards, IPTIF is also starting an expert opinion column on topics relevant to the stakeholders. I am very pleased to read the opinion piece from Dr. Vijendran, industry expert in the CPS domain & Chair Professor, IPTIF, and I am sure it will be a good read for the readers. I invite you all to go through this issue of "Kaleidoscope" and understand more about IPTIF.



## COO's Message



### Dr. Saishyam Narayanan

Chief Operating Officer, IPTIF

I joined the role of Chief Operating Officer at IPTIF in April 2023 and have taken charge of the Hub operations since June 2023. I gratefully acknowledge the funding support given to IPTIF by the Department of Science and Technology, Government of India under the National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS). I thank all the readers of "Kaleidoscope" for your wonderful response and feedback for the first two volumes. It gives me great pleasure to write this message in this capacity for the third volume of "Kaleidoscope".

Under the visionary leadership of our respected Chairman, eminent Board of Directors, enthusiastic Project Directors and vibrant Operations Team, IPTIF has expanded its footprint as a highly dynamic and growing organization in the previous year with focus on driving innovation towards new technology products from startups, innovators and academic researchers. The Hub has been providing a wonderful networking platform for the various stakeholders of innovation ecosystem, be it researchers, startups, industries, mentors, students and policy makers.

With the mission of creating an ecosystem for seamless development of cutting-edge technologies and products in the realm of Cyber Physical Systems (CPS), especially addressing challenges in energy & safety sector using intelligent collaboration of CPS components, IPTIF has scaled up its activities to impart relevant knowledge and skills to the students and innovators, support and mentor entrepreneurs & startups in the domain, create infrastructure and funding mechanisms for technologies to mature into marketable products and, importantly, bridge the gap between academia and industry for seamless collaborative activities.

In this edition of "Kaleidoscope", we bring to you all the major activities and initiatives of the past one year since the second edition and introduce to you our committed team, top-level expert advisors, vibrant researchers, new partners & well wishers in our journey. As you will see, most of our initiatives have started to bear fruits in the form of patents, publications, awards and collaborations, demanding scale-up and advancement in our activities. Keeping this in mind, IPTIF has launched its flagship national-level technology funding program, IMPACT, to attract and fuel development of more technologies from academia, startups and industries. We have many such skill development, entrepreneurship development and infrastructure development activities queued up in the pipeline in the coming months. I request all the readers to follow IPTIF on our social media and website for all the updates.

Now, I welcome you to please read this volume of "Kaleidoscope" and share your valuable feedback for our future issues. I thank all the readers for your continued support to IPTIF in our efforts to make a greener and cleaner future for our Nation.



## Expert Speaks



### Dr. Vijendran Venkoparao

Chair Professor, IPTIF & Former Head, Technology Strategy & Innovation, Bosch Global Software Technologies

## Cyber Physical Systems: Current trends, Challenges and Opportunities in India

Cyber-Physical Systems (CPS) are integrated systems engineered to combine computational control algorithms and physical components such as sensors and actuators, effectively using an embedded communication core. Examples of CPS are Smart Grid Networks, Smart Transportation System, Enterprise Cloud Infrastructure, Utility Service Infrastructure for Smart Cities, etc. Smart cities can be viewed as large-scale, heterogeneous CPSs that utilize technologies like the Internet of Things (IoT), surveillance, social media, and others to make informed decisions and drive the innovations of automation in urban areas.

The intellectual challenge in CPS is about the intersection, not the union, of the physical components and the cyber systems. This intersection combines engineering models and methods from mechanical, environmental, civil, electrical, biomedical, chemical, aeronautical and industrial engineering with the models and methods of computer science and engineering. In the past decade, the emergence of promising tools such as Enterprise Systems provided industries with solutions to improve their productivity and service quality. But today's competitive nature enforces industries to implement more recent technologies to secure their position among competitors.

Term Cyber-Physical Systems (CPS) was introduced in the year 2006 by Ellen Gill. The concept was based on the combination of cyber (computation and communication) and physical components (devices, gadgets, and systems) that can use smart computation techniques to interact with real-world objects. The concept map illustration from the cyberphysicalsystems.org (Fig.1.) is best to get a holistic picture of CPS.

