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# IIPE MANUFACTURING NEWS

Monthly Newsletter of the Indian Institution of Production Engineers

Editor-in-chief
Dr. K. Gopalakrishnan

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***Prof. R. M. Vasagam,*** *National Chairman, IIPE* ***Dr. Wooday P Krishna,*** *National President, IIPE*

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# IIPE-VISTAS Chapter of IIPE Inaugurated at

## Vels Institute of Science, Technology and Advanced Studies (VISTAS), Chennai

Inauguration of IIPE –VISTAS Students Chapter held on 08 February 2023 at Vels Institute of Science, Technology and Advanced Studies Welcome address delivered by Dr. V. Muthuraman, Professor and In-charge of IIPE, Department of Mechanical Engineering (DoME), VISTAS. Dr. R. Thirukkumaran, Head R&D, INGUs Knowledge Academy (P) Ltd., Chennai has made Theme presentation on “Industry 4.0”. Dr. R. Sridhar, Associate Professor/DoME, VISTAS has announced office bearers.


Secretary: Sudeesh Babu Kota, III Yr. Mech
Treasurer: Srinath. S, III Yr. Mech & Joint-Secretary: Abhishek Kumar Pandey. M, II Yr. Mech


# Cubes in Space™

## NASA Space Experiments: Cambridge School, KR Puram has been Selected based on Intent to Fly Form (IFF)

### "Cubes in Space" Team of 2 Teachers and about 5-8 Students of Cambridge School

**TEACHER/EDUCATOR:** Mr. **Prashanth Fernandes** (prashantfernandes06@gmail.com)

**SPACE EXPERIMENT TITLE:** Influence of microgravity on enhancing curcumin content in Curcuma longa L., commonly known as turmeric, a rhizomatous herb of the family Zingiberaceae **(Area: Agricultural Biology)**

As a part of the 75 Students' Satellites Mission and related activities in brand-building for the participating schools and institutions, ITCA is working with **Cambridge Team, Mentored by CIT** and submitted proposals for the **"Cubes in Space"**, a global competition offered at no cost for students 11-18 years of age to design and propose experiments to launch into space or a near space environment on a NASA Sounding Rocket and Zero-Pressure Scientific Balloon. For more details: https://www.cubesinspace.com/

***What is the need/justification for conducting the experiment in a space or near-space environment?***

Enhanced curcumin, which is a more concentrated form of curcumin than what is found in natural turmeric, has been studied for a variety of potential health benefits. Some of the ways that enhanced curcumin may be useful include:
Anti-inflammatory properties: Curcumin has been shown to have potent anti-inflammatory properties, which may help to reduce inflammation and pain in conditions such as arthritis, colitis, and other inflammatory disorders.
**Brain Health:** Curcumin may help to improve cognitive function and protect against neurodegenerative diseases such as Alzheimer's and Parkinson's.
**Heart Health:** Curcumin may help to improve heart health by reducing inflammation, lowering cholesterol levels, and improving blood vessel function.
**Cancer Prevention:** Curcumin has been shown to have anticancer properties and may help to prevent the growth and spread of certain types of cancer cells.

# Annual Report on Activities of IIPE Student Chapter of AVCCoE

A.V.C COLLEGE OF ENGINEERING
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The IIPE STUDENT'S CHAPTER of Mechanical Engineering Department, A.V.C College of Engineering, Mayiladuthurai organized Technical Competitions like Technical Quiz, Technical Talk and Mr.Lathe from 09.05.2022 to 12.05.2022 for the welfare of IIPE Student members.

| Sl. No | Date | Program | Program Head | No. of Students Participated |
|---|---|---|---|---|
| 1 | 09.05.2022 & 12.05.2022 | Technical Quiz (Preliminary Round & Final Round) | Mr. P. Yeganarayanan & Mr. T. Karthikeyan | 40 |
| 2 | 10.05.2022 | Mr. Lathe | Mr. S.S. Nivas & Mr. K. Sivaramakrishnan | 30 |
| 3 | 11.05.2022 | Technical Talk | Dr. C. Swaminathan & Mr. T. Karthikeyan | 14 |
| 4. | 05.04.2022 | Application of CAD/CAM Software's | Mr. R.Omprakashan, proud CADD Centrian, Engineer, Tech Speaker,Team Builder, Business Support Engineer, Myiladuthurai | 85 |
| 5. | 07.12.2021 | Introduction to Computational Fluid Dynamics and it's Applications | **Dr. P. Padmanathan,** Assistant Professor (Senior), Department of Thermal and Energy Engineering, School of Mechanical Engineering, Vellore Institute of Technology, Vellore | 122 |

