



# HINDUSTAN

INSTITUTE OF TECHNOLOGY & SCIENCE  
(DEEMED TO BE UNIVERSITY)

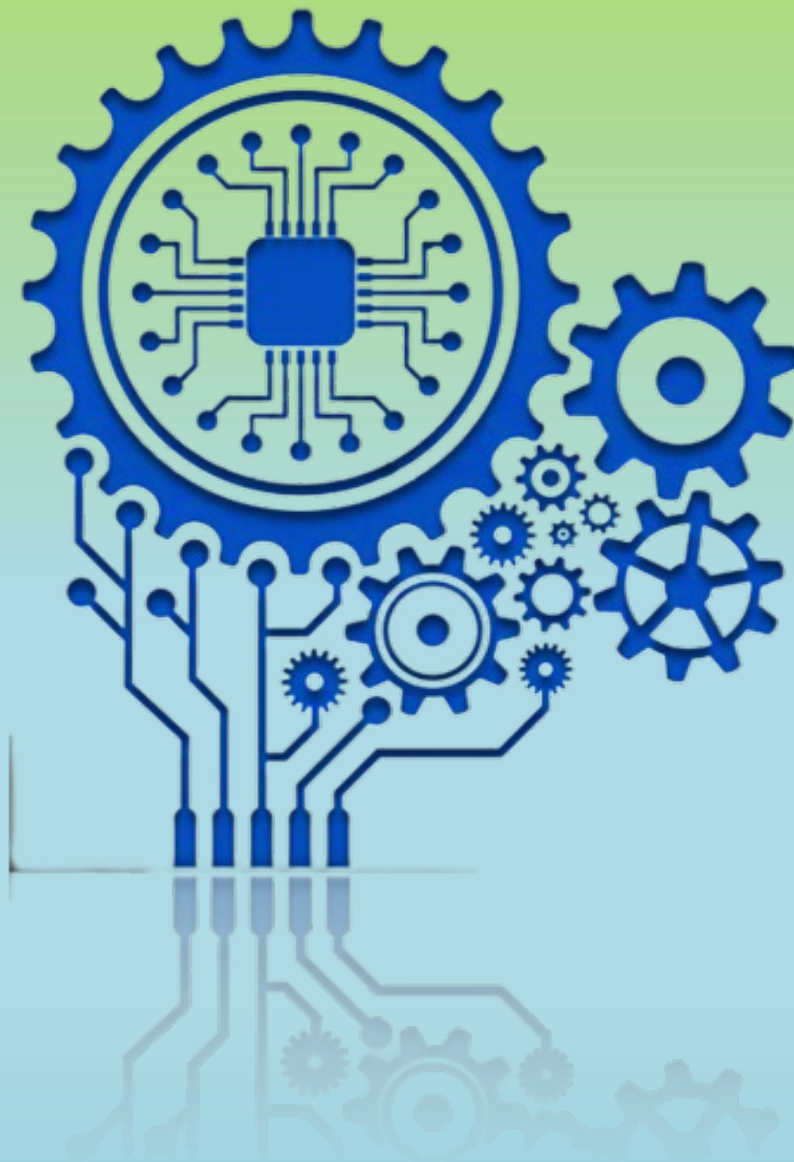


CENTRE FOR  
AUTOMATION &  
ROBOTICS

# MECHATRONICS MIRROR

NEWS LETTER

Issue No 1 | Jan 2023

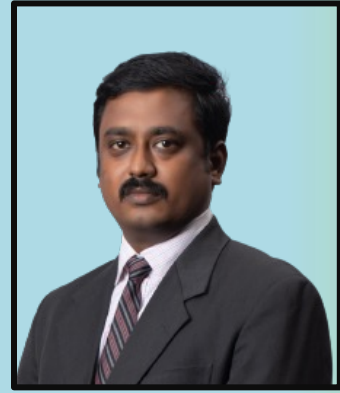


*Create, Enhance, Sustain and Deliver Excellence*

DEPARTMENT OF MECHATRONICS ENGINEERING

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## HoD'S MESSAGE



Good day, Stakeholders.