Ref: <http://cyberphysicalsystems.org/>

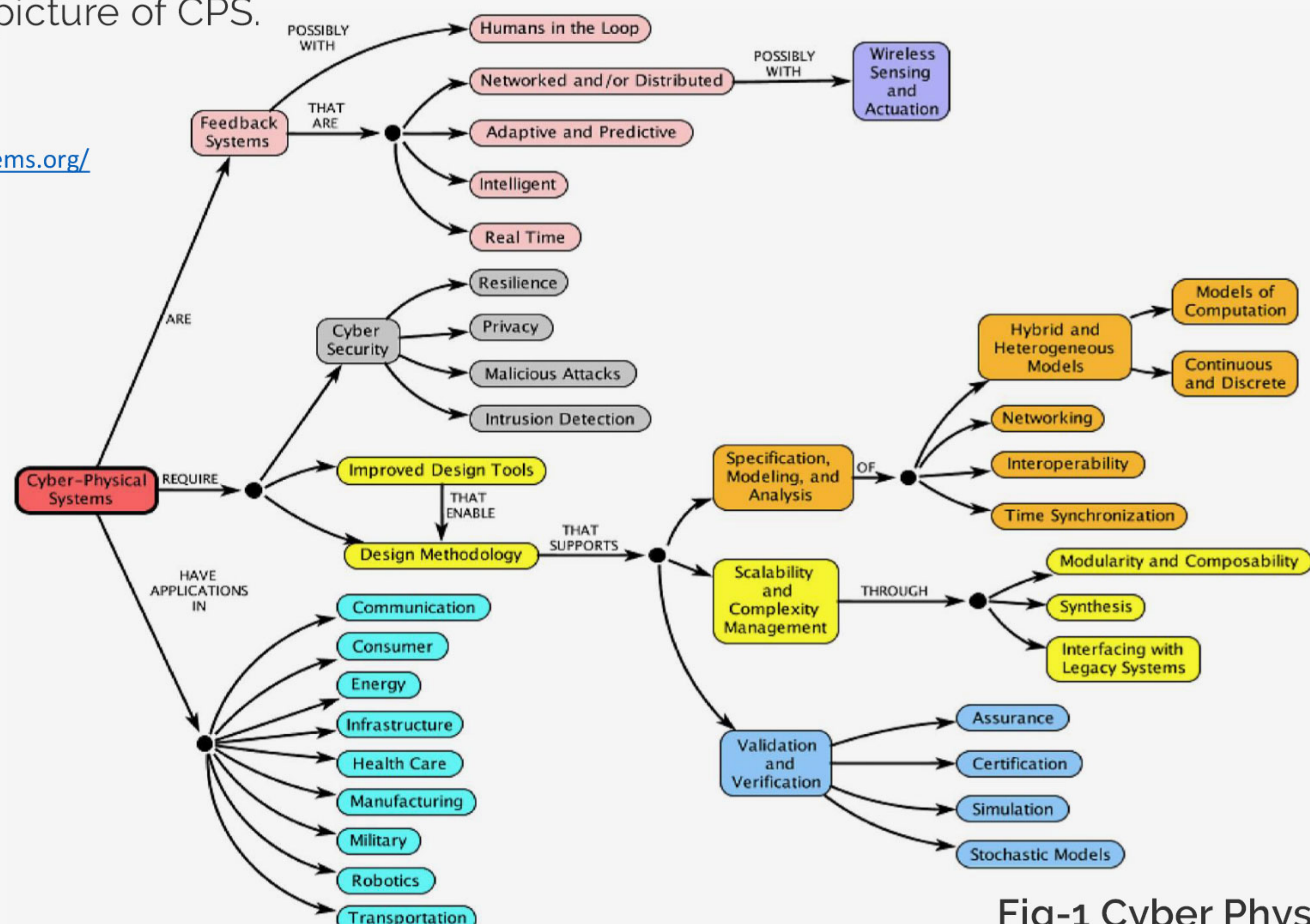


Fig-1 Cyber Physical Systems

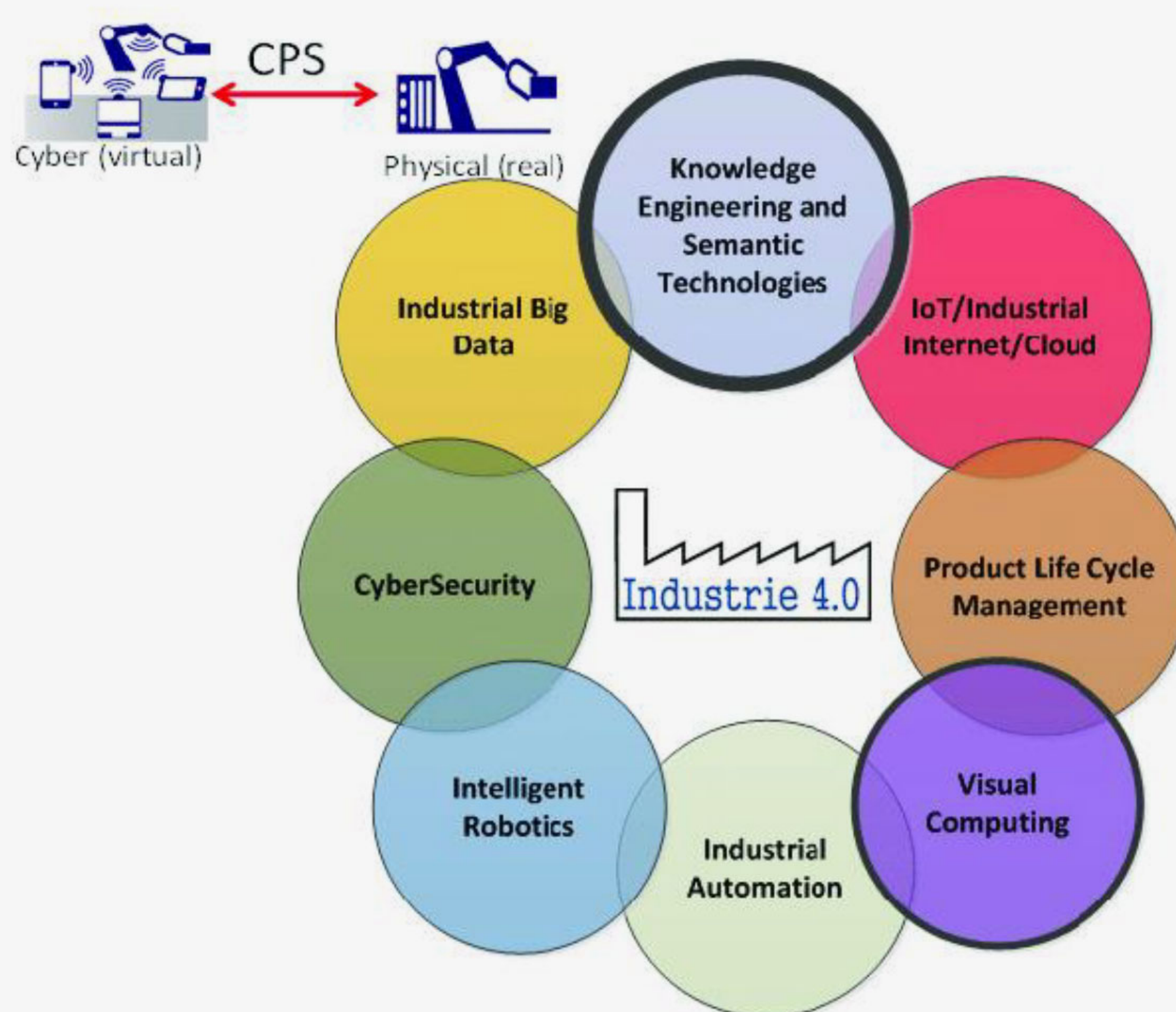


## Expert Speaks

In the past decades, advancements in Web/Internet-based systems and applications have opened the possibility for industries to utilize the cyber workspace to conduct efficient and effective daily collaborations from anywhere in distributed manufacturing environments. CPS may be viewed as having been present within the manufacturing sector for quite some time. Embedded controllers, sensor systems, collaborating robots and others may represent the early technologies. The advent of advanced communication technologies has now brought new possibilities. CPS bridges the gap between different disciplines and the notion of abstract architectural work, finds resistance as most manufacturing engineers are mechanical experts.

Applications of CPS arguably have the potential to dwarf the 20-th century IT revolution. They include high confidence medical devices and systems, traffic control and safety, advanced automotive systems, process control, energy conservation, environmental control, avionics, instrumentation, critical infrastructure control (electric power, water resources, and communications systems for example), distributed robotics (telepresence, telemedicine), defense systems, manufacturing, and smart structures.

The term Industry 4.0 (I4.0) originated from a high-tech strategy from the German government that has been funding research and development activities to improve the manufacturing efficiency adopted by other countries around the world. The (I4.0), also called the fourth industrial revolution, is a new era of industry that is centered on the extensive use of advanced resources of information and communication technologies (ICT) to improve the manufacturing processes and business, which has been known as smart factories. Fig 2 illustrates the technology collaboration in I4.0.



Technology pool in Industry 4.0 CP

Fig-2 Technology Collaboration in I4.0



**Role of Standards and interoperability in CPS:**

CPS is a classic example of a typical heterogeneous system involving interactions with different sensors, actuators, computing elements, and communication protocols. As CPS technologies continue to evolve, the need for more stringent standards and interoperability solutions is becoming increasingly important. Without unified standards, CPS systems will be unable to communicate with each other, leading to fragmentation and an inability to leverage the full potential of CPS technology.

Standardization is key to ensuring interoperability between different components of CPS. This is because standards provide a common language for communication and data exchange which can help to reduce complexity and improve the usability of these systems. Key Challenges are (a) Many CPS and IoT standards are not yet ready, (b) Open data is not widely available, (c) Availability of computing power for model training and data analysis

**Indian Context:**

One of the pioneering initiatives in the areas of CPS was undertaken by Bosch in India by setting up a research center in collaboration with Indian Institute of Science (IISc) in Bangalore in 2012 viz. Robert Bosch Centre for Cyber Physical systems. The cutting-edge research activities at this center led think tanks in the Government of India to keenly focus on realizing the true potential of CPS. This has led to a nationwide initiative on CPS namely NM-ICPS. With the massive population and area of coverage, the Indian subcontinent poses its unique challenges in the implementation of technologies around CPS. Many flagship programs are organized which have invited academia and research institutions across the country to work on the development of interdisciplinary CPS. The NM-ICPS is primarily focused on the development of cyber-physical systems to solve country-specific problems through the development of embedded systems using IoT for smart homes and services, promoting entrepreneurship, social inclusion, etc.

Current R&D activities in CPS within Indian academia is not rightly substantiated with focused competency development initiatives. There is a strong need for focused competency development initiatives in Indian academia specifically in the CPS domain. IPTIF is one of the institutions under the umbrella of NM-ICPS which is perfectly positioned to bring-in both industries and various schools/departments within IIT- Palakkad and other eminent academic institutions together to drive activities in CPS education and skill development programs, nurture new technology areas in collaboration with industry eco-systems and most importantly can take up the specific initiative on driving standards for CPS. IPTIF can become a pioneering institution developing in the areas of "Standards for CPS ". In addition, Short-term certificate courses and long-term curriculum combining engineering models and methods from mechanical, environmental, civil, electrical etc., leading to an interdisciplinary course in CPS will be most valuable under the skill development focus of the institute.





## Team updates

### Our Advisors & Experts



**Prof. Narayana Prasad Padhy**

Director, MNIT Jaipur,  
joined as Chair Professor,  
IPTIF on 1<sup>st</sup> January 2023



**Prof. Santhakumar Mohan**

Professor IIT Palakkad & Dean- ICSR  
joined as Faculty Fellow,  
IPTIF on 1<sup>st</sup> March 2023



**Prof. Ashokan Thondayath**

Professor (HAG), IIT Madras  
joined as Chair Professor,  
IPTIF on 1<sup>st</sup> August 2023

### Operational Team

Year 2023 saw the IPTIF team expanding with addition of senior operational roles and new talents to our engineering team



**Dr. Rajeswari R**

HR Manager



**Dr. Saishyam Narayanan**

Chief Operating Officer



**Mr. Ajmal K**

Senior Associate (Skill Development)

### Engineering Team



**Ms. Vidya S**



**Mr. Agney marath**



**Mr. Nandagopan K**



**Mr. Ajun Nath**



**Mr. Thomson James**



**Ms. Anjali C V**



**Mr. Avanthik Vikas**



**Mr. Aravnd K Jayan**



**Dr. Dony J Muttath**



**Mr. Jerin Peter**



**Mr. Noble A**



## Technology Development Updates

As a Technology Innovation Hub, technology /product development forms the center of all the activities undertaken by IPTIF. We are developing new products, technologies, IPs, skilled human resources and infrastructure for prototyping and testing.

### Summary of Technology Development activities

Technology Development Projects -11

Doctoral Thesis- 23

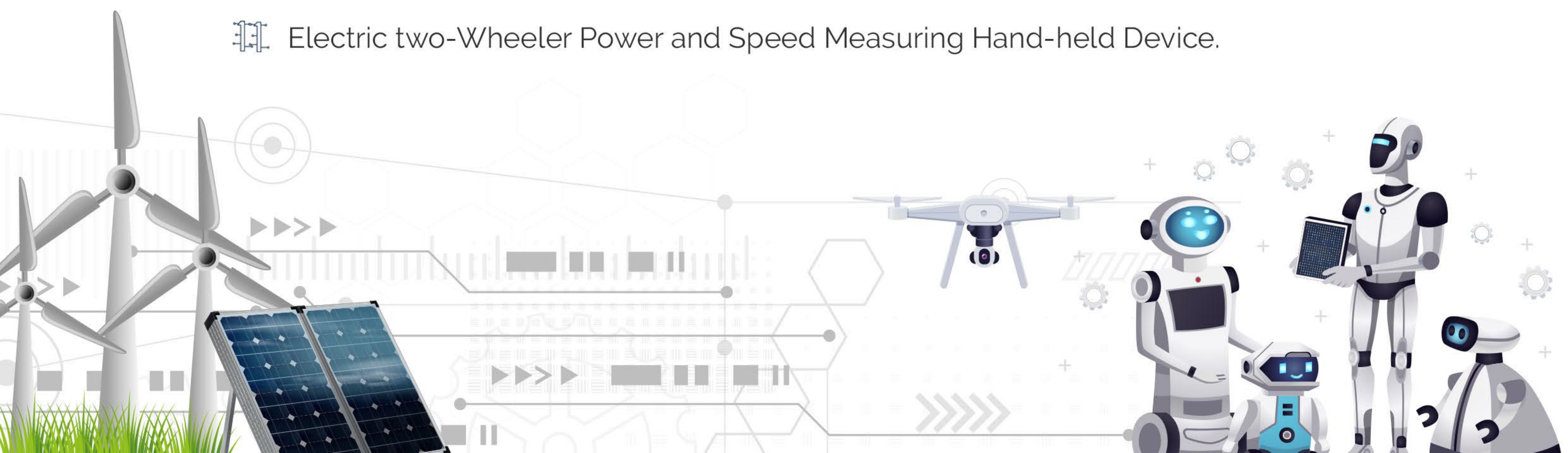
Prototypes developed- 06

Patents Filed-02

Research / Conference paper publications-09

### Inhouse Projects

- 1 Long Endurance Glider plane.
- 2 Underwater Robotics Vehicles
- 3 Multipurpose Mobile Manipulator
- 4 Real-time Monitoring and Control of Road Bridge Systems.
- 5 Aerial Dexterous Manipulators, Grasping and Transportation.
- 6 Smart Agriculture Weather Station.
- 7 A Unified Framework for Collaborative Intelligent Systems.
- 8 Distributed Estimation, Control and Implementation Architecture for Networked Robots.
- 9 Switched Reluctance Motors.
- 10 Explainable AI through Weight Space Characterization.
- 11 Electric two-Wheeler Power and Speed Measuring Hand-held Device.