# TECHNICAL QUIZ COMPETITION held at AVC College of Engineering, Mayiladuthurai


**RESOURCE PERSON DELIVERING HIS PRESENTATION**

# Era of Small Satellites: Pico, Nano and Micro Satellites (PNM Sat): BIG Applications

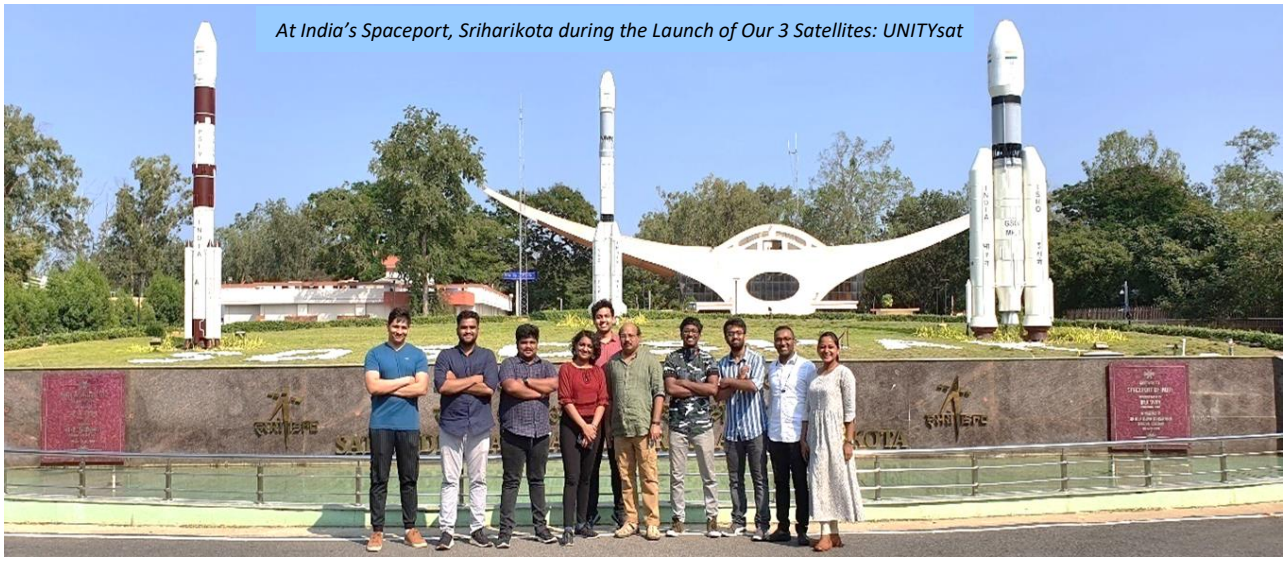
**Dr. K. Gopalakrishnan[1], Dr. Cyril Prasanna[2], Dr. Girish[3]**

*[1]Secretary General, Indian Technology Congress Association, Project Director, 75 Students' Satellites Consortium: Mission 2022 and Professor Emeritus, Cambridge Institute of Technology, Bangalore; [2]Director, CCCIR, CIT; [3]Associate Professor, Dept of ECE, CIT*

## Abstract

Every nation small or big is aspire to launch their own satellite to space and wish to provide an opportunity to their scientists/students in such a way to encourage them to continue the space research. For majority of the nations and academic institutions including leading research universities, it is still a distance dream! Out of 10,000+ Higher Educational Institutions (HEIs)/Universities, in India, hardly, 12 HEIs. This presentation highlights the opportunities opened up globally during the Space 2.0 Era and need for the Pico, Nano and Micro Satellites (PNM Sat) as a frugal way to access the space and sustain space research by academic institutions and many small nations in a frugal way! These Small Satellites have BIG applications due to the contemporary technological advancements, smaller components with superior capabilities at affordable cost!