Happy New Year 2023, Greetings!

Welcome to the Department of Mechatronics Engineering, HITS, Chennai.

It gives me great pleasure and pride that our department is releasing the I/2023 issue of its newsletter, "Mechatronics Mirror," as a precursor to departmental activities. This issue focuses on the inside activities and accomplishments of our department students and faculty. It also focuses on the innovation that occurred in the department over the past six months, revealing the major strengths of the department as well as the academic excellence of our students. As the department's head, I would like to thank and congratulate all the students, faculty members, non-teaching staff, and supporting staff for their limitless support and earnest efforts for the betterment and development of the department. In the era of Engineering and technology, I believe that this newsletter will motivate teachers and students to share their creativity and new ideas with the world and will help in their overall development. I sincerely congratulate all the members of the editorial board and the faculty advisor, Ms. Manju Mohan, for bringing up this issue in better shape.

Dr. RM Kuppan Chetty  
Professor and Head i/c, Mechatronics

***Mechatronics @ HITS*** is a unique interdisciplinary platform that allows the young minds to explore and grow in multidimensions. Innovative curriculum, state of art facilities, industry internships and real time projects kindle the activity and dynamism of students. Students learn to adapt technological changes and excel in mechanical design, electronic system design, programming and control. The program focuses on robotics, automation and artificial intelligence and pave way for the students to work on the miche areas such as virtual reality, augmented reality, mobile/autonomous/collaborative/swarm robots and many more. Learning Mechatronics nurture the students to meet dynamic global demands of industries and societies.

## VISION

To be recognized internationally in providing mechatronics education, producing professional engineers with outstanding competencies for innovation, research and entrepreneurial skills

## MISSION

**The Mechatronics Engineering program continuously strives,**

- M1. To provide a conducive academic environment with state of art laboratory infrastructure
- M2. To promote collaborative research and innovation with institutions and industries
- M3. To offer interdisciplinary curricula and learning practices to meet the global demands
- M4. To impart technical, managerial and lifelong learning skills, embedded with ethical values and social relevance

## IN THIS ISSUE:

**P.3:** Students & Faculty achievements  
**P.5:** Placements  
**P.6:** Events  
**P.8:** Robotics club Activities

**P.9:** Infrastructure & Celebrations  
**P.10:** Student Articles  
**P.12:** Creative Corner  
**P.13:** Upcoming event

## LEARNING BEYOND CURRICULUM: ACHIEVEMENTS



The students welcome Mr. Anbil Mahesh Poyyamozhi with the help of 'Hindustan Rover'. The prototype has been developed by a group of nine students from second, third and fourth year Mechatronics.



Arjun, Dhanush SS, Kishore Kumar C and Dhivakar J (2018-22 Batch) won second prize in IIT Pals Innawah 2021-22 competition



Aditya Sharma, Vikram R and Dinesh Chandar L (VIII Semester) won first prize in Drone Race at VIT, Chennai





**Justin Paul Kolengadan, VIII Semester**

Received the permanent Chartered Toastmaster Membership; Received the Best table topic speaker award; Successfully cleared the "Microsoft Technology Associate"; Won second rank in Robotrix 2.0 Quiz; Won first prize in World speech day, organised by HITS



**Ramanathan Venkatachalam, 2018-22 Batch**

Achieved Asia Book of Records and India Book of Records in Rubik's cube solving



**Sasidharan V, Noel Innocent, Hamin Mj, Syed Ahmed** (Simulation And Real Time Of VR Controlled Robotic Manipulator Using ROS), **Nithin Krishnan, Manav T.P, A.N Geethanjali, Dinesh Kumar** (Design and development of drone), **Lokesh Ramesh, Crispin Marie Peter, Gladwyn K, Sundeep R, Tharun A** (Motor Modelling and Magnetic adhesion Simulation For Hybrid Wall Climbing AGV) of Third year B. Tech Mechatronics class presented papers at the 4<sup>th</sup> IEEE Bombay Section Signature Conference (IBSSC-2022)