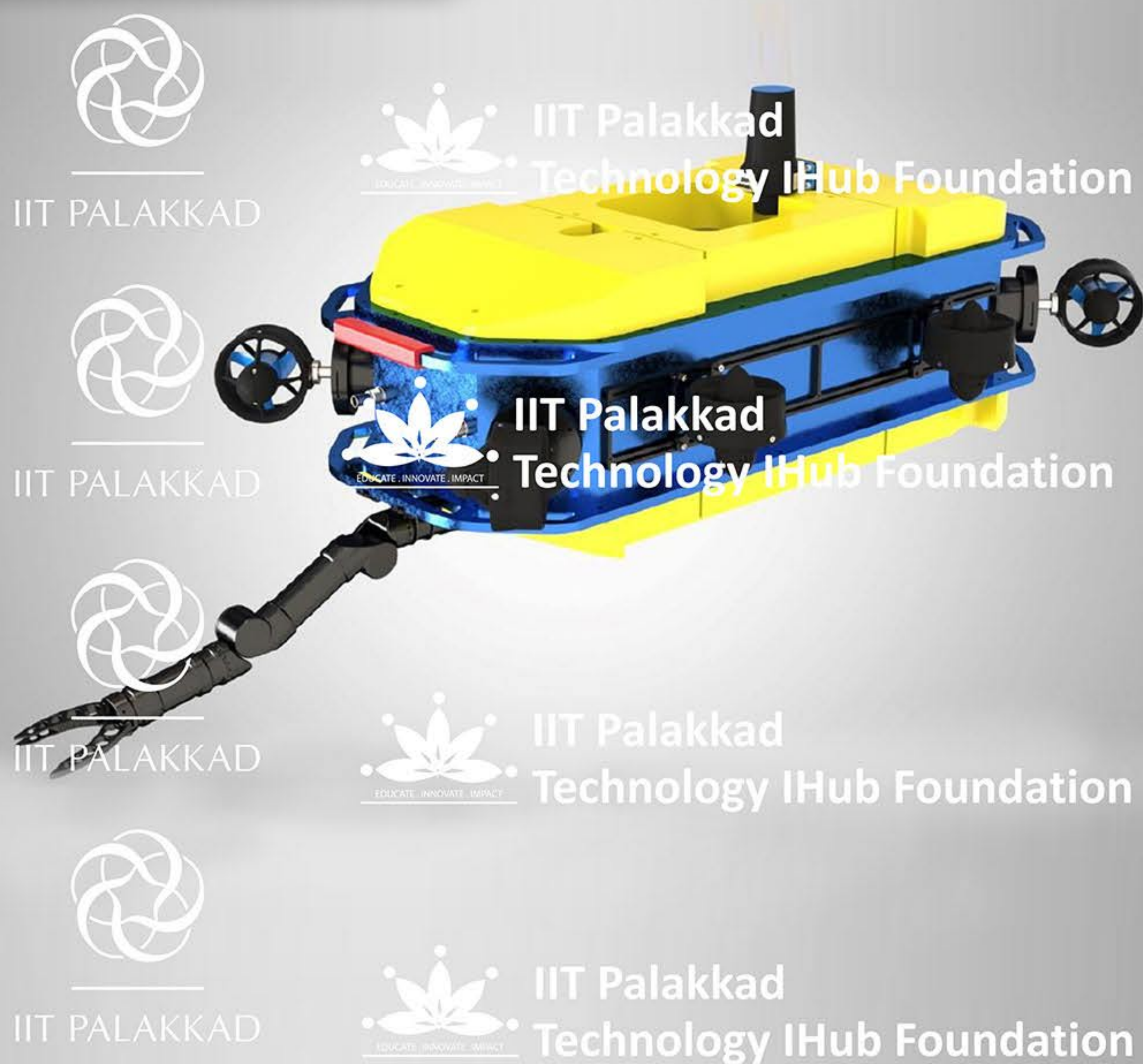




# Prototypes Developed

Underwater Robot

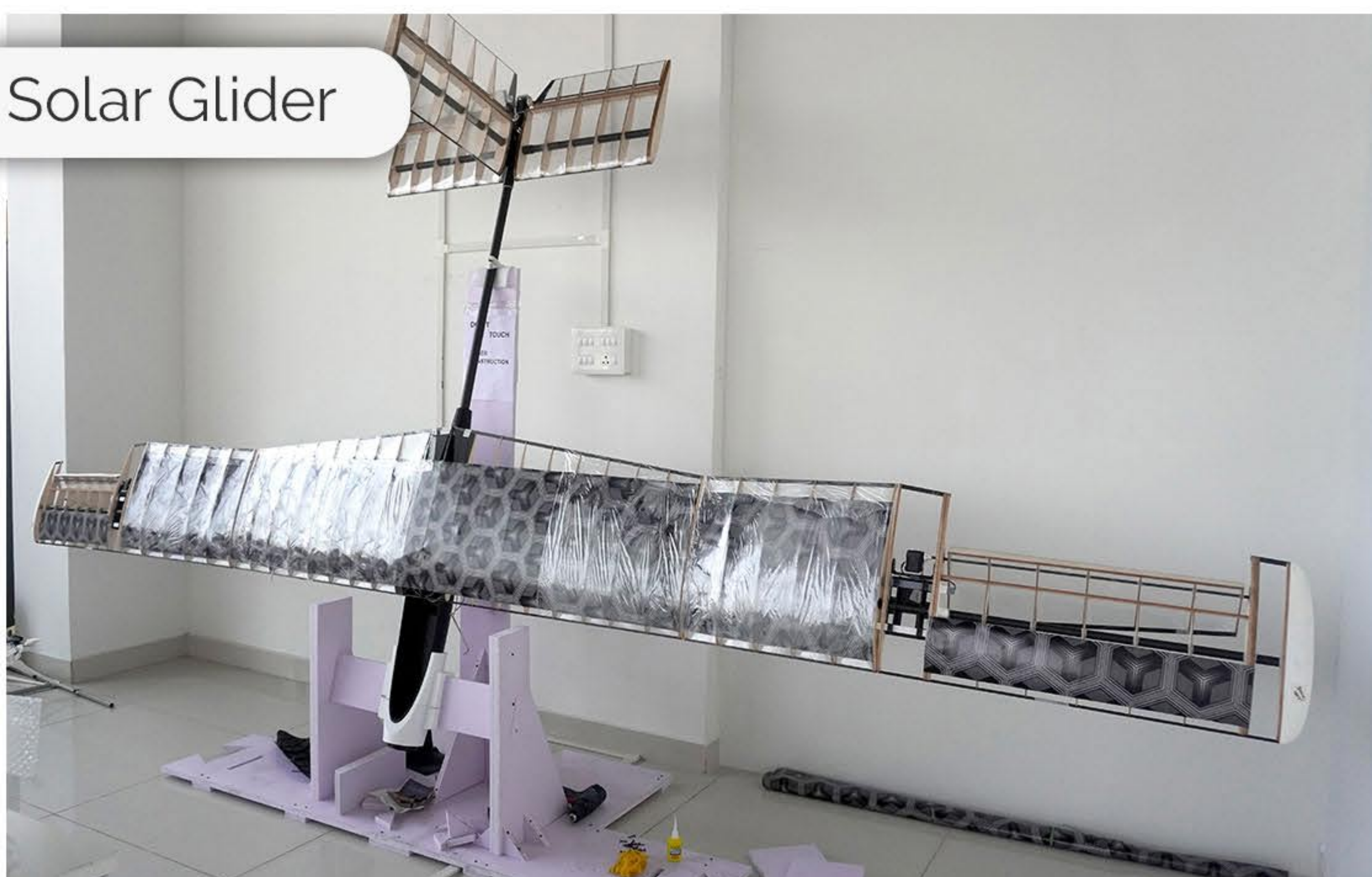
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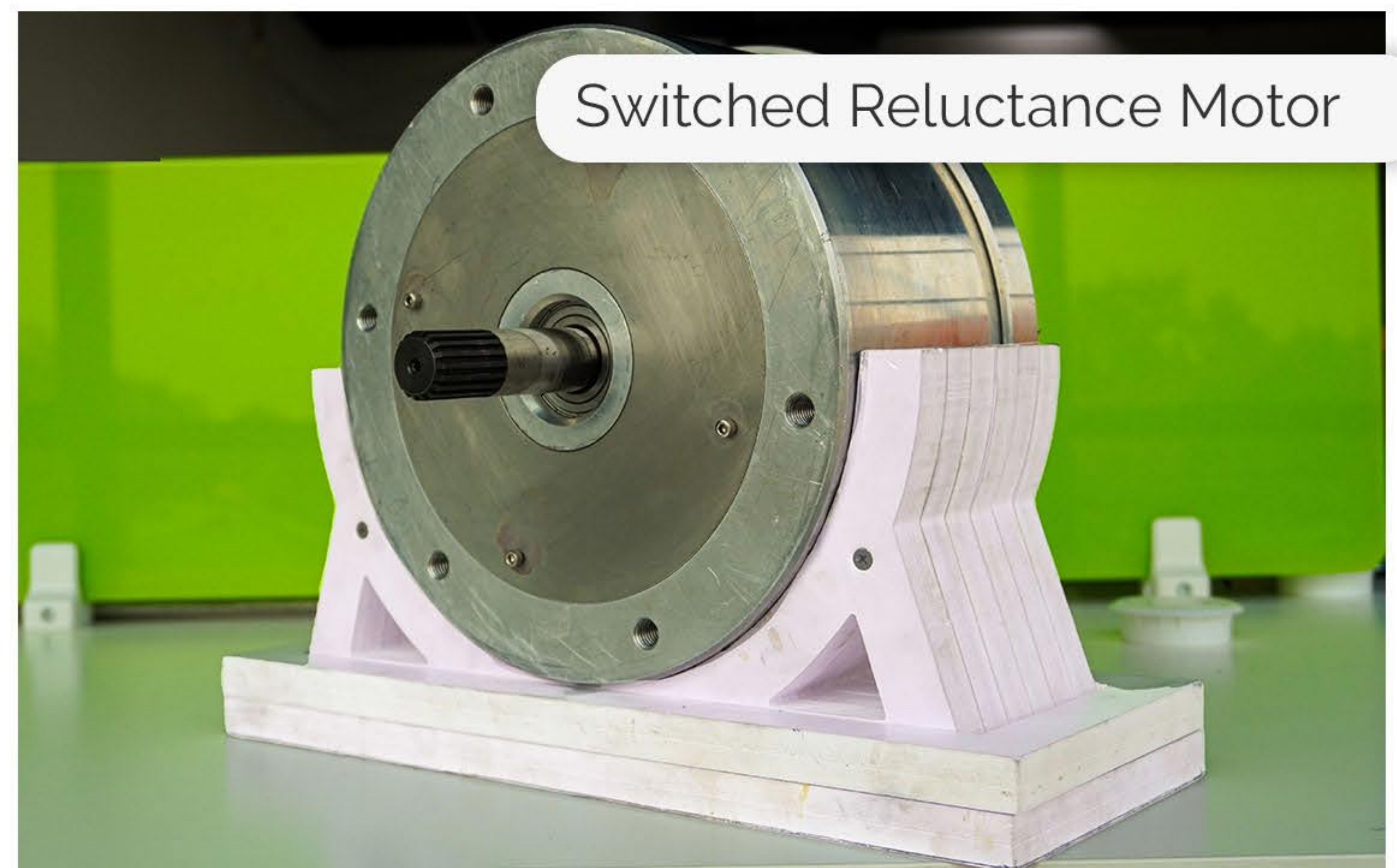
Demilitarization Robot