**Keywords:** Pico, Nano and Micro Satellites (PNM Sat), CanSat, PocketQube, CubeSat, UNITYsat



*At India's Spaceport, Sriharikota during the Launch of Our 3 Satellites: UNITYsat*

## Introduction

The first man-made object that was launched into space was the Sputnik-1 satellite [1] in 1957. That was fascinating and appealing for all humankind and escalated the Space Race [2], consequently developing technologies and bringing attention to space science around the globe. Space become more accessible and open not just for governmental space agencies and huge companies, but for universities and other educational institutions in recent years. Technologies and devices have a tendency of becoming smaller in size and more powerful in performance (an ideal example is the Smartphone industry). A similar development has occurred in small satellite design, they have decreased in size as well as becoming more standard in their build-up. This trend was introduced by the California Polytechnic State University and Stanford University as CubeSat in 1999.

***CubeSat*** *concept introduced by Bob Twiggs and Jordi Puig-Suari in 1999*

- *small (10x10x10 cm, 1 kg: Picosatellite)*
- *low cost*
- *short development time*
- *ideal for education*
- *involvement in all phases of Space project*

## Cube Satellite (CubeSat)

***Classification/Category of Satellites (Based on Weight)***

a) *Minisatellite (100–500 kg)*
b) *Microsatellite (10–100 kg)*
c) *Nanosatellites (1 -10 kg)*
d) *Picosatellites (100 gm-1 kg)*
e) *Femtosatellites (10-100 gm)*

It is a cubic-shape satellite identified by the number of units. One unit, more commonly known as 1U, is a cube with a volume equivalent to the one litre and a side-length of 10 cm. By merging a few cubes on top of each other, the variety of sizes increases (1U, 2U, 3U, 6U…). Satellites can be categorised by their mass. The one with a mass below 1 kg is a Pico satellite, which is very often a 1U CubeSat (by default the mass of each unit should not exceed 1.33 kg), or a PocketQube (0.25U). The majority of launched or built CubeSats consist of NanoSatellites with a mass of 1-10 kg.

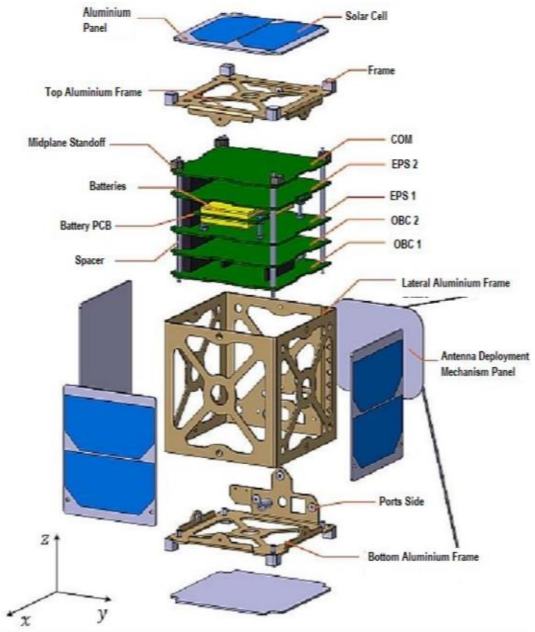
## Applications of Satellite Programmes:

ISISpace has been working on training next generation scientists and engineers, performing small scale science missions or planning a novel application using a globe-spanning constellation etc. Potential space applications are listed below *(but not limited to the following) [3]*:

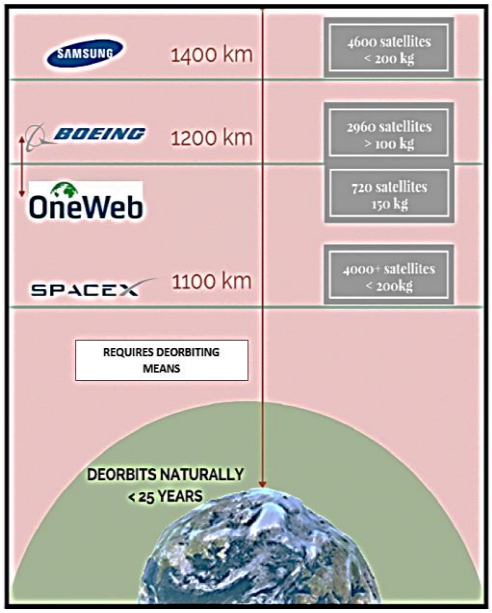
1. ***Earth Sciences:*** *NanoSatellites for better understanding of our own planet*
2. ***Ship Tracking Services:*** *Near real time vessel tracking using satellite-AIS*
3. ***Aircraft Tracking:*** *Keeping track of aircraft on a global scale using ADS-B*
4. ***Space Research:*** *Small scale astronomy and exploration missions*
5. ***Climate Monitoring:*** *Network of satellites to monitor climate change*
6. ***Earth Observation:*** *Provide real-time imaging capability with satellite swarms*
7. ***Agriculture Monitoring:*** *Improve crop production using remote sensing data*
8. ***Microgravity Research:*** *Use the space environment to gain new insights*
9. ***Pipeline Monitoring:*** *Monitor critical infrastructure using satellites*
10. ***Signal Intelligence:*** *Use small satellites to ensure the security of our nation*
11. ***Education and Training:*** *Train the next generation scientists & engineers*
12. ***Telecommunications:*** *Provide global connectivity using small satellites*
13. ***Technology Validation:*** *Test your latest technologies on-board a small satellite*