## FACULTY ACHIEVEMENTS



**Dr. RM. Kuppan Chetty, Professor**

Received "BEST TEACHER AWARD" from Hindustan Institute of Technology and Science



**Dr. A. Joshuva, Assistant Professor (S. G.)**

Received "Encouragement Award for Highest Indexed Publication - 2021" from Hindustan Institute of Technology and Science for publishing more Scopus indexed journal papers in fiscal year 2021

# FUTURE STARTS HERE: PLACEMENTS



Simson D Souza,  
VIII Semester  
Techera



Neeraja Sankar, VIII Semester  
Cognizant Technology Solutions  
Renault Nissan Technology &  
Business Centre India Pvt. Ltd,



Justin Paul Kolengadan  
VIII Semester  
Cognizant Technology Solutions



Imaadudee,  
VIII Semester  
Techera



Muhammad M  
VIII Semester  
Cognizant Technology  
Solutions



Md. Thoufeeque Ahsan  
VIII Semester  
Techera



Bandi Venkata Manish  
VIII Semester  
Techera



Premraj  
VIII Semester  
Renault Nissan Technology &  
Business Centre India Pvt. Ltd



Sri Aniridh Srikanthan  
VIII Semester  
Skolar



Arun Krishna  
VIII Semester  
Cognizant Technology Solutions



Gottipatti Yagna Datta  
VIII Semester  
Techera



Hemanth Madhava Reddy  
VIII Semester  
Tata Consultancy Services



## DEPARTMENT EVENTS

### RANE 2022

3rd International Conference on “Robotics, Automation & Non-Destructive Evaluation”, RANE 2022 is the flagship conference in the field of robotics and an international event for researchers, companies and end users. The following dignitaries were present for the Conference: Mr. Manoj Vijayan, Assistant Regional Manager, SMC Pneumatics; Mr Vasudevan, Head – Technical SEW Euro Drives; Dr. S.G. Ponnambalam, Professor, HAG, VIT University, Former Professor, UMP, Malaysia; Mr. Rajesh Raghavan, General Manager (Robotics) & Head (Skill Development), Yaskawa India; Dr. Tariq Sattar, TWI Chair, Director LSB – Innovation Centre for Automation of NDT, UK; Dr. Mohammad Osman Tokhi, Professor, London South Bank University, UK.



## GUEST LECTURE

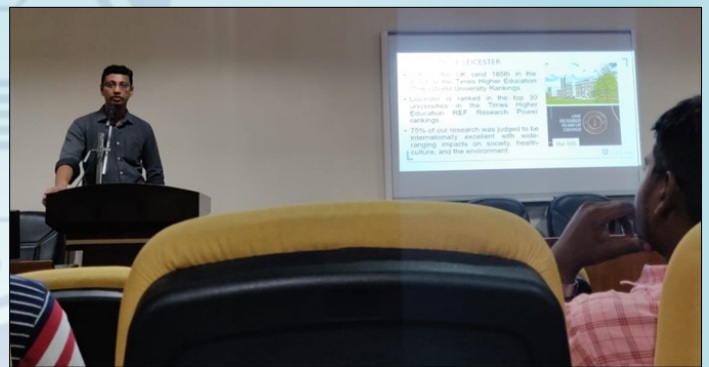
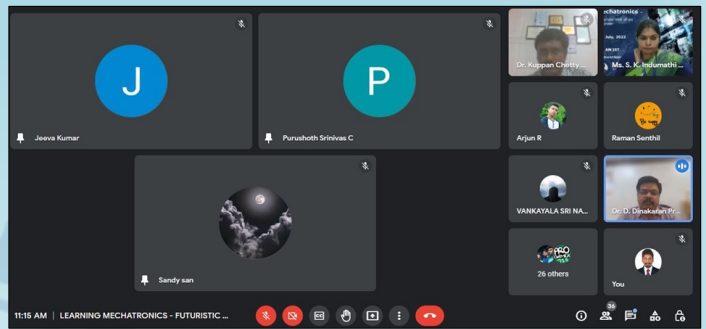
**Dr. Arockia Selvakumar Arockia Doss, Professor, School of Mechanical Engineering, VIT Chennai campus** delivered a guest lecture on “**Kinematics for design of Robot systems**” on 21<sup>st</sup> September 2022.