Solar Glider



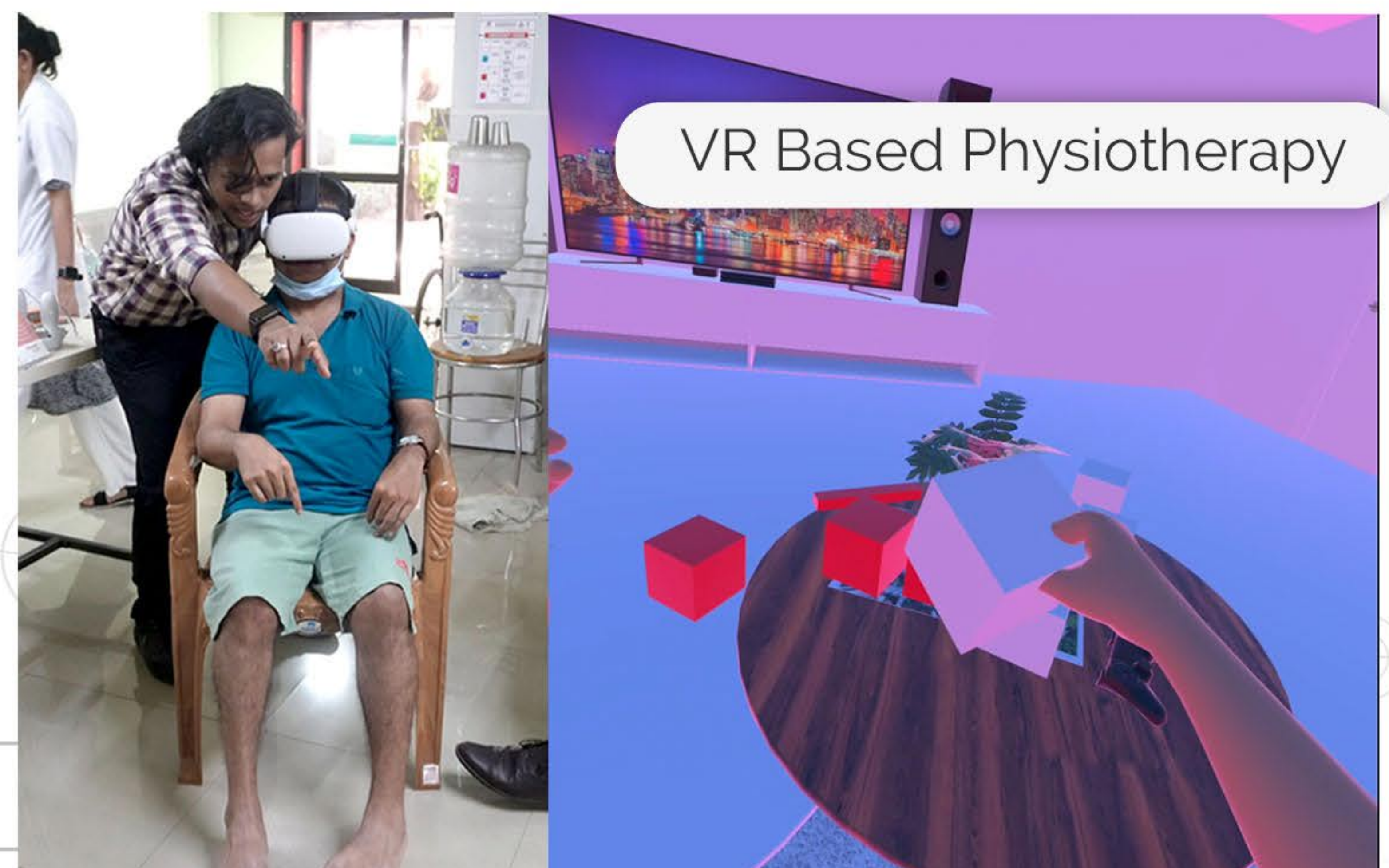
Switched Reluctance Motor



Power-Speed Measuring Device



VR Based Physiotherapy





## Patents and Publications

IPTIF filed two high-value Indian patents during this period.

■ **High efficiency glider for high altitude pseudo Satellite**

Dr. Vijay Muralidhran & Dr. Senthilvel Santhakumar

■ **Demilitarization Robot**

Prof. Santhakumar Mohan, Mr. Sandeep Kumar & Mr. Prashant Raturi

- **State estimation and control for networked control systems in the presence of correlated packet drops- in the Journal of System Science -Ayyappadas Rajagopal & Shaikshavali Chitraganti** -July 2023  
<https://www.tandfonline.com/doi/abs/10.1080/00207721.2023.2230225>  
 Kinematic and Static Modelling of a New Two-Degree-of-Freedom Cable Operated Joint -Conferenec Paper- Isaac John, Santhakumar Mohan & Philippe Wenger  
[https://link.springer.com/chapter/10.1007/978-3-031-29815-8\\_12](https://link.springer.com/chapter/10.1007/978-3-031-29815-8_12)
- **Development of a Passive Ankle-Foot Exoskeleton for Variable Force Resistance Training-In the Journal of Mechanisms and Machine Science- Avinash S Pramod, Poongavanam Palani, Santhakumar Mohan & Asokan Thondiyath** -May 2023  
[https://link.springer.com/chapter/10.1007/978-3-031-32446-8\\_16#:~:text=The%20mechanism%20is%20designed%20to,foot%20at%20variable%20resistive%20forces.](https://link.springer.com/chapter/10.1007/978-3-031-32446-8_16#:~:text=The%20mechanism%20is%20designed%20to,foot%20at%20variable%20resistive%20forces.)
- **Effect of Optimum Control Input in Seismically Excited Structure Considering Modal Control Spillover -Conference paper -S. Abhishek & Sanjukta Chakraborty** -July 2023  
[https://link.springer.com/chapter/10.1007/978-981-99-1608-5\\_30](https://link.springer.com/chapter/10.1007/978-981-99-1608-5_30)
- **IndoorRSSINet - Deep learning based 2D RSSI map prediction for indoor environments with application to wireless localization-Nibin Raj; Vineeth B. S.**-January 2023  
<https://ieeexplore.ieee.org/document/10041394>
- **Robust Motion Control of Fully/Over-Actuated Underwater Vehicle Using Sliding Surfaces" in the Journal of Intelligent and Robotic Systems-Dr. Santhakumar**-July 2023  
[https://www.researchgate.net/publication/372676653\\_Development\\_of\\_an\\_Autonomous\\_Ground\\_Robot\\_Using\\_a\\_Real-Time\\_Appearance-Based\\_RTAB\\_Algorithm\\_for\\_Enhanced\\_Spatial\\_Mapping](https://www.researchgate.net/publication/372676653_Development_of_an_Autonomous_Ground_Robot_Using_a_Real-Time_Appearance-Based_RTAB_Algorithm_for_Enhanced_Spatial_Mapping)








1<sup>st</sup> Call for proposals under

# IMPACT



Innovation-to-**M**arket **P**roduct **A**cceleration in  
Cyber Physical **T**echnologies

**IMPACT** is the flagship technology development funding program of IPTIF to support technology/product development in Cyber Physical Systems (CPS). Under this 1<sup>st</sup> call, proposals are solicited from academic/R&D institutions, technology hubs, start-ups, LLPs and industries across India for technology /product development in the field of Intelligent Collaborative Systems (ICS), addressing the existing gaps in energy, safety and other domains.

## Areas supported

-  Intelligent Collaborative Systems (ICS) for Energy
-  Intelligent Collaborative Systems (ICS) for Safety
-  Intelligent Collaborative Systems (ICS) for other domains

## Categories

-  PoC/ Prototype Development (TRL -3)  
Only for Academia and R&D Institutions
-  Technology/Product Validation (TRL 4-6)
-  DFM-Ready, Scaleup, Field implementation & Market Launch (≥ TRL-7)

**Funding Support up to ₹ 2 CRORE**

APPLY BEFORE



For Detailed Program click here  
<https://tinyurl.com/Document-IMPCT>



Click Here or Scan the QR to Apply  
<https://tinyurl.com/IPTIF-IMPACT-APPLICATION>

For Any Queries  [rnd@iptif.tech](mailto:rnd@iptif.tech) / [office@iptif.tech](mailto:office@iptif.tech)

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## IPTIF

IIT Palakkad Technology IHub Foundation (IPTIF) is a Section 8, not-for-profit company established by IIT Palakkad under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), DST, Government of India, to facilitate Technology development, Skill enhancement, Entrepreneurship and Collaborations in the area of Intelligent Collaborative Systems (ICS) with special focus on energy & safety sectors along with other domains.



## Entrepreneurship Programs at a Glance

In its effort to create an innovation ecosystem in the region that produces academic spinoffs and startups, IPTIF launched few entrepreneurship programs to support startups and innovators.

