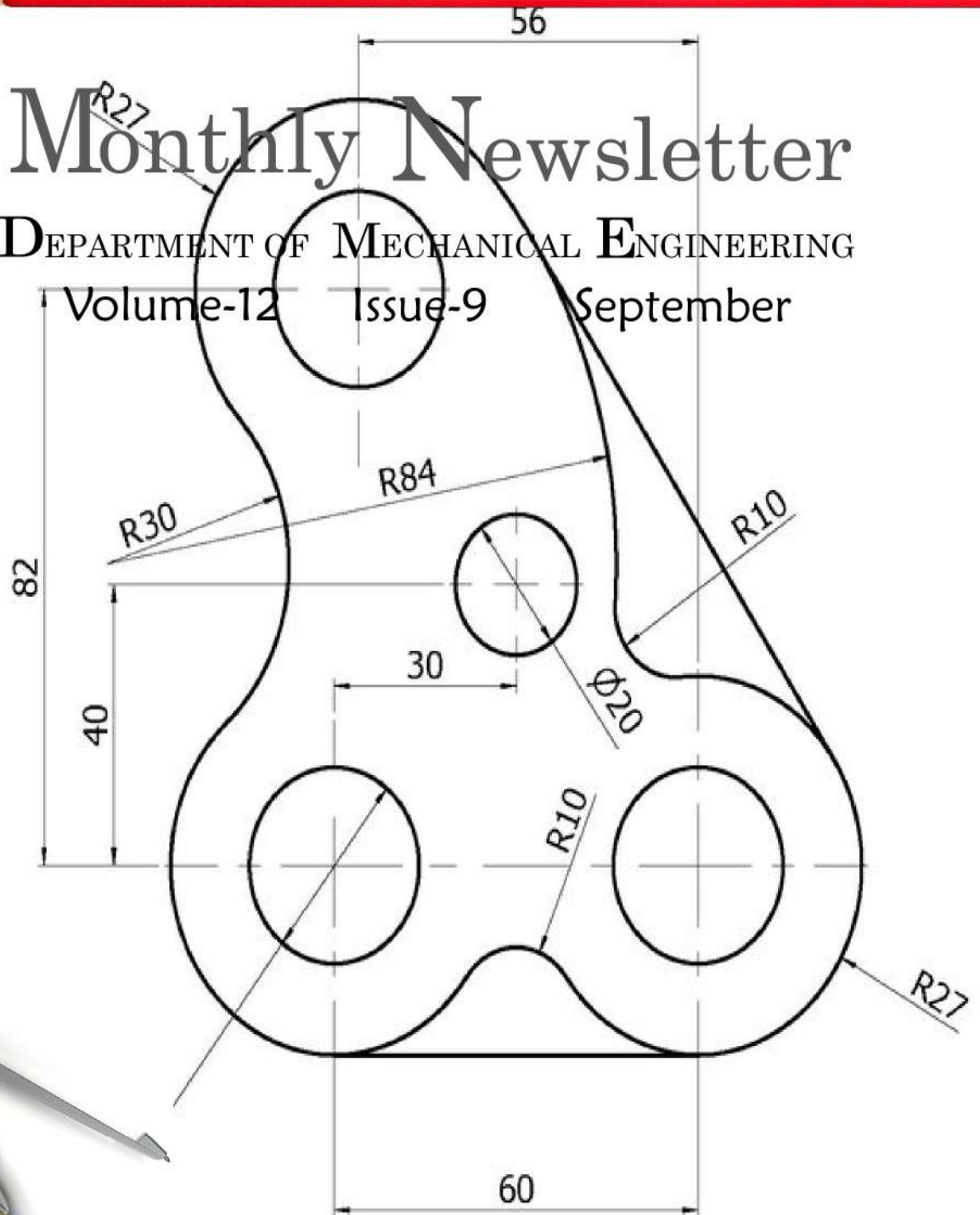


# ASPIRE

ACHIEVEMENTS IN SPORTS, PROJECTS, INDUSTRY, RESEARCH AND EDUCATION

## Monthly Newsletter

DEPARTMENT OF MECHANICAL ENGINEERING  
Volume-12 Issue-9 September



SRI SIVASUBRAMANIYA NADAR  
COLLEGE OF ENGINEERING

Rajiv Gandhi Salai(OMR), Kalavakkam, Chennai, Tamilnadu, India

## From The HOD's Desk...

We are delighted to bring out the September edition of Aspire!!!

In the Nobel laureate's section, we feature Barry C Barish, who was awarded the 2017 Nobel Prize in Physics for his work on the Laser Interferometer Gravitational-Wave Observatory (LIGO) and the first direct detection of gravity waves.

SSN was ranked 48<sup>th</sup> in the latest NIRF 2022 rankings, which is an exemplary feat being a single disciplined institution. SSN teams win big in SIH competitions. And it's that time of the year when campus placements begin and here's wishing each one of our students the very best.

As a team invested in research, our faculty keep bringing good publications to the table and work on consultancy assignments while also striving to learn more with participation in FDP's. An online quiz was conducted, and the student chapter certificate received as part of ASM activities. A workshop on thermal analysis using Ansys was conducted with good participation from students. Heartening to note the active participation of our non-teaching staff in workshops, to upskill themselves.

Our student has won the silver medal in an International astrophysics competition and shares his experience. Students share their internship and company visit experiences, which they feel has been truly rewarding. In Mech marvel, we feature sensors for the heart and innovative space suits.

Our alumni Deepak Ram, who is with the Heritage Group of International Schools, shares his experiences as a Fellow of the Teach for India program.

We had a good time bringing this edition of Aspire and we hope you have a great time reading it.

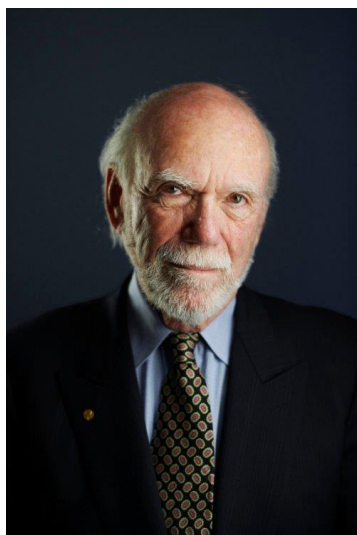
We wish, you have a captivating September, full of possibilities!!!