## WORKSHOP

A workshop on **“Learning Mechatronics-A Futuristic Skills”** on 11th of July 2022, for the engineering aspirants to provide them with an insight into Mechatronics Engineering.

**Dr. John Paneer Selvam, Senior Lecturer, School of Computing and Mathematical Sciences, University of Leicester, UK** delivered a technical seminar on **“An Analytics Approach for Sustainable Data centres”** on 18<sup>th</sup> August 2022



## INDUSTRIAL VISIT

Second year B. Tech Mechatronics students visited **Diamond group of Engineering** and experienced the manufacturing processes such as lathe operations, welding, joining processes in firsthand.



Third year B. Tech Mechatronics students visited **LEEPRA Technologies Pvt Ltd** and gained an insight on to the manufacturing services, wire harnessing, and assembly of electronics products.





## ROBOTICS CLUB ACTIVITIES

The Robotics club of the Mechatronics Department was triggered with a round of internal voting and election of the core committee members. The club aims to establish the hands-on activity-based learning accompanied with insightful lectures.



Orientation program for first year students



Workshop on Augmented reality

## CELEBRATIONS



Pookalam by Department of Mechatronics Engineering during Onam Festival 2022



Graduation Ceremony of 2018-2022 Batch B. Tech Mechatronics Engineering

## INFRASTRUCTURE

The laboratories of the Mechatronics Department were recently equipped with Emerging technologies-based platforms to impart knowledge and practice in real applications on AI, AIOT, Ai Robotics, and ICT Convergence vis-à-vis Smart Home, Smart Farm, Serving Robot, Smart Car, , Autonomous Drive, Mesh Network with LoRa and other emerging technologies.



Smart Home - AIOT Home



AIOT Self driving robot



Smart Farm with real soil  
and hydroponic cultivation



## CARBON FOOTPRINTS OF AN EV- HOW GREEN IS GREEN ENOUGH?

Numerous fresh discoveries have been made over the past ten years and have been made public. Others have revolutionized our way of life, while some were modifications to the facilities that already existed. The electric automobile is one such breakthrough. While most people feel that this product's sustainability and environmental friendliness were its primary selling points, there have been discussions that reveal the truths that render these claims to be just partially correct. So, to address that specific query, are electric automobiles "green"? Yes, but it's a convoluted answer. Most experts concur that over the course of their lifetime, electric vehicles leave a smaller carbon footprint than do automobiles and trucks powered by conventional internal combustion engines. The question at issue is: What effects do lithium batteries have on the environment? Even if electric cars don't produce any emissions, at least not when powered by renewable energy, they nevertheless have an impact on the environment when they are being made, especially the battery. The production of battery cells, modules, and packs requires a significant amount of energy, which contributes to greenhouse gas emissions. The construction of a single lithium battery with a capacity of 40 kWh (for example, the Nissan Leaf) or 100 kWh (for example, the Tesla) costs between 73 kg CO<sub>2</sub>-equivalent/kWh and emits 2920 kg and 7300 kg of CO<sub>2</sub>, respectively. The battery can be broken down into three basic parts: the pack, the battery management system, and the cells, which house the active elements. The type of energy used throughout the manufacturing process also contributes to the high carbon footprint of lithium battery production. The current trend in battery production is for them to be produced in nations with less clean energy mix, such China, which gets 60% of its electricity from coal. The carbon footprint of the batteries might be reduced by performing this method in nations with higher percentages of cleaner electrical sources (renewable and nuclear). A German company has created a geothermal energy-based lithium extraction technology that it says emits no CO<sub>2</sub>, in accordance with the tight EU climate agenda, as a solution to this challenge. By manufacturing enough lithium for 1 million batteries annually, the project is expected to boost the EU's ability to provide its own domestic car batteries. Production might begin as early as 2024. The lithium-ion battery is prepared for a second life once its "automotive" life is done in order to investigate new options. It still has enough power for several applications, such as stationary energy storage. For cleaner but less predictable stationary energy sources like wind and solar, battery storage acts as a buffer to handle changes in supply and demand. Therefore, even though the creation of electric vehicles does not represent the purest example of a sustainable product, it is consistent with the principles of sustainability, which encourage people to strive for "more sustainable" solutions if "completely sustainable" ones are not yet conceivable.