### Samarth Maha Utsav

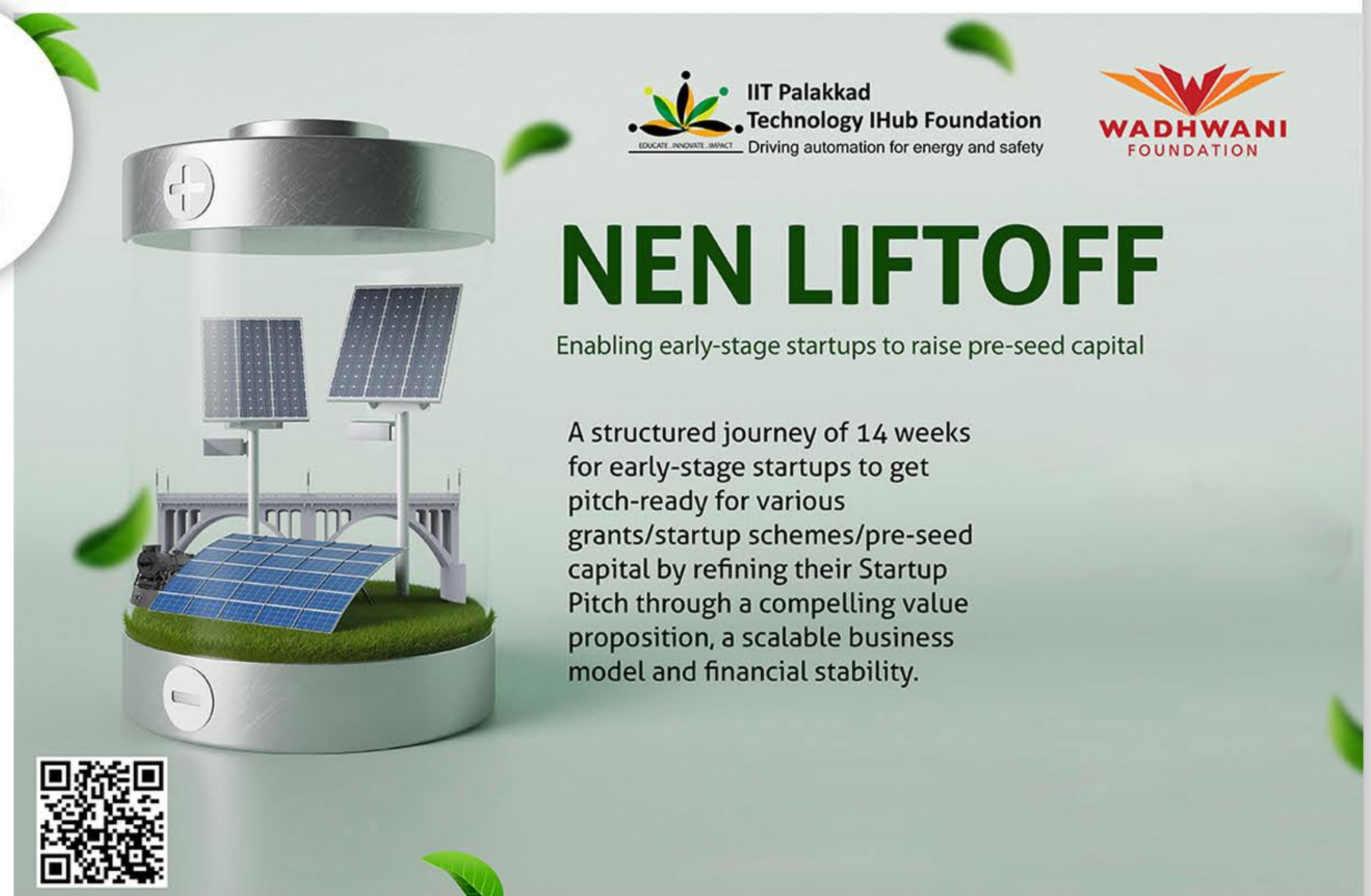
Launched on 5<sup>th</sup> January 2023  
Aim to encourage innovation in renewable energy and safety  
Received 30+ applications  
Finalized on 5 startups for further support.



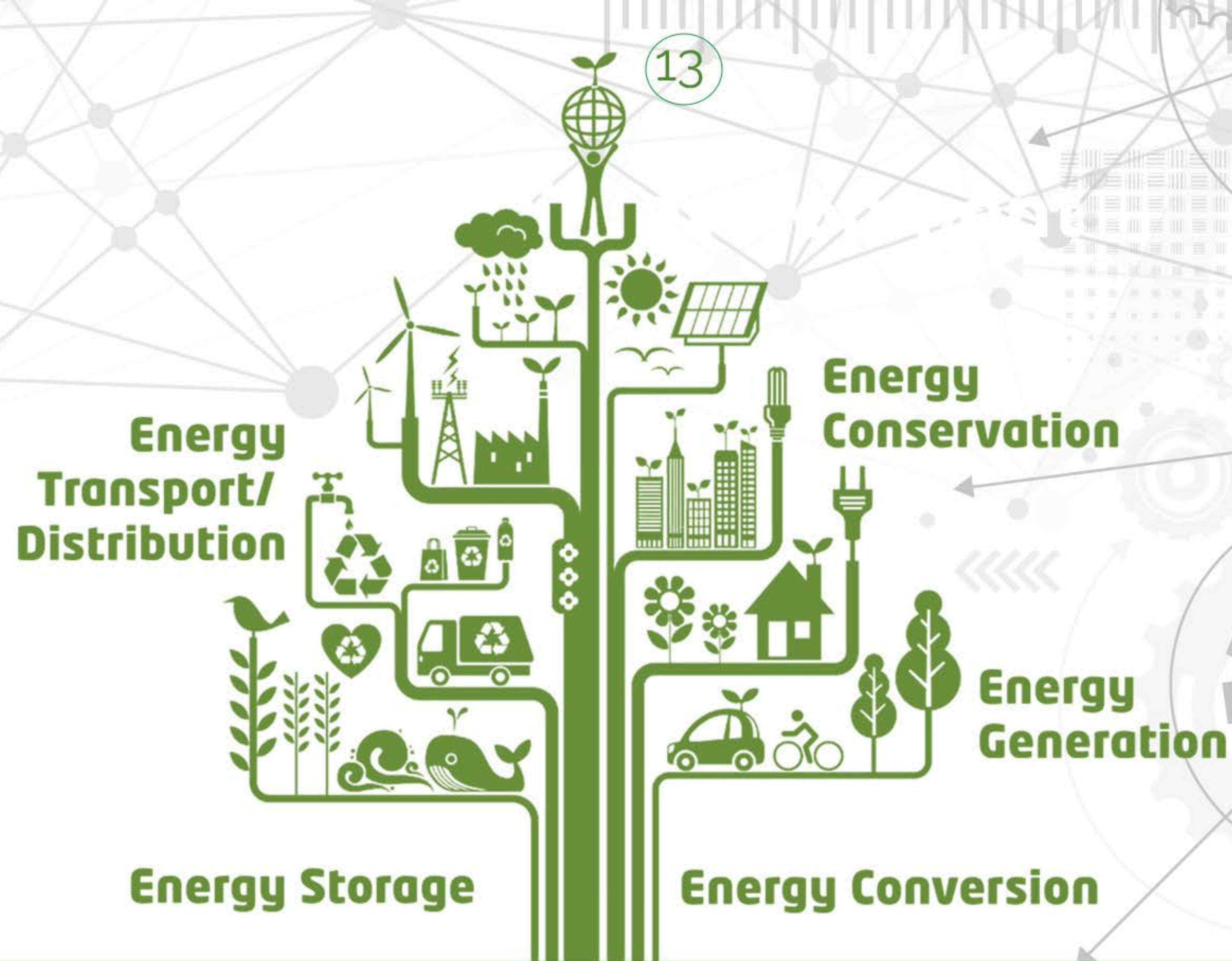
### NEN LIFTOFF – Wadhvani Foundation

7 startups from Samarth Mahotsav were taken through a 14 week full mentorship program of Wadhvani Foundation under NEN Liftoff

- Avris Environment Technologies
- Warbler Psm Pvt Ltd
- Terranxt Pvt Ltd
- Motohyb Cleanerg Pvt Ltd
- Infinityx Innovations Private Limited
- Gogreen Bioenergy India Pvt Ltd
- Golden Ray Renewable Energy







## Oorja Grand Challenge

IPTIF's Oorja Grand Challenge to boost cyber physical technology innovations in the energy domain has completed the second phase to shortlist 8 startups/innovators for further support.

### 8 Finalists

- Inaluz Private Limited
- Infinity Innovations Private Limited
- Fuselage Innovations Private Limited
- Electromove Technologies Pvt Ltd
- ARKLE Energy Solutions
- MiniMines Cleantech Solutions Pvt. Ltd
- Synod Biosciences
- Swissro



## Our Startups and Entrepreneurs in Residence (EIRs)



PVACS by Inaluz is a plug-and-play solar cleaning system



Metal-air battery-Supercapacitor hybrid for stationary and mobile energy storage



Geothermal Cooling solution



EV Battery swapping solution



VR based Physiotherapy & Stroke Rehabilitation



Invin All in One Motor Controller for EV



FIA QD10 UAS Drones for Precision Agriculture



Vanadium Redox Flow Battery (VRFB)