Best wishes,

**K.S. Vijay Sekar** | [vijaysekarks@ssn.edu.in](mailto:vijaysekarks@ssn.edu.in)



## Barry C. Barish



Barish was an American Physicist who was awarded the 2017 Nobel Prize in Physics for his work on the Laser Interferometer Gravitational-Wave Observatory (LIGO) and the first direct detection of gravity waves. Beginning his career in high-energy physics he worked on experiments at the Stanford Linear Accelerator Center, and in the 80s he became involved in the search for magnetic monopoles. He also headed a team to design an experiment for the Superconducting Super Collider (SSC), a giant particle accelerator to be built in Texas, which was cancelled the U.S. Congress in 1993.

After the cancellation of the SSC, he became the LIGO principal investigator in 1994. A slew of doubts was presented by the National Science Foundation about its feasibility and management structure. Barish instituted technical changes to LIGO's design, such as using solid-state lasers, which were more powerful than the originally planned argon gas lasers. LIGO was run mainly as a small collaboration between Caltech and the Massachusetts Institute of Technology.

In 1997, the LIGO Scientific Collaboration was established since it demanded permanent staff and many more scientists to help in what was an extremely technically demanding project. That same year Barish became LIGO director. Barish's changes pleased the NSF, which funded LIGO at a much higher level, and were credited with doing much to make LIGO a success.

LIGO's two interferometers at Livingston, Louisiana, and Hanford, Washington, were constructed in 1994. Even though there were no detection of gravity waves in their early years Barish pushed through advances and finally an advanced version was set up in 2014, On September 14, 2015, Advanced LIGO made the first detection of gravity waves from a pair of black holes that spiraled into each other 1.3 billion light-years away.



## CAMPUS UPDATE

### TIME FOR PLACEMENTS

Students are equipping themselves with skills in core, aptitude, and programming to face the companies. And to excel in their dream companies. As their 4 years of hard work is finally gone pay off. Companies have already begun to flood are campuses from August 17<sup>th</sup>, 2022. Beforehand they went into placement training initiated by our college to reinvigorate themselves in this field. Hoping for everyone to chase their unique dream companies.



### 10 TEAMS FROM SSN TO SIH FINALS!!!

SIH (Smart India Hackathon) a Smart India Hackathon is a nationwide initiative to provide students with a platform to solve some of the pressing problems we face in our daily lives. It's an honor that 2 teams bagged first prize in the software edition of SIH2022 held across India, by success they bring laurels and glory to our campus. Winners are presented with goodies and cash prize. The following teams are selected: (Software)

- 405Found\_SIH2022
- Intecoders\_SIH2022
- Kyogre\_SIH2022
- RandomVariables\_SIH2022
- Challengers\_SIH2022
- Alpha Beta Gamma
- ByeWorld\_SIH2022



- SSNsquad\_SIH2022

The following teams in hardware:

- Zeolite\_SIH2022
- Edromis\_SIH2022

Congratulations to all the teams who participated in the final round, and to the 2 team who won (In photo) in the software domain.



## 48<sup>TH</sup> RANK IN THE COUNTRY!!

SSN as known for its ever-grown diversity in sports as well as in academics topped many colleges in India and grabbed a position as one of the affiliated colleges in India. The infrastructure and in all the fields (sports, academics, and placements) SSN managed to grab a position in the top 50 colleges all over India, the college with only 750 intakes of student for each academic year. It's a great feat achieved by the management, leaders, and the faculties. The people behind the hard work for college growth, and diversity. It managed to rank No. 1 among the affiliated colleges, an immense feat achieved by the campus. A great feat and success achieved by all the students and faculties.

IR-E-U-0476	Shanmugha Arts Science Technology & Research Academy	<a href="#">More Details</a>	Thanjavur	Tamil Nadu	53.36	41
IR-E-U-0356	Kalinga Institute of Industrial Technology	<a href="#">More Details</a>	BHUBANESWAR	Odisha	53.06	42
IR-E-U-0255	Indian Institute of Space Science and Technology	<a href="#">More Details</a>	Thiruvananthapuram	Kerala	52.37	43
IR-E-U-0020	Koneru Lakshmaiah Education Foundation University (K L College of Engineering)	<a href="#">More Details</a>	Vaddeswaram	Andhra Pradesh	51.93	44
IR-E-U-0747	Chandigarh University	<a href="#">More Details</a>	Mohali	Punjab	51.73	45
IR-E-U-0410	Malaviya National Institute of Technology	<a href="#">More Details</a>	Jaipur	Rajasthan	51.69	46
IR-E-U-0530	Motilal Nehru National Institute of Technology	<a href="#">More Details</a>	Prayagraj	Uttar Pradesh	51.17	47
IR-E-C-16604	<b>Sri Sivasubramaniya Nadar College of Engineering</b>	<a href="#">More Details</a>	<b>Kancheepuram</b>	<b>Tamil Nadu</b>	<b>50.50</b>	<b>48</b>
IR-E-U-0249	Visvesvaraya Technological University	<a href="#">More Details</a>	Belgaum	Karnataka	50.20	49
IR-E-U-0172	National Institute of Technology Kurukshetra	<a href="#">More Details</a>	Kurukshetra	Haryana	50.11	50
IR-E-U-0379	Lovely Professional University	<a href="#">More Details</a>	Phagwara	Punjab	49.58	51
IR-E-U-0374	Dr. B R Ambedkar National Institute of Technology, Jalandhar	<a href="#">More Details</a>	Jalandhar	Punjab	49.45	52
IR-E-U-0202	Birla Institute of Technology	<a href="#">More Details</a>	Ranchi	Jharkhand	49.33	53

## DEPARTMENT UPDATE

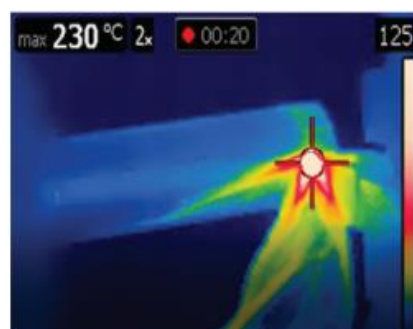
### INTERNATIONAL JOURNAL PUBLICATION - SCI /CLARIVATE INDEXED



Dhananchezian, M., and K. Rajkumar. "Cutting velocity influenced machinability of Monel 400 by coated tool." *Materials and Manufacturing Processes* (2022): 1-10. Clarivate Impact Factor: 4.783



Cutting Zone Temperature (°C)



(a) Uncoated carbide insert



(b) TiAlN coated carbide insert

Maximum temperature of cutting zone at 114 m/min.