***Nano Satellites (NanoSat)***

- *First CubeSats launched in early 2000*
- *By now: > 800 NanoSatellites launched*
- *Record in 2017: 104 on a single PSLV launcher*
- *Exponential increase in recent years*
- *Standard deployers important*
- *XPOD, P-POD, ISIPOD, Nanoracks (from ISS)*
- *Standardized launcher interfaces*
- *Initially mostly 1U, 2U, 3U CubeSats*
- *Trend to larger NanoSatellites 6U, 8U, 12U*
- *NanoSatellite classification 1…10 kg mass*




**Exploded View of 1 U Cube Sat**




**Upcoming Satellites Large Constellations @ LEO [4]**



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1. Origin of the Sputnik project, http://www.russianspaceweb.com/sputnik_origin.html, (visited 31.03.2020)
2. Elizabeth Howell, Sputnik: The Space Race's Opening Shot, 2012, http://www.space.com/17563-sputnik.html, (accessed August 7, 2016)
3. https://www.isispace.nl/ *(accessed 31.03.2020)*
4. NanoSatellite database by Erik, Figures: CubeSat type. http://www.nanosats.eu/index.html#figures. *(accessed 31.03.2020)*


*CIT has Successfully Integrated Class Room Satellite Training Kits for 75 Satellites Consortium! CIT is the Knowledge Partner for Training Puneeth Satellite Team!*

## R&D Team of CCCIR/CIT has Visited PRAGYA Automobile Factory for Electrical Vehicles…

***Dr. Cyril Prasanna**, Director, CCCIR, **Dr. Shankar**, Principal Scientist, CCCIR and **Dr. K. Gopalakrishnan,** Emeritus Professor, CIT and **Dr. Y. Muralidhar Reddy** have visited the PRAGYA Automobile Factory at Hoskote Industrial Estate on 16 May 2023 and explored the possibilities of Collaborative Initiatives in the area of Electrical Vehicles and marketing the CCCIR's innovative "Nano Powder" which revive and enhance dead batteries life again!*

## IIPE National Secretary at Deftronics & Spacetronics 2023



India Electronics and Semiconductor Association (IESA) has kick started two-day Spacetronics and Deftronics 2023 on May 25, 2023 at Hilton Convention Centre, Embassy Manyata Tech Park in Bengaluru and attended by **Dr. K. Gopalakrishnan, National Secretary, IIPE**. The conference and exhibition has brought together over 500+ participants from the public and private sector showcasing cutting-edge technologies and promoting collaboration to drive the growth of the strategic electronics in space and defence sector.


## R&D Team of CCCIR/CIT-IIPE Team has Visited Si2 Microsystems and Explored Collaborative R&D

**Dr. Cyril Prasanna Raj** Director, CCCIR, CIT and **Dr. Y. Muralidhar Reddy** have Visited to Si2 Microsystems, Whitefield on 25th April, 2023


Si2 Microsystems (Si2) delivers turnkey Systems and SiP solutions by integrating System & Chip design capabilities with Manufacturing Technology. Si2 support a global customer base requiring commercial, military and space applications. Over 150 employees globally support their SiP and system manufacturing facilities and design centers. Si2 offers the convenience of a "One Stop Shop" from design to product, encompassing systems engineering, prototyping & packaging and manufacturing for international markets. The formidable knowledge base of the company is in the areas of: ASIC / FPGA development, System in Package (SiP), PCB Design and fabrication, Electronic assembly, Microelectronics, Sub- systems design and complete systems design.