Wireless Control of Automobile Devices



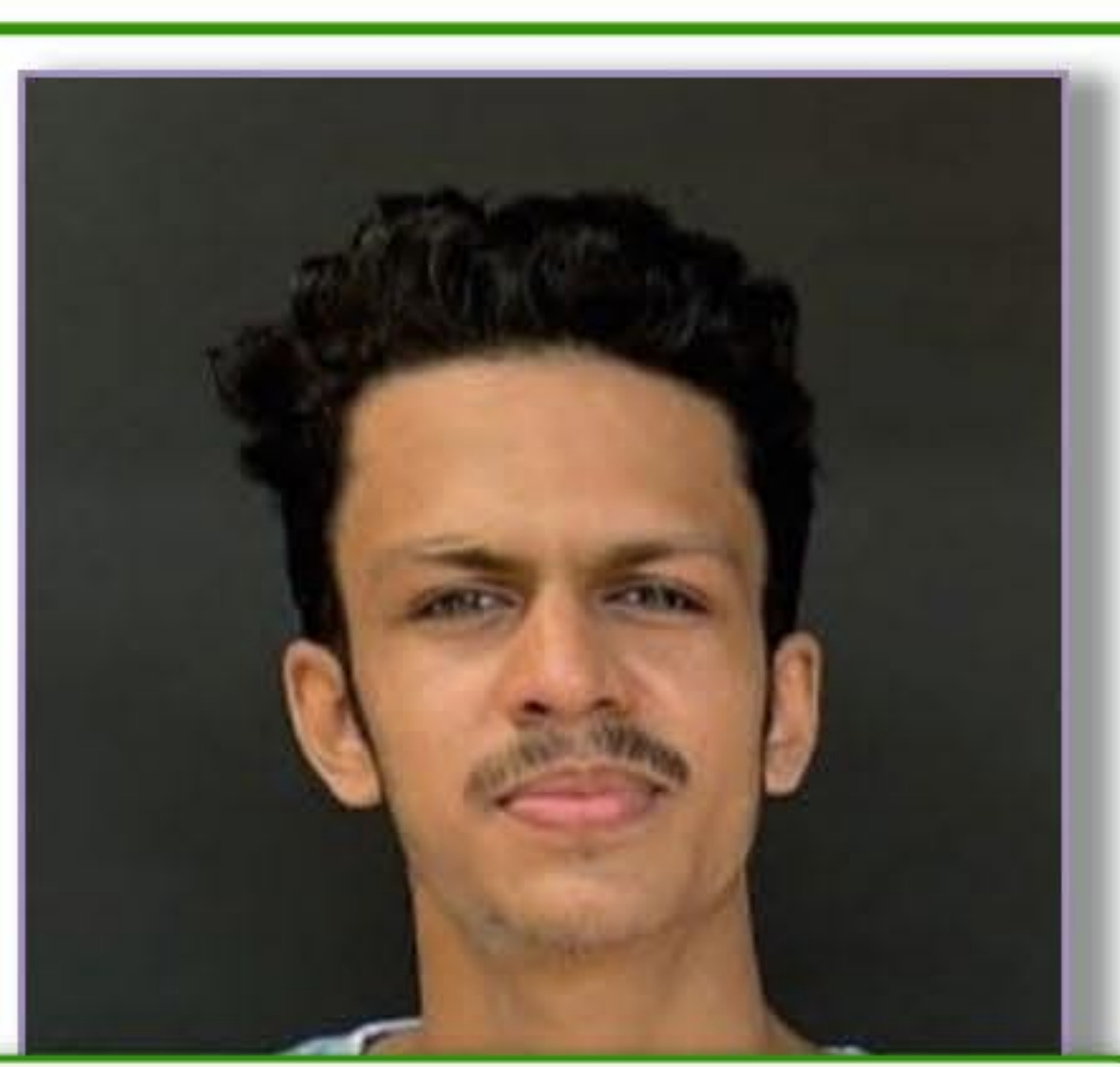
Biochar Machines- Biomass to Charcoal

IPTIF onboarded three more EIRs under EIR 2.0 for technical and entrepreneurship mentoring



**Mr. Vimal Kumar CR**

Wireless Control of Automobile Devices.



**Mr. Abeedar M A**

Hybrid Energy Source for IoT Nodes.



**Mr. Govinda Hari Sonawane**

Low Cost Bio-Charcoal Machine.



## Skill Development Activities

IPTIF is committed towards upskilling human resources on the latest skill sets relevant to technology development & industry in CPS, Energy, Safety and associated domain areas. IPTIF is adding more and more modules and training partners to the list to scale the skill development activity. In the year 2023, we added 20+ new iTREND centers to disseminate and host our skill development activities in different geographies.



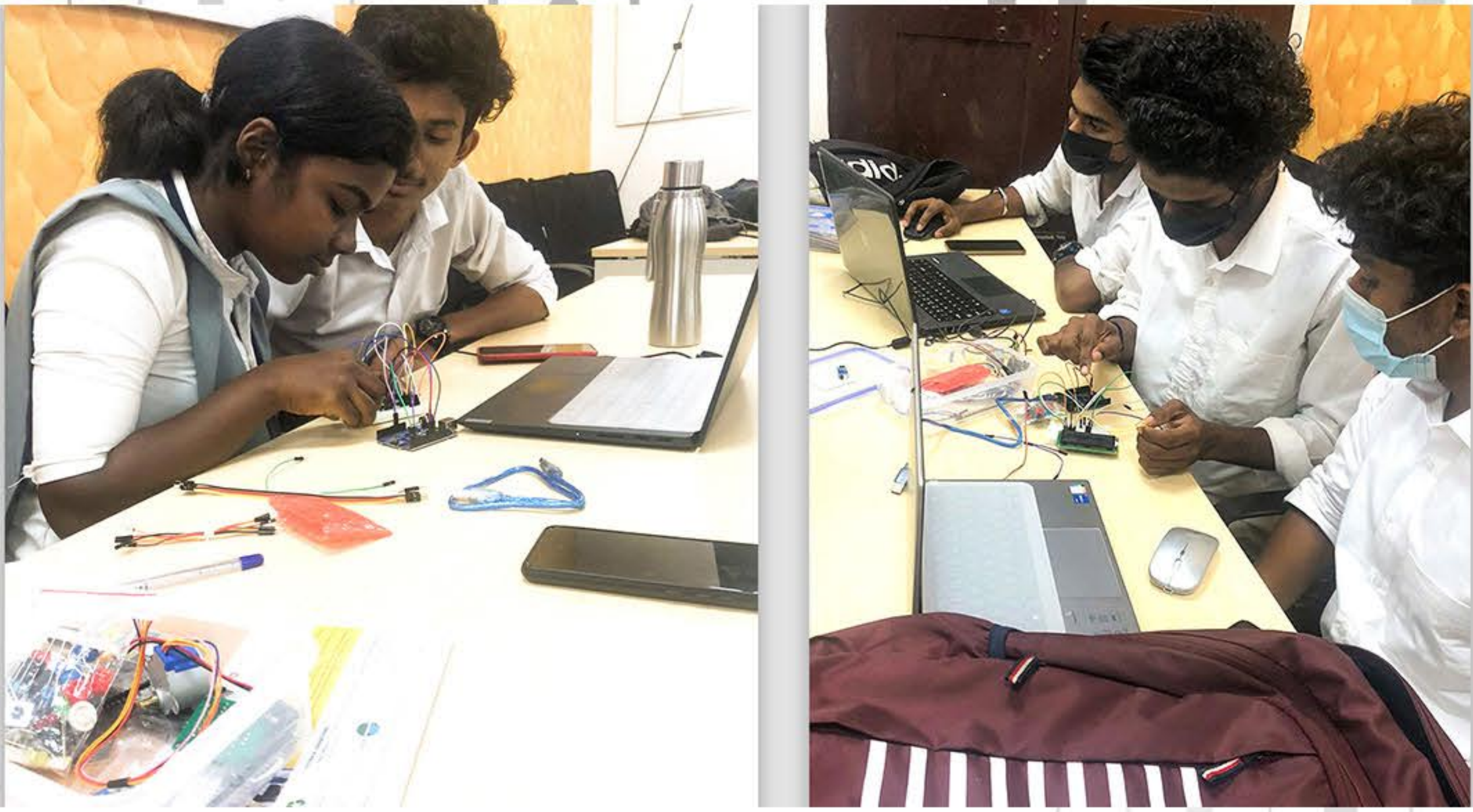
Technology Research Entrepreneurship Development Centre

## List of new iTREND centers

- Nehru Institutions (Kerala & Tamilnadu).
- SNS Institutions, Chennai, Tamilnadu.
- Viswajyothi College Of Engineering, Muvattupuzha, Kerala.
- Sreepathy College Of Engineering, Koottanad, Kerala.
- SSM Polytechnic College, Tirur, Kerala.
- Jai Shriram Engineering College, Tirupur, Tamilnadu.
- MES College Marampally, Kottayam, Kerala.
- Lead College Of Management, Palakkad, Kerala.
- Govt. Engineering College, Palakkad, Kerala.
- EASA College, Coimbatore, Tamilnadu.
- NSS College Of Engineering, Palakkad, Kerala.
- Jyothi Engineering College, Cheruthiruthy, Kerala.
- Govt Polytechnic College, Palakkad, Kerala.



## Technology Skill Development Workshops



Embedded Intelligence With Jetson Nano and Metaverse Experience conducted for Muthoot Institute of Technology and Science Varikoli, March and April 2023. 60 plus students participated.



Unlocking the potential of AI using Jetson Nano Exploring the Connected World - Introduction to IoT and Embedded System Design conducted at Providence College of Engineering & School of Business, Alappuzha during May and June 2023. 50 students participated.



Training programs conducted in deploying machine learning models on an edge device conducted for Toc H Institute of Science and Technology, Kochi on 24<sup>th</sup> March 2023. 28 students participated.



Training programs conducted in Embedded Intelligence with Jetson Nano in Muthoot College 26<sup>th</sup> to 28th April 2023



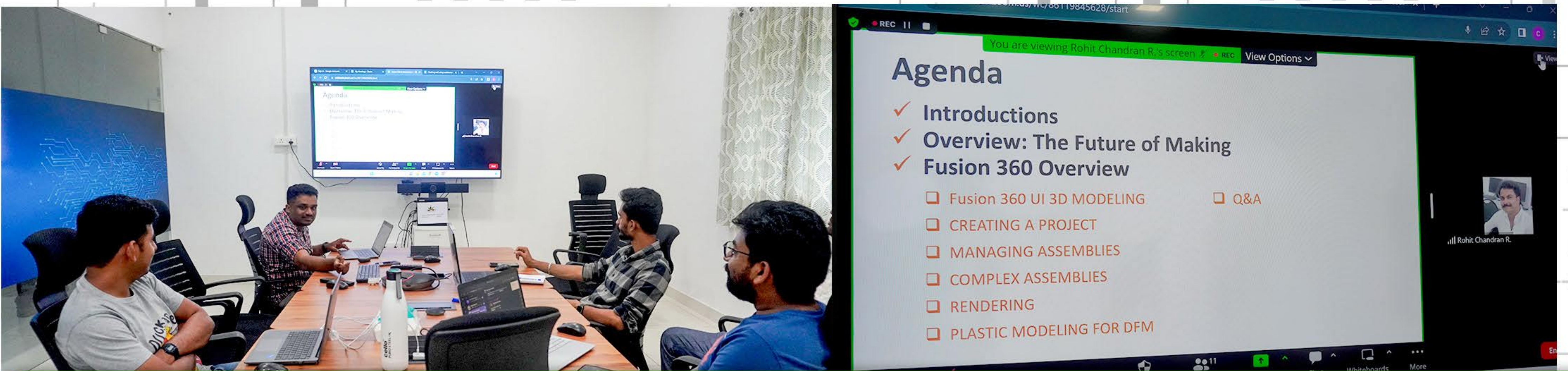
One of our flagship skill development programs is hands-on training experience at our FAB Lab.



## Technology Skill Development Workshops



Multiple Fab lab training programs were conducted for batches of students from Vimala College, Thrissur and Govt. Polytechnic College Palakkad during the period of May to July 2023. .