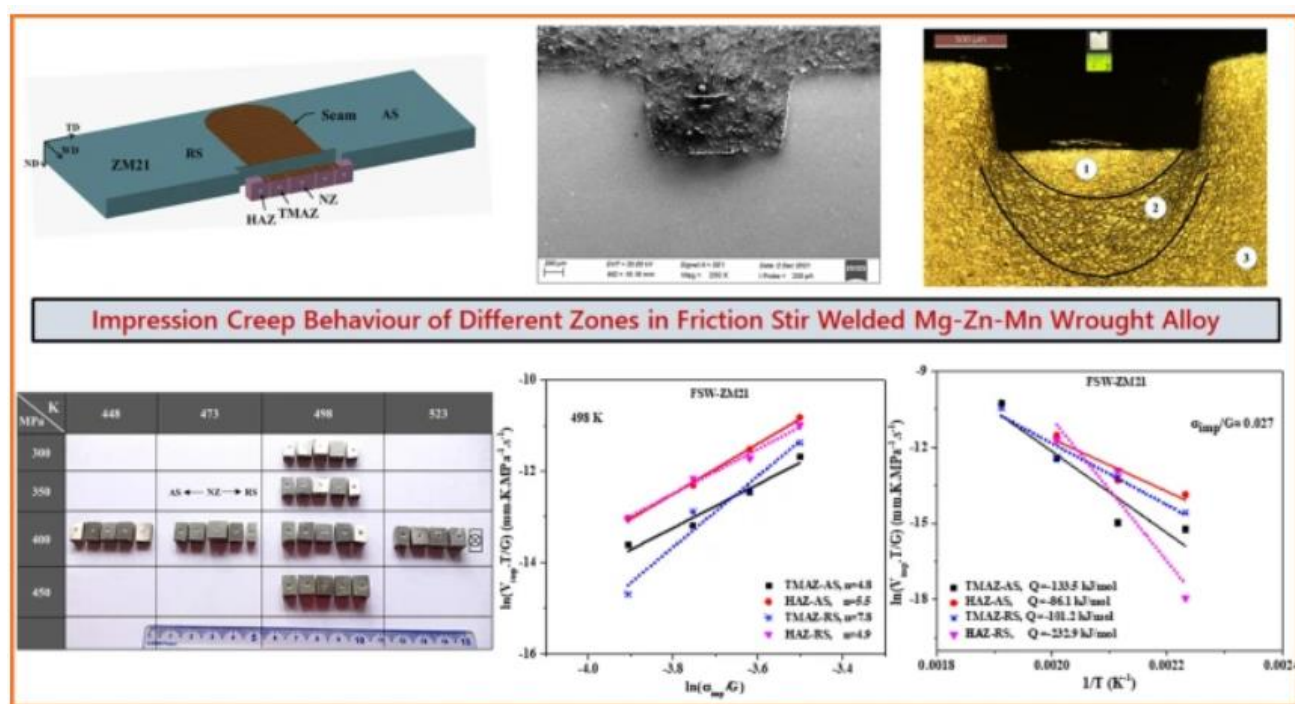


## INTERNATIONAL JOURNAL PUBLICATION - SCI /CLARIVATE INDEXED



Ebenezer, D., SR Koteswara Rao, K. L. Harikrishna, and G. Madhusudhan Reddy. "Impression creep behavior of different zones in friction stir welded ZE41 magnesium-rare earth alloy." *Materials Science and Engineering: A* 851 (2022): 143615. Clarivate Impact Factor: 6.044

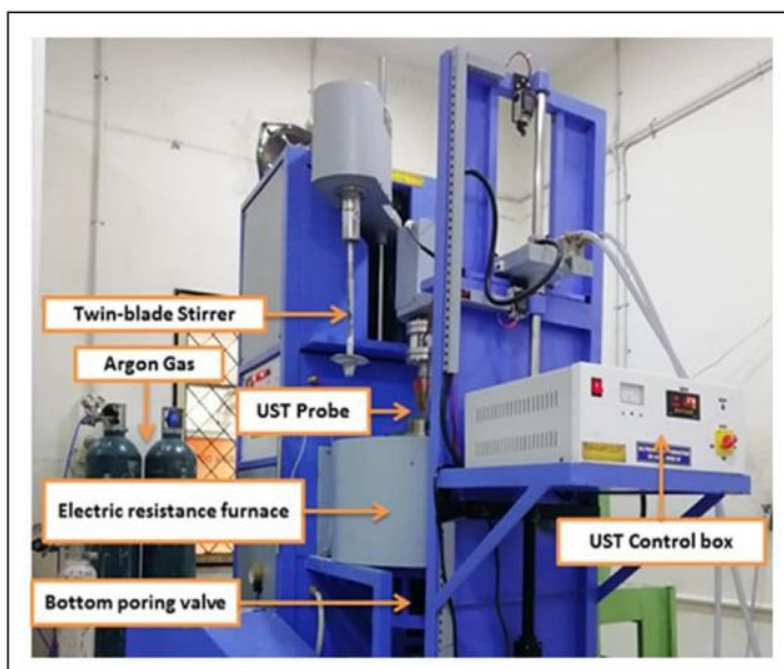
Ebenezer, D., SR Koteswara Rao, K. L. Harikrishna, and G. Madhusudhan Reddy. "Impression creep behavior of different zones in friction stir welded ZE41 magnesium-rare earth alloy." *Materials Science and Engineering: A* 851 (2022): 143615. Clarivate Impact Factor: 4.682



## INTERNATIONAL JOURNAL PUBLICATION - SCI /CLARIVATE INDEXED



Surendran, KT Sunu, A. Gnanavelbabu, and K. Rajkumar. "Identification of self-lubricative mode for the ultrasonic treated AA6061-B4C-CNT hybrid composites." *Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology* (2022): 13506501221113168. Clarivate Impact Factor: 1.818



Ultrasonic treatment assisted stir casting set up.