**-Rishikesh  
B. Tech Mechatronics (1 year)**

## PREDICTIONS FOR THE METAVERSE

**S** Going back roughly 50 years, if someone posed the topic of what the future will look like, they probably had visions of a space-faring civilization in their head. They would probably have you studied if we could go back in time and show those thinkers how small handheld devices can offer you access to more information than a hundred libraries could. Nevertheless, here we are, a generation that could literally get groceries in 10 minutes with just a press of a \*virtual\* button. We believe in moving fast, towards a more immersive, interactive virtual world pretty much like "The Oasis" from "Ready Player One". Yes, that's my definition of a possible metaverse. Let's look at Microsoft who brought together the Xbox, which is in essence a VR device without a headset but with a camera-based motion capture system. The company is pushing all their applications onto oculus/streamVR so that people start getting used to interacting with applications using gestures. In theory, this seems like a very practical first step towards mass adoption of the metaverse in contrast to changing company names to "meta" after buying out oculus.

**A** So, if you are just as interested in Metaverse as I am, here are a few predictions I have: One of the primary use dominator could be react-three-fibre (R3F) as web-based software is generally lighter and hence is currently the most used for cross platform applications, moreover metaverses are multiplayer worlds and hence have a heavy dependence on the internet. Edge GPUs (or) graphic routers (wi-fi router like devices for handling heavy computation requirements of all XR headsets in a room) will rise to become an indispensable part of the metaverse. Communication between low spec light weight headset and graphic routers / edge GPUs would take require a bidirectional communication protocol such as WebSocket. AR headsets would be VR headsets integrated with camera using electronically opacity variable screens such as the ones used for in-display selfie cameras. Circling back to why R3F, a 3D graphics library for the web called three.js has been used to build amazing interactive/game-like web projects such as Bruno Simon's portfolio. Being a library for the web, it is lightweight i.e., doesn't put as much computational strain on the CPU so any device with a browser can have a nice experience. This will be a ideal and attractive factor for the widespread adaptation of metaverse. However, three.js similar to JavaScript has a major issue: developer experience. It's tough to create large complex apps with plain JavaScript, while react simplifies that by introducing something called components. Components spilt an application into smaller, easy to maintain, reusable pieces, i.e., bringing in the advantages of OOP into web applications. The hiccup being three.js is not directly usable inside react, and so a team of open-source developer called the poimandres (my personal dream team) built a layer of abstraction over three.js to make it easily usable inside react and hence R3F was born. It's worth noting that three.js being the open-source project that is, has shown the public a to-be-merged PR demos showing renders that are on par with platforms such as Unreal (might be use-case specific but that's good news).

To conclude, these are a few notable trends that can be predicted to be seen in the future of Metaverse, in my opinion.