Autodesk Fusion 360 Training by Mr. Rohith Chandran, Bimlabs Global for IPTIF Project Engineers.



ISO9001 Training program Conducted for IPTIF Employees



## Visitors

IPTIF welcomed and hosted many eminent personalities and well wishers during this period. Few important visitors are below



Dr. Ramchandran & Mr. Parvees along with Dr. Vijendran from Bosch Automotive Electronics visited IPTIF to discuss collaboration.



Prof. Rajesh Gupta, Founding director of the Halicioğlu Data Science Institute, Distinguished Professor of Computer Science and Engineering at UC San Diego & renowned expert in the Cyber Physical Systems domain visited IPTIF and interacted with our team.



Dr. Akhilesh Gupta, Senior Advisor, DST, Govt of India and Secretary, SERB visited by IPTIF team.



## Visitors



Dr. Manesh Thomas,  
CEO of Manipal-Government of Karnataka,  
Bioincubator, visited IPTIF.



Prof. Ashish Gosh, Project Director,  
IDEAS-TIH, ISI Kolkota Visited.



Mr. Debanand Singdeo,  
Senior Engineer Mathworks at IPTIF office.



Team from Canadian Embassy Visited IPTIF.



## IPTF Events & Workshops

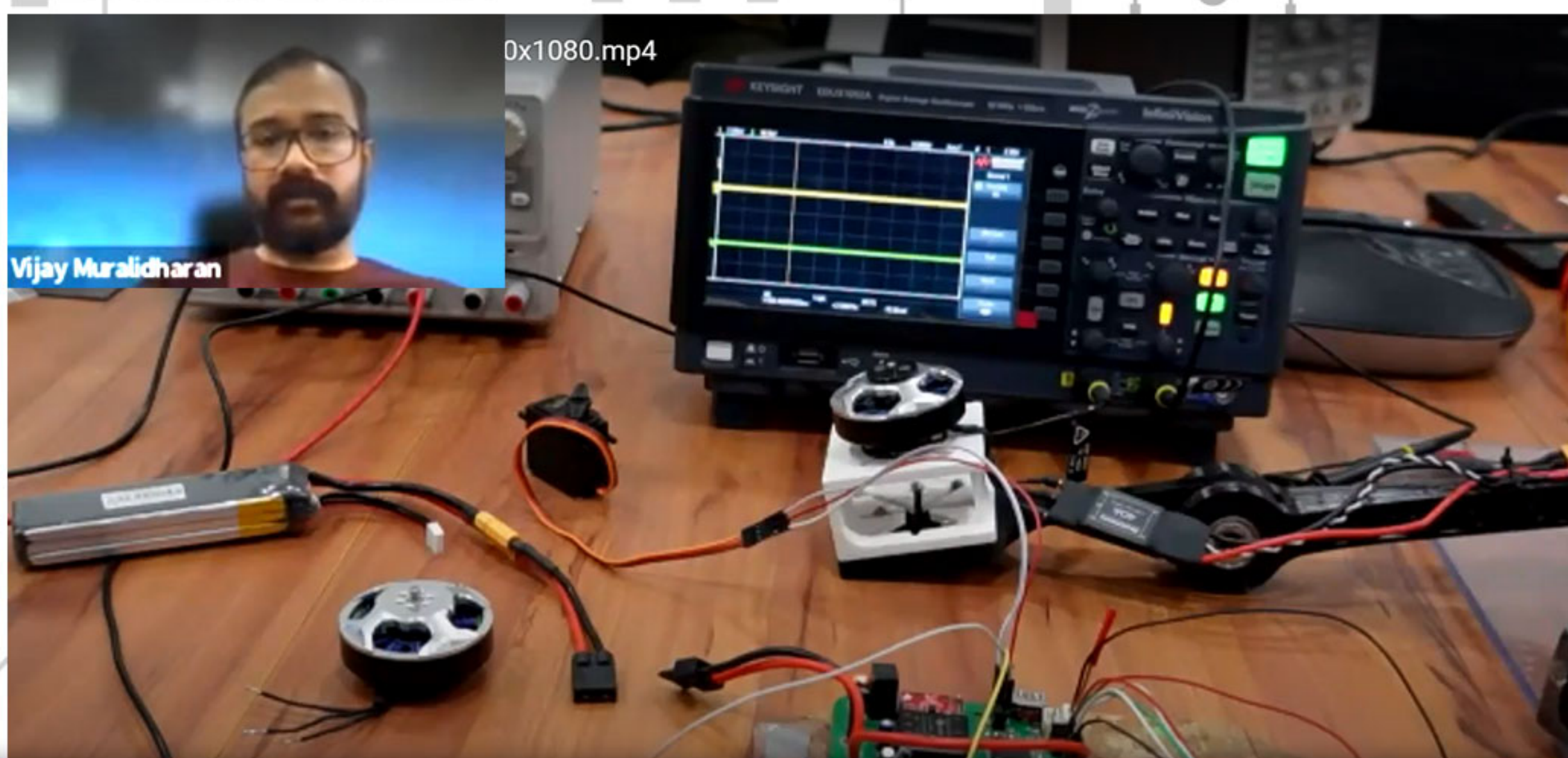
IPTIF organized few high-profile events and workshops as a platform to share the knowledge and impart new skills





IPTIF organized an industry oriented "Green Powered Future" stakeholder workshop in collaboration with the Department of Science and Technology, Govt. Bureau of Energy and Efficiency, Ministry of Power, IIT Roorkee, and MNIT Jaipur on 8<sup>th</sup> and 9<sup>th</sup> May 2023 at MNIT Jaipur.



IPTIF Co-Sponsored a 11-day ACM Summer School along with National SuperComputing Mission (NSM) at IIT Palakkad during June 2023. 37 students participated and IPTIF selected the best 5 students for AGNI UG Fellowships.



A month-long Monsoon webinar series namely 'ElectroSkies' was conducted in hybrid-mode on different topics related to drone design for students, young entrepreneurs and innovators between 3<sup>rd</sup> & 26<sup>th</sup> July. 70+ registered participants attended the webinar

**IIT Palakkad**  
Technology Hub Foundation

### Electro Skies

*IPTIF's Monsoon Webinar Series*  
— From 3<sup>rd</sup> July to 26<sup>th</sup> July 2023 —

<p>Selection of Drone Components Dr. Vijay Muralidharan (Assistant Professor, IIT Palakkad)</p> <p>Inertial Measurement Unit Based Orientation Estimation Mr. Vijaya Kumar Reddy (PhD student, IIT Palakkad)</p> <p>Mathematical Modeling and Control of Wheeled Mobile Robot Dr. Vijay Muralidharan (Assistant Professor, IIT Palakkad)</p> <p>Mathematical Modeling and Control of Drone Mr. Vijaya Kumar Reddy (PhD student, IIT Palakkad)</p>	<p>03 July 2023 Basics of Aerodynamics in fixed wing Aircraft/Glider &amp; Software Simulation Demo Dr. Senthilvelu Sankar Kumar (Senior Research Engineer, IPTIF)</p> <p>05 July 2023</p> <p>10 July 2023 Intro to Brushless DC Motor and RC Servo Motor Dr. Vijay Muralidharan (Assistant Professor, IIT Palakkad)</p> <p>12 July 2023</p> <p>17 July 2023 Image Processing in Python Dr. Vijay Muralidharan (Assistant Professor, IIT Palakkad)</p> <p>19 July 2023</p> <p>24 July 2023 Mathematical Modeling and Control of Robot Arm Dr. Vijay Muralidharan (Assistant Professor, IIT Palakkad)</p> <p>26 July 2023</p>
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Each webinar in the series will be streamed through a Zoom Meeting at 4 PM to 5:30 PM

**Registration Link :** <https://tinyurl.com/Monsoon-WebinarSeries>

+91 9744830804    upskill@iptif.tech    www.iptif.tech



## IPTF Events & Workshops



IPTIF partnered in organizing Technova 2023, an all Kerala Technology Showcase events for Polytechnic Students, at Govt Polytechnic College, Palakkad during 12<sup>th</sup> March 2023. 240 plus students participated.



IPTIF conducted a 2-day Summer camp on Robotics & soft skills during May 2023. 12 students participated in this program



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

# 10

## HOUR

online training programme

### WORKSHOP ON OPENSEES FOR STRUCTURES UNDER EXCITATIONS



**Dr. Sanjukta Chakraborty**  
Assistant Professor, Civil Engineering  
IIT Palakkad



From **24<sup>th</sup>** to **26<sup>th</sup>**  
**February 2023**



Scan the QR



Scan the QR



10 Hour online Workshop on the topic "Opensees for structures under Excitations" on 24<sup>th</sup> to 26<sup>th</sup> February 2023, 11 students Participated



## Awards and Recognitions

5 ACM summer school participants were awarded **IPTIF AGNI Fellowships** based on their performance in summer school and interview

**Mr. Srikar Racharla**

Amrita Vishwa Vidyapeetham

**Mr. Harsh Somvanshi**

PES University

**Ms. Sakshi Takale**

Indian Institute of Technology  
Hyderabad

**Mr. Adithya R**

Amrita Vishwa Vidyapeetham

**Mr. Bhudagam Devichand**

Indian Institute of Technology Kharagpur

A new Indian patent filed for  
**"High-efficiency glider designed for high-altitude pseudo satellites"**