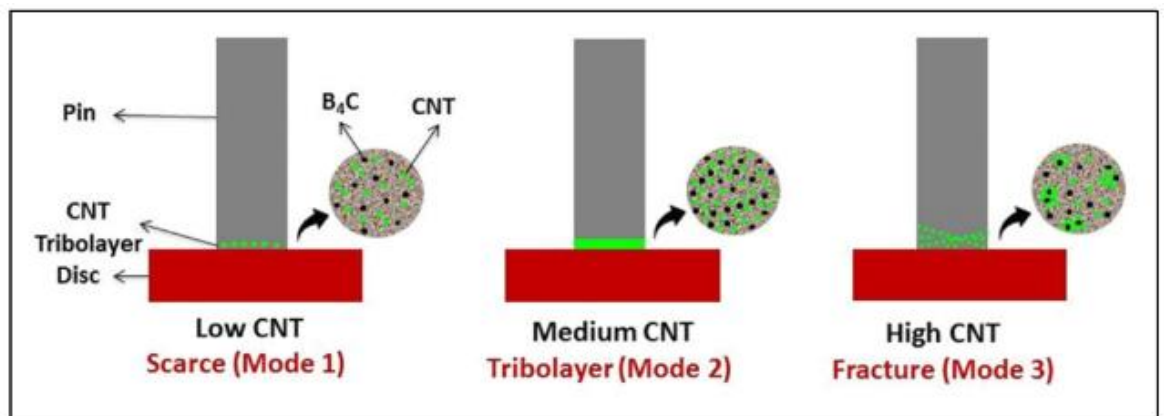


Illustration of a self-lubricative mode of hybrid composites.



## INTERNATIONAL JOURNAL PUBLICATION - SCI /CLARIVATE INDEXED



Santosh, S., et al. "Comparison of Internal friction measurements on Ni-Ti reinforced smart composites prepared by Additive Manufacturing." *Journal of Alloys and Compounds* (2022): 166027. Clarivate Impact Factor: 6.371

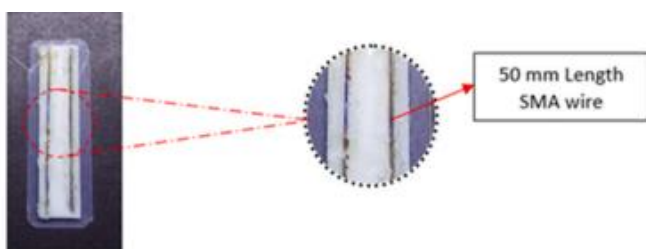


Fig. 2. Continuous reinforcement type smart composite.

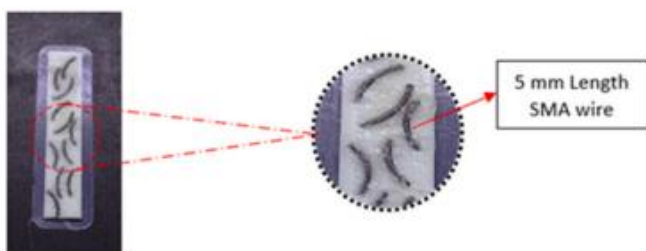


Fig. 3. Discontinuous (random type) reinforcement type smart composite.

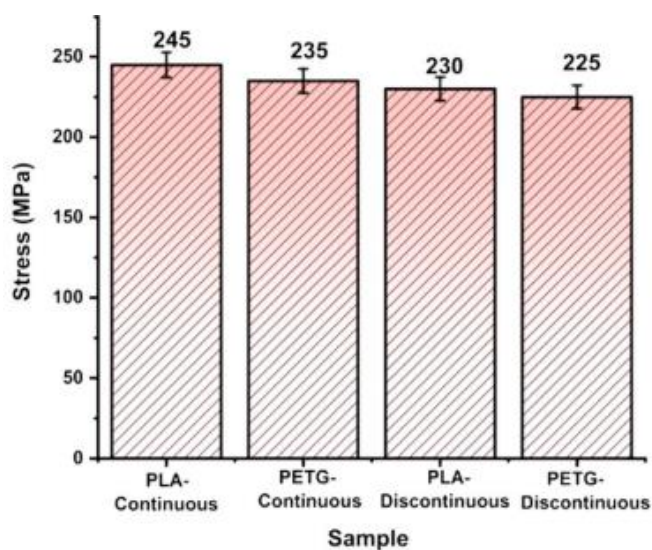


Fig. 11. Tensile strength values of different samples.

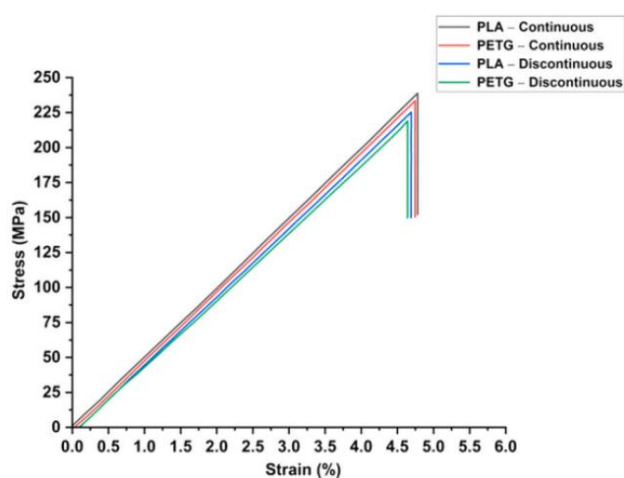


Fig. 10. Tensile test plot for the SMA reinforced composite.

## SCOPUS PUBLICATION

Gobivel, K., and **KS Vijay Sekar**. "Influence of cutting parameters on end milling of magnesium alloy AZ31B." *Materials Today: Proceedings* (2022). **Scopus Impact factor:0.36.**

**Sekar, KS Vijay**, et al. "Cutting forces and tool wear studies on machining of Hastelloy X." *Materials Today: Proceedings* (2022). **Scopus Impact factor:0.36.**

Gobivel, K., and **KS Vijay Sekar**. "Investigation on the effect of Tin and Al<sub>2</sub>O<sub>3</sub> coated tools in the Machining of Ti-6Al-4 V alloy." *Materials Today: Proceedings* (2022). **Scopus Impact factor:0.36.**

## FACULTY WRITE-UP

## REPORT ON ONLINE QUIZ

As part of our ASM Material advantage student chapter activities, an online quiz was conducted on 6<sup>th</sup> August 2022 between 10.30 A.M and 11.30 A.M. Before starting the quiz, an interactive session was conducted to find out the expectations of the student's chapter from the students. The students wanted to know about the benefits of joining the chapter and programs that were being conducted by ASM International. This Association ventures to provide a medium for students to interact with various professionals and experts in the field of material science. Newly formed, this association looks forward to providing the knowledge and guidance for students who are interested in this field. Funding opportunities for students were brought to the notice of the students. Midway through the previous semester, the positions were assigned with the help of an application process followed by a write up. The following students were selected for various positions.