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- Microcontrollers
- Drone Technology

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25th May 2023 to
12th June 2023

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Dr. G. Indumathi, Principal-CIT

**Coordinator IDEA Lab**
Dr. S. Shankar, Professor

**Co-Coordinator IDEA Lab**
Dr. Cyril Prasanna Raj, Professor

# Dr. K. Gopalakrishnan, National Secretary, IIPE at 14th Graduation Day of T. JOHN Institute of Technology, Bangalore


Dr. K. Gopalakrishnan, National Secretary, IIPE has delivered the Graduation day address as Chief Guest at 14th Graduation Day of T. JOHN Institute of Technology, Bangalore held on 24 May 2023


IN-SPACe

ASTRONAUTICAL SOCIETY OF INDIA

UNISEC INDIA
University Space Engineering Consortium

***IIPE Chapters interested in Launching Their Own Satellites or to establish the UNISEC India Chapter at Their Institutions can contact: Dr. K. Gopalakrishnan, National Secretary, IIPE at profgoki@yahoo.com or M: 98451 73730***

### India- Israel Partnership

- Innovation, Robust Technology Base, Disruptive Technologies
- Academic Research to Products and Solutions
- Approach to Outreach Educational Programmes – Industry & Institute
- Mastered in Space Technology
- Strong in Communication, Observation Science and EducationInternational Co-operation, Bilateral Agreements with India including Student
- Exchange Programmes and Joint Projects
- Funds - Grants, Soft Loans etc