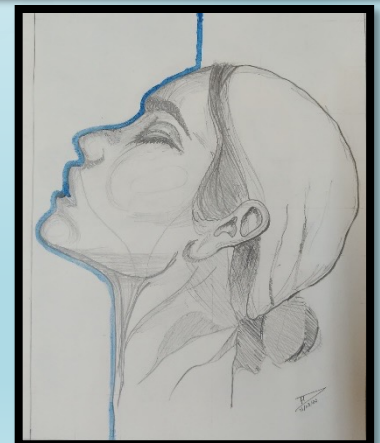
- Suraj Nukala  
B. Tech Mechatronics (IV year)



# CREATIVE CORNER



*Aditya Sharma*  
B. Tech Mechatronics  
(IV year)



*Devashish Sharma,*  
B. Tech Mechatronics (III year)

## DEPARTMENT EVENTS IN QUEUE – ARC 2023

Automation and robotics challenge, ARC is a national level competition that combines the excitement of sports with the robotic technology to enhance the learning skills of school and college students. The 2<sup>nd</sup> edition of this ARC is scheduled on 30<sup>th</sup> and 31<sup>st</sup> of March 2023.

Arc Fest'23 is a robust and spirited event with the highest cash reward in Chennai. The participants will find themselves challenged by dynamic tasks including Robosprint, Hindustan Rover Challenge and many more!

For more details:

<https://arcfest.in/>



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**ARC '23**  
TECH FEST LIKE NO OTHER

Organised by  
**Department of Mechatronics Engineering**

Registration Open For School & College Students

**INR 1,00,000/-**  
PRIZE MONEY

**EVENTS**

- Innovatiō (Lightbulb icon)
- Bot-le-Zone (Robot icon)
- Robo-Sprint (Checkered flag icon)
- HRC (Hindustan Rover Challenge) (Rover icon)
- Line Follower (Line icon)

30<sup>th</sup> and 31<sup>st</sup> March 2023  
HITS, Chennai

<http://www.arcfest.in/>

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**CENTRE FOR AUTOMATION & ROBOTICS**  
**ROYAL ACADEMY OF ENGINEERING**

## OUR INSTITUTION



Hindustan Institute of Technology and Science (HITS) is a prestigious Institution accredited with “A” grade by NAAC, Govt. of India. QS, the reputed International Ranking Agency has awarded an overall rating of three star to the University, five star for Academicians, Employability, Facility, Innovation and Inclusiveness.

HITS has completed over three decades of dedicated service to the Nation. It has a cosmopolitan ambience with high calibre and learned faculty, who are thought leaders, consultants, technology implementers and inventors. The Institution is driven by the virtuous vision of the founder Chairman, Late Dr. K.C.G. Verghese, “To Make Every Man a Success and No Man a Failure” and is devoted to the excellence in research, Teaching and Learning.

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**Innovative teaching learning pedagogies**  
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**Exclusive Project Laboratory**

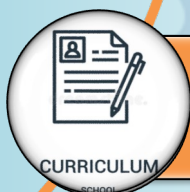
## Features of Mechatronics Programme



**6 Exclusive Laboratories for Mechatronics**  
**State of the art Robotics & Automation Facilities**  
**Advanced Research Facilities**



**Projects with University of Leeds, Warwick, LSBU, UoN**  
**Collaborative Curriculum Design**  
**20 students/faculty Visits and Exchanges**



**50+ Institutions/ Industries involved in curriculum design**  
**India's leading curriculum for Mechatronics**  
**Focus on Interdisciplinary system integration**

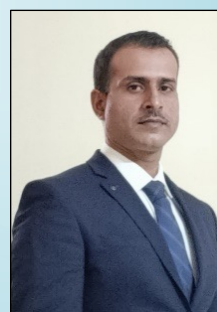
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**<https://apply.hindustanuniv.ac.in/>**

## EDITORIAL TEAM



**Ms. Manju Mohan**  
 Assistant Professor (S. G.)  
 Department of Mechatronics Engineering



**Dr. Prem Shankar Pandey**  
 Assistant Professor (SG) and Assistant Editor  
 Department of Languages

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