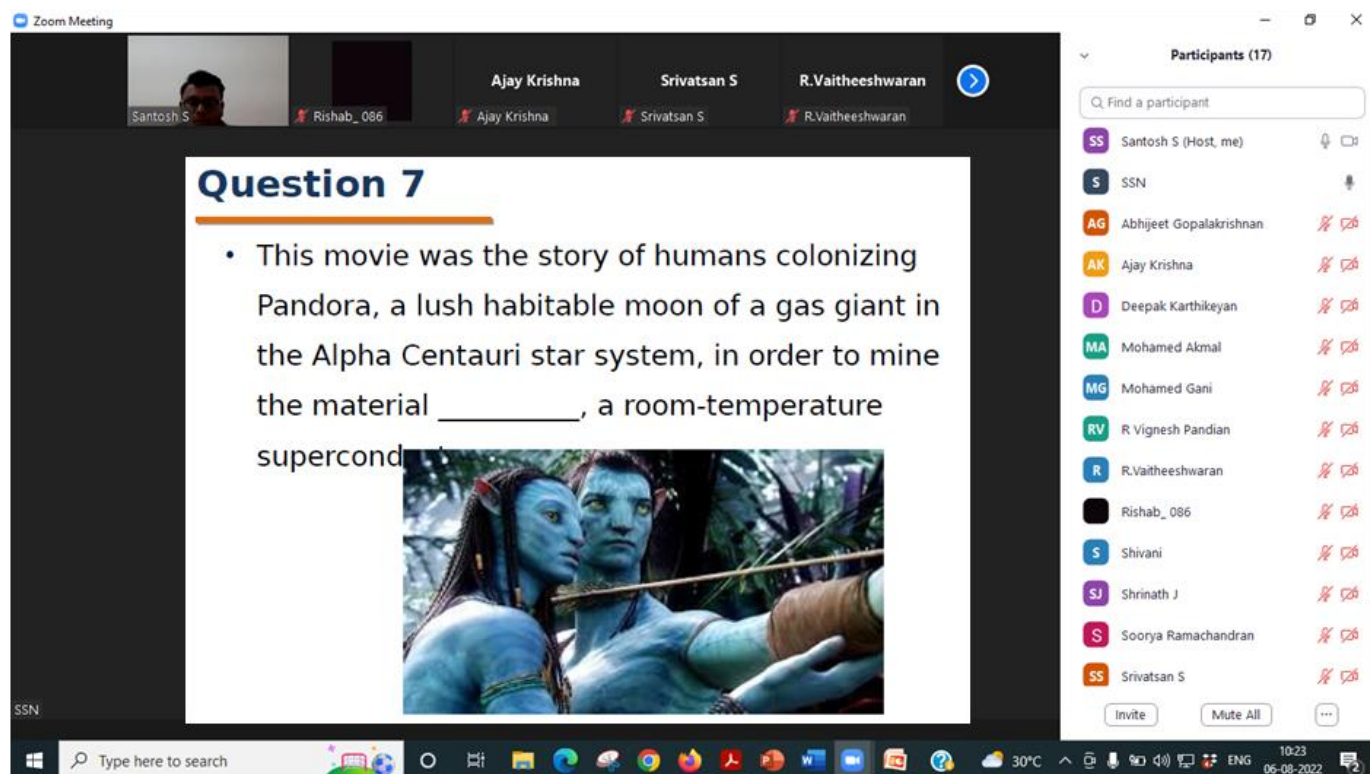
Chair - Rishab Rajesh IV Year Mechanical

Vice Chair - Mohammad Akmal Baig A III Year Mechanical

Treasurer - R Vignesh III yr Mechanical

Secretary - R Vaitheeshwaran III yr Mechanical

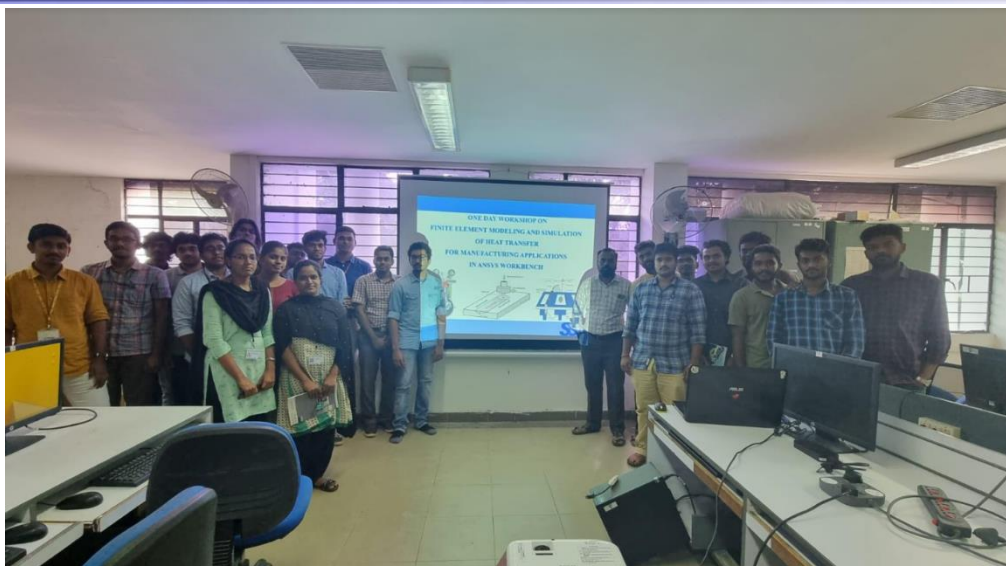
The quiz was conducted in 4 parts-Connections, Personalities, Minerals, Mixed bag and Contemporary materials. 15 students participated enthusiastically, and we hope to conduct one students chapter program in 3 months.