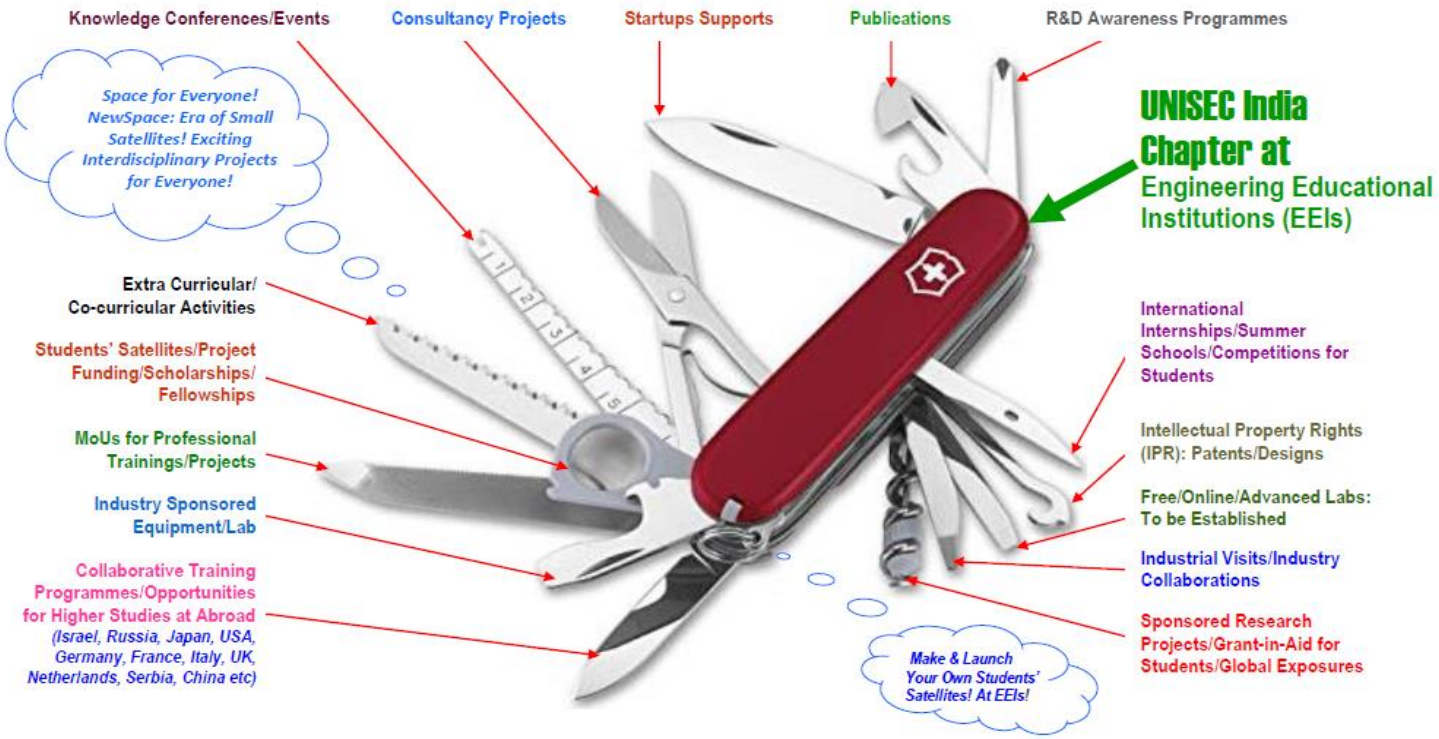
### How Institutions Can Engage

- Build Strong "Space Technology" Competencies
- Hands on Development Experience- Students and Faculty Members
- More Industry Interaction (Real Time)
- State-of-the-art Technology Interventions
- Create New Job, Start-ups and Incubation facilities
- Nurture Future Space Engineers/Scientists
- Technology Demonstration - S&T Research
- Support Education Outreach
- Make Students Future Career Ready

**UNISEC India:** Secretariat @4th Floor,#3, First Main, BDA Layout, Kodihalli, HAL 2nd Stage, Bengaluru – 560008, Karnataka, India;
**Contact Info:** +91 80 6559 2501, +91 80 4850 8380; Website: www.unisec-india.in

## BENEFITS OF UNISEC INDIA CHAPTER AT EEIs

*Become a Member! Smartly Avail the Unlimited Opportunities! Globally!*

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## *Benefits of Professional Bodies Chapter at EEIs: Including the Students' Chapters at CIT Which Provide Network to Achieve the Following:*

***Publications***

- Research Papers: Published in Journals (With ISSN/Impact Factors etc)
- Research Papers: Published in Conference (Proceedings with ISBN)
- Books
- Monographs/White Papers
- "h" Index of Each Faculty
- "I 10" Index

***Intellectual Property Rights (IPR)***

- Patents
- Trade Marks
- Geographical Indications
- Layout-Designs of Integrated Circuits
- Industrial Designs
- Trade Secrets
- Copy Rights (rights of authors of literary and artistic works including Computer Programmes)

***Sponsored Research Projects/Grant-in-Aid***

***Consultancy Projects***

***Industry Sponsored Equipment/Lab***

***Free/Online/Advanced Labs: Established***

- Students/Faculty Activities

***R&D Awareness Programmes***

***Extra Curricular/Co-curricular Activities***

- Establishing Chapters of Professional Societies/Trade Bodies
- Enhancing Team Activities/Interpersonal Skills etc

***Emerging Trends Watch: Alternative Teaching & Learning***

- Innovations/Patents/Video Watch etc

***Industrial Visits/Industry Collaborations***

- Arranging Industrial Visits/Field Training of Faculty/Students at Industries
- B.Tech and M.Tech Mini-Major Project/Dissertation Work at Industries
- Collaborative Training Programmes/Credit Courses
- Companies to Take Students for Learn & Earn Programs
- Practical Training/Pre Internship of students in Industries (Unpaid/Paid)
- Professional Chairs Sponsored by Industries at EEI
- R&D Laboratories sponsored by industries at EEI
- MoU between Industries/R&D Labs/Professional/Trade Bodies
- Scholarships/Fellowships Instituted by Industries for Students of EEI
- Short-Term Assignment/Exchange of Faculty Members in Industries
- Expert/Professionals from Industry as Visiting Professors or Guest Lectures and Delivering Lectures on Industrial Best Practices & Trends

***Knowledge Conferences/Events: Organized/Attended***

- Workshops, Conferences and Symposia *In House Events:*
- Faculty Participation in External Events:
- Having Tie-ups with Foreign Universities
- Promote International Internship /Summer Schools

***Startups: Established***

- Startups by Students/Faculty Members

# IIPE Congratulates *Nadoja* Dr. Wooday P Krishna!

**Dear IIPE Fellows,**

It gives me great pleasure to inform you that Our **National President of IIPE, Nadoja Dr. Wooday P Krishna** has been conferred with **Honorary Degree of Doctor of Letters (D. Lit.) from Bengaluru City University** for his exceptional service to society. I congratulate him on behalf of all Members of IIPE and wish him continued success and years of health and progress.

Best Wishes,

**Dr. K. Gopalakrishnan**,
*National Secretary,*
*Indian Institution of Production Engineers (IIPE)*