**IIT Palakkad**  
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### New Indian Patent Filed on

**"HIGH EFFICIENCY GLIDER FOR HIGH ALTITUDE PSEUDO SATELLITE"**  
by IPTIF and IIT Palakkad.

**IPTIF Congratulates the Inventors**



**Dr. Vijay Muralidharan**

Assistant Professor  
Electrical Engineering, IIT palakkad

**Dr. Senthilvel Santhakumar**

Senior Research Engineer, IPTIF

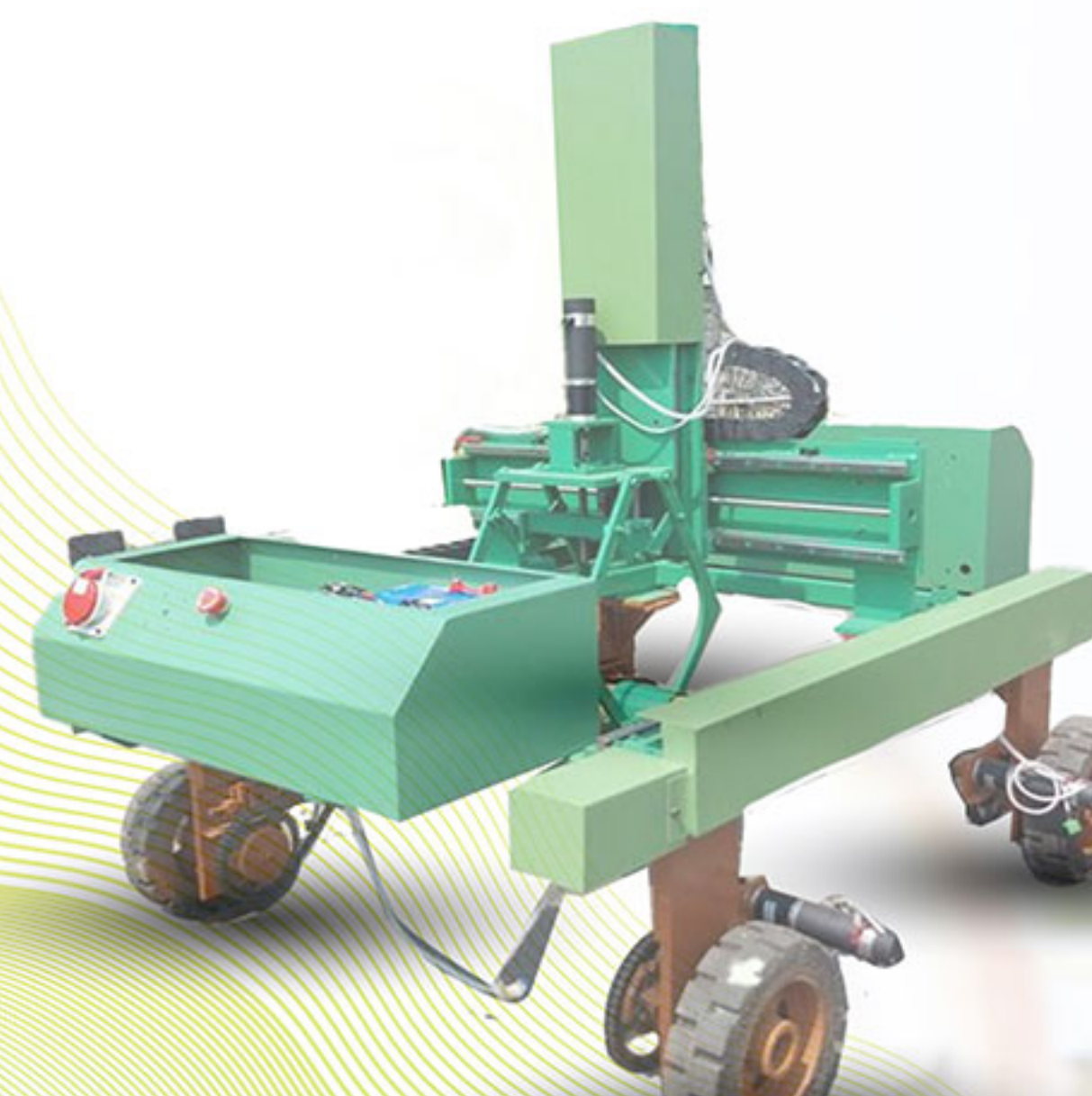
A new Indian patent filed for the  
**"DEMILITARIZATION ROBOT"**

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



### New Indian Patent Filed on

**"DEMILITARIZATION ROBOT" by IPTIF**  
**IPTIF Congratulates the Inventors**



**Prof. Santhakumar Mohan**

Faculty fellow, IPTIF & Professor  
Mechanical Engineering, IIT palakkad

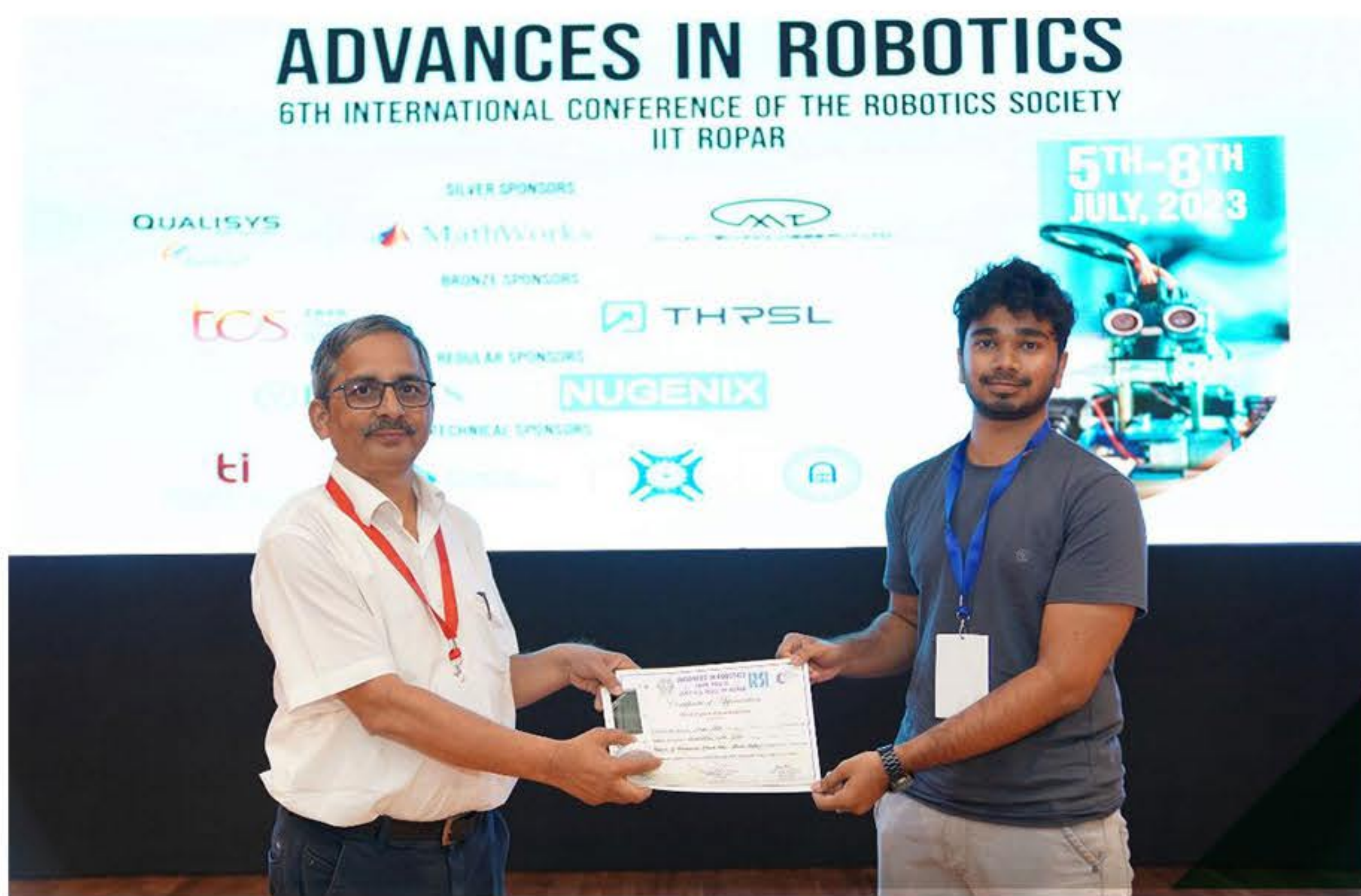
**Mr. Sandeep Kumar & Mr. Prashant Raturi**







- Best Paper Presentation Award to Dr. Mervin Joy & Mr. Jerin for their paper titled "Development of autonomous ground robot using areal time appearance based algorithm for enhance mapping" at the 6<sup>th</sup> International Conference of the Robotics Society, Advances in Robotics-2023 held at the Indian Institute of Technology Ropar from 5-8<sup>th</sup> July 2023.



- Mr. Jerin Peter, Our project engineer won first prize with a cash award in Swadarsh 23 Competition organized by C-DAC, Thiruvananthapuram and TiHAN, IIT Hyderabad for his innovative project on building a service robots



- Best Paper Award to Mr. Avinash S Pramod, Doctoral Fellow, IPTIF for his paper titled "Development of a passive ankle-foot exoskeleton for variable force resistance training" presented at the International Workshop on New Trends in Medical and Service Robotics 2023 held at Craiova University, Romania.





## Our Collaborations

IPTIF forged collaborations with few academic institutions, industries and ecosystem partners during this period for R&D, skill development and entrepreneurship development



**BOSCH**

Bosch Automotive Electronics Pvt Ltd



IPTIF signed a five year R&D partnership MoU with Bosch Automotive Electronics Pvt Ltd to work on Industry relevant problem statements on automation & automotives

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SWINBURNE  
UNIVERSITY OF  
TECHNOLOGY

IPTIF is collaborating with IIT Palakkad, IIT Madras & Swinburne University, Australia in a Collaborative International project "Responsible AI for Net Zero – An Australia and India Collaborative Approach towards Practice, Governance and Ethics in Energy Futures" sponsored by Australia-India Cyber and Critical Technology Partnership, Department of Foreign Affairs and Trade (DFAT), Australia

IPTIF has signed an MoU with the Southern Regional Load Despatch Centre (SRLDC)- Grid-India





## Cherishing moments at IPTIF



Women's Day:- celebrated with colourful events by empowering women employees at IPTIF on 8<sup>th</sup> March.

Environmental day observed on 5<sup>th</sup> June 2023, by distributing samplings to staff and taking the earth protection oath.

Independence Day observed by a stand up meet to give respect to nation on 15<sup>th</sup> August 2023



Onam celebrations:- Cultural festivals increases employee bonding. Onam celebrated with colourful events like pookalam making and other onam games On date 24<sup>th</sup> august 2023





## Team IPTIF



## Future Plans

- Solar/Smart Grid/EV/Robotics Training Programs
- Skill Development Modules
- UG & PG fellowships
- PRAYAS Call
- Entrepreneurship Sessions
- Innovation/Startup Festival
- Collaborative Workshops
- Certified training & Faculty Development Programs

## Editorial Team

Dr. Saishyam Narayanan  
 Dr. Rajeswari R  
 Mr. Akhil Prakasan  
 Mr. Vishnu Narayanan M