## WORKSHOP ON THERMAL FEA ANALYSIS

Application of novel engineering materials in commercial applications is not simple. Owing to multiple processes used to manufacturing a component, understanding the role of heat affected zones is critical. This knowledge enables a designer to choose the right temperature and processing conditions for a particular application. It also enables the designer to overcome limitations and constraints in a design path especially since materials and transformation technologies have become variables of the creation process. While testing several prototypes requires heavy investments, modelling the heat transfer may give valuable insights.





Keeping this in mind, Dr. Anirudh V. K. and Dr. M Nalla Mohammed organized a one-day hands on workshop on “Finite Element Modelling and Simulation of Heat Transfer for Manufacturing applications in ANSYS” on the 23rd of July 2022 (Saturday). It had three sessions with in-person participants including undergraduate students, post graduate students and faculty. The first session involved looking at the basics of conduction, convection and radiation and the equations governing the heat transfer applications. A brief introduction on how these are implemented, and the basics of FEA were also covered.

During the second session, participants had a hands-on experience on developing a thermal model for a double walled glass from scratch. The participants created solid models of the glass and air model in Design Modeler of ANSYS Workbench and then carried out steady state heat transfer analysis in ANSYS.

The last session focused on transient or time-based heat transfer. Here, participants had an opportunity to simulate the heat generation in a single cylinder engine as well as simulate heat transfer zones in a friction stir welding process.

The output of this included the understanding of depth of heat affected zones as well as and animations simulated how the heat is distributed over time. Participants were very much impressed with the capabilities of the software and how easy it is to use to improve our understanding of the heat transfer phenomena in solid bodies.

## APPROVAL OF ASM MATERIAL ADVANTAGE STUDENT CHAPTER

We are delighted to inform that the approval for establishment and conduct of a Material Advantage Student Chapter has been granted. The certificate is given below. We now look forward to conducting various activities under this flagship with the help of student office bearers and student members.

Faculty coordinators: Dr. D. Ananthapadmanaban and Dr. S. Santosh



This is to certify that the Board of Directors of ACerS, the Board of Directors of AIST, the Board of Trustees of ASM International, and the Board of Directors of TMS have granted a

### CHARTER

for the establishment and conduct of a  
Material Advantage Student Chapter at

**Sri Sivasubramaniya Nadar College of Engineering**

It shall be the duty of the properly elected officers of this chapter  
to conduct business of the chapter in accordance with the Constitution  
and Rules of Government of the parent organizations.

Witness our hand and seal

**March 17, 2022**

Elizabeth Dickey  
President  
ACerS



Steven Henderson  
President  
AIST



Judith Todd  
President  
ASM International



Ellen Cerreta  
President  
TMS



## CONSULTANCY ASSIGNMENT

Dr. R. Vimal Samsingh, Dr. C. Arun Prakash, and Dr. S. Esther Florence of our college conducted a training program on Data processing and Analysis for Industrial Management for the employees of Nova Carbon Private Limited, Tirunelveli on August 18th and 19th . The purpose of the Training program was to ensure seamless operation of various Industrial Management activities using Simple Data Modelling and Analysis tools.

Dr. R. Vimal Samsingh, Dr. C. Arun Prakash, and Dr. S. Esther Florence of our college received a consultancy project of worth Rs.3,24,500/- from LIFO Technologies Private Limited for designing and developing a customized cloud connected cashless vending machine with e-commerce compatibility.

## OTHER ACTIVITIES

### NON-TEACHING STAFF

<b>Mr. Balasundaram</b> / Lab assistant / Mechanical / Participated one day webinar Hydraulics pneumatics and PLC on 10. Aug.2022 at 4 pm to 5 pm Company: Famic Technologies. Pune.
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<b>Mr. Nagarajan S</b> / Lab Instructor/ Department of Mechanical Engineering participated the webinar "Understanding Recurring Heatwaves Risk Impact and the Way Forward for Resilience"" on 26.07.2022 organized by National Institute of Disaster Management, Ministry of Home Affairs, Govt. of India in collaboration with IMPRI.
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<b>Mr.M. Giridharan</b> /Lab Assistant/Mechanical attending Five-day Faculty Development Programme on "Medical System Design, Modeling, and Simulation
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using Fusion 360" organized by the department of Biomedical Engineering, SSNCE From August 01 to 05, 2022.

**Mr.M. Giridharan**/Lab Assistant/ Mechanical involved in admission duty for First year Rural student B. E./B. Tech Admissions on 01Aug 2022.

**Mr.M. Giridharan**/Lab Assistant/ Mechanical involved in admission duty for First year B. E./B. Tech Admissions 2022-2023 during 27 June to 5 Aug 2022.

**MR. BALASUNDARAM.P** / LAB ASSISTANT / MECHANICAL / COMPLETED ALISON COURSE OF COMMUNICATION FUNDAMENTALS ON 22.08.2022 AT 10 AM

## TEACHING STAFF

**Dr R Rajeswari**, ASP, Mechanical Engineering has been recognized as PhD supervisor under the Faculty of Mechanical Engineering from Anna University on 12-08-2022

**Dr K.S. Vijay Sekar**, Prof and Head, Dr Arun Prakash C and Dr Anirudh VK (Asst. Professors) participated and won the II prize in the Quiz event organized as part of Teachers Day celebrations in SSNCE.

**Dr K.S. Vijay Sekar**, Prof and Head participated in the "Game show" and "Sing a Song" event organized as part of Teachers Day celebrations in SSNCE on 16th and 23rd Aug 2022.

**Dr. S. Santosh** attended the online training on Peer Review Excellence: IOP Training and Certification.

**Dr. N. Lakshmi Narasimhan**, ASP/Mech Coordinated at institute level the Students' Data Filing to DOTE on Aug 26, 2022, connected with the Naan Mudhalvan Initiative. A team of around 32 faculty members across the departments were involved to handle the task.

**Dr. Anirudh V. K.** and **Dr. M. Nalla Mohammed** organized a one-day hands on workshop on modeling and simulation of heat transfer in manufacturing applications using ANSYS workbench on the 23rd of July 2022.

### **FDP /STTP/WORKSHOP ATTENDED**

**Dr.R. Prakash**, Associate Professor, Participated a Professional Development Program on "Renewable Energy Sources" at National Institute of Technical Teachers' Training and Research (NITTTR), Chennai from 27-06-2022 to 01-07-2022.

**Dr Divya Zindani** of Sri Sivasubramaniya Nadar (SSN) College of Engineering has actively participated in the International Faculty Development Program on "Futuristic Research in Mechanical Engineering" organized by Department of Mechanical Engineering, SRM Institute of Science and Technology, Ramapuram Campus, Chennai from 08th August to 13th August 2022

Project Title: Design and Development of an Active Pitch Bi-Rotor Horizontal Axis Wind Turbine (HAWT), PI: Dr. T. Micha Premkumar/AP/Mechanical; Co-PI: Dr. Chitra Babu/Prof/CSE; Total Budget (INR): 53,88,992 Funding Agency: MNRE

**Dr. Santosh Sampath** presented a paper (online mode) entitled 'Fabrication and characterization of Ni-Ti reinforced smart composites' in the 19th International conference on Internal Friction and Mechanical Spectroscopy, Rome during June 27 - July 1, 2022.

**Dr. S. Santosh**, AP/Mech delivered a guest lecture on "Futuristic Trends in Materials Science and Engineering" at the Department of Mechanical Engineering, Sri Venkateshwara College of Technology, Chennai on 20th August 2022 (Saturday) from 10:00 AM to 11:00 AM.

## STUDENT WRITE-UP

S.NO	DATE	ACTIVITY DONE DURING THE MONTH
<b><u>THIRD YEAR</u></b>		
1)	17/8/2022	Shashaank.C. S
2)	03/08/2022	<ul style="list-style-type: none"> <li>International Astronomy and Astrophysics Competition (IAAC) Silver Honors</li> </ul>
3)	26/07/2022	R. Vaitheeshwaran
4)	23/08/2022	<ul style="list-style-type: none"> <li>INTERNSHIP AT THE MERIND AUTOMOTIVES PVT LTD</li> </ul>
5)	23/08/2022	<p>Sarath S</p> <ul style="list-style-type: none"> <li>1 Month Internship at Sky raptor Electric Cycles</li> </ul> <p>Mothimukesh. K</p> <ul style="list-style-type: none"> <li>Internship at RANE NSK Steering Systems Pvt Ltd</li> </ul>
<b><u>FOURTH YEAR</u></b>		
6)	09/08/2022	Athulan R
	01/08/2022	<ul style="list-style-type: none"> <li>Internship at ICF Ayanavaram</li> </ul> <p>Palvannan B</p> <ul style="list-style-type: none"> <li>2 weeks Internship in a shop floor</li> </ul>

### Shashaank.C. S, III-Year writes...

The IAAC is an international competition on Astrophysics, with 14000+ participants all over the world, so there's a 3-round format in this competition, The pre-qualification round, qualification round and the final round. The entire competition takes over a span of 4 months, this year it started on 4th March and ended on 25 July. The Pre-qualification round was a set of 5 questions with medium difficulty which tested the grasp on the basics of physics, maths, Astrophysics and Astronomy. Passing that brings the participant to the Qualification Round which had 4 problems that ranged from simple to complex and two research articles which must be thoroughly read and interpreted, clearing this round leads to the final round which contains 20 MCQ questions which tested the knowledge on physics, maths, astronomy, astrophysics, and questions based on pre-qualification and qualification rounds.



The silver honour is given to participants who finish at top 10 percent out of the overall participants, this year there were around 4600 participants, out of which I was among the top 460 worldwide. This experience taught me to trust on the process rather than expecting immediate results for everything

For someone who aspires to make it big is Astronomy/Astrophysics it's a good steppingstone as we get to contest against participants from every corner of the world

### **Mothimukesh K, III-Year writes...**

I'm Mothimukesh K from Mech-A, III Year. I would like to share my internship experience at RANE NSK Steering Systems Pvt Ltd. It was my first day, and I was eager to learn about the different processes involved in manufacturing a steering system. I got allotted to the PLE department, which is the product line engineering department, which involves the scheduling of repairs and maintenance required for each piece of machinery. and conducted different documentation works. Here I learned about the SOP that is being designed by the design engineers for each component, and how the operator follows this and produces the component. And after all that, I learned about the different components that are being manufactured in each section. There were a CNC m/c section, an UJ assembly section, twin torch welding and rotary welding sections, and a robot welding section. In each welding section, different sub-parts of a steering column are manufactured, such as an outer tube assembly and a spline shaft assembly. There were about 7 assembly lines in which steering columns for different companies were carried out. Their major customers include Ashok Leyland, Daimler, Maruti Suzuki, Tata, Eicher, etc. In this plant, only manual steering systems are manufactured. And there was a R&D test lab in which different tests have been conducted to ensure its durability, performance, torsional stability, tilt and telescopic durability, its working condition in muddy water and many other tests. There was also another testing lab in which the penetration of welds was evaluated. Then I got to learn about the phosphating and coating processes involved. At the end of this internship, I gained practical knowledge and skills towards industrial needs. And it mainly gave me an outline of what I studied in college to visualize in practice. I would like to thank the HOD of the department who encouraged and permitted me to do an internship.

## R. Vaitheeshwaran, III-Year writes...



I am R. Vaitheeshwaran, III Year Mech-B. I feel privileged to share my experience of visiting the company Merind Automotives Pvt LTD as an intern along with my friends Srivatsan S, Vignesh Pandian R, and S Rohit Kumar for a week.

Merind Automotive Pvt Ltd is a small-scale industry that produces high-precision aluminium machined components for the Indian and global market. Their company has CNC machineries with both turning centres and VMC and produces a wide range of components ranging from electrical industries to automotive industries like starter bodies, alternator bodies, and aluminium castings along with machined components for BOSCH, MICO, VISTEON, EBM NADI, DELCO REMY, UCAL, and many other overseas customers. They also have their own aluminium pressure die casting foundry by the name of MERIND Die Cast Private Limited. MERIND caters to customers across the globe, delivering on schedule with a rejection rate of 0.05. All the days of the program were filled with lots of knowledge, fun, and eagerness to learn something new. Each department taught us different things, which become essential when it comes to an industry. The quality control department taught us the important things required for the component dimensions. The production department utilised the CNC and VMC for the production work. The Inspection Department carries out the final checks of a component. All the departments have a commitment to produce the most accurate product and contribute greatly to the company. The practical knowledge in us was greatly improved as we were only familiar with the theory part but getting introduced to such an environment and industry where lakhs and lakhs of components are manufactured on a large scale motivates us to work upon it further in the future with such dedication and passion, greatly contributing to the field of mechanical engineering. I thank Merind Automotives Pvt Ltd for allowing us to do an internship in their prestigious organization. I also thank our HOD for letting us proceed with the internship.

## Sarath S, III-year writes...



We (I, C Karthikeyan, and V Santhosh Narayan) got an opportunity to do a 1-Month Internship at Sky raptor Cycles, which provided us with a taste of industry experience. Sky raptor Cycles is an IITM start-up aiming to build electric cycles with better pedalling efficiency. We worked on the design and

calculations of the gear system and the frame design of the cycle.

Firstly, we got experience of the interview process (I had to draft my resume for the first time, the interview, and an assignment to design a spur gear in Solid works, we took that chance to revise Sem 3 KOM Unit 5 Gears).

We worked on gear calculations first, for which we used Excel initially, but we couldn't get the results we wanted in an easier way, so we switched to Python. With just four nested for loops, we were able to get the different gear teeth count possibilities in the gear system for a specified gear ratio.

So, we learned that being a mechanical engineer doesn't mean coding isn't a necessary skill. It is a versatile tool that can be applied in several scenarios, like how it helped us with the gear ratio calculations.

From the results of the calculations, we started designing the gear system, and then we had to figure out a gear shifting mechanism for it. We carried on researching the different types of steel grade (EN), about which Sir gave us some insights from his experience.

Finally, we worked on designing a cycle frame, but first we had to investigate all the cycle terminologies and their significance in riding comfort, different types of cycles, etc. I thought cycle was a simple thing since it doesn't have many moving parts nor has

a complicated structure but working on it made me realise the huge amount of detail and nuances that go into designing one.

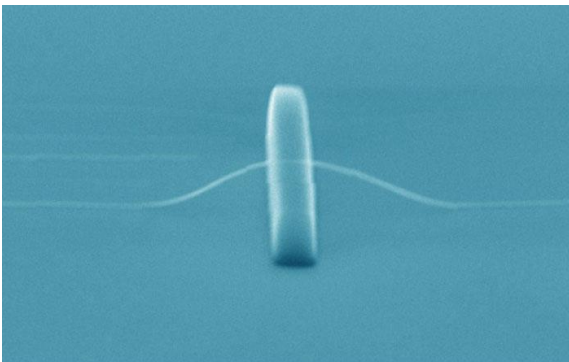
We are extremely thankful to Mr. Arun Kumar for the opportunity and for continually giving us feedback on our work, and we can't conclude without thanking Boobalan Anna, who was our mentor throughout the internship. He helped us with Solid works and pretty much any problem that we crashed into.

## **MECH MARVEL**

### **Amazing Innovation 223**

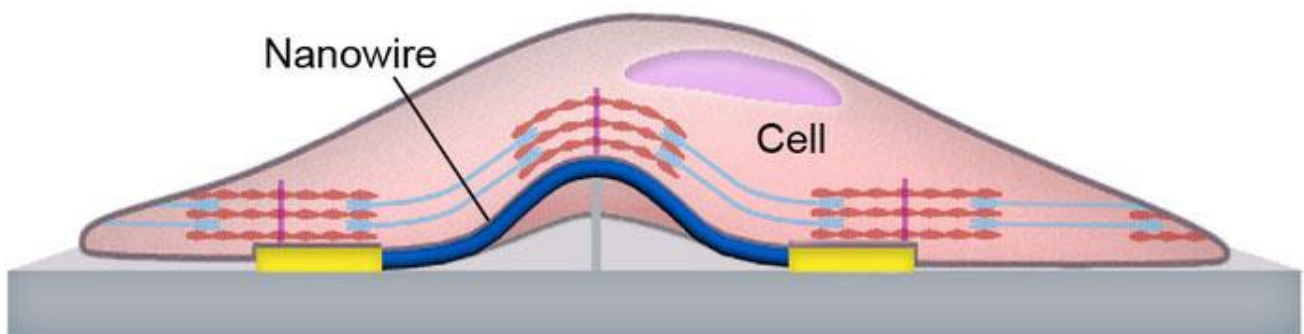
#### **Nano-electric sensors for the Heart!**

Diagnosis of a heart, for drug testing, disease studies and regenerative medicine has never become simpler after a research team in University of Massachusetts developed a nanoelectrical sensor to measure its electrical and mechanical activities. It is claimed to have the leading edge for the treatment of cardiovascular diseases.



Since a cell is biologically the basic functional element its electrical and mechanical signals are the two key properties to analyse its status which is imperative for diagnosis and tissue repair. Usually, separate sensors were used to measure mechanical and electrical activities, and it was required to have a thorough

assessment of a cell. A 3D suspended semiconducting silicon nanowire forms the construction sensor. Being smaller than a biological cell the nanowire can patch on to a cell membrane and detect cellular activity later converting the detection into electrical signals.





In the long run, the Nano sensors can be safely delivered to living cardiac systems for improved health monitoring and early disease diagnosis.

## **Amazing Innovation 224**

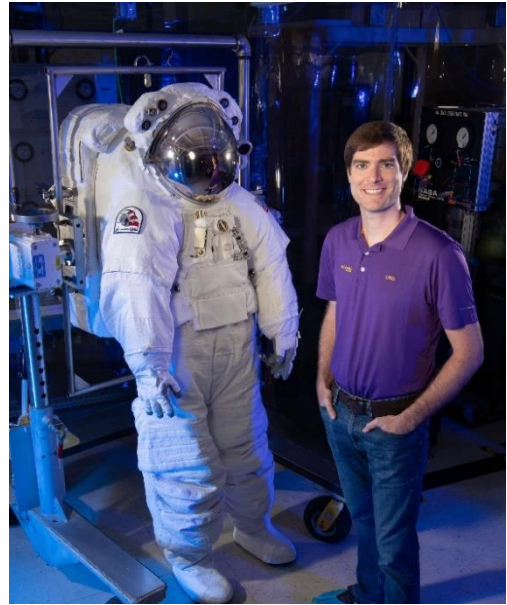
### **A New Spacesuit**

The spacesuit hasn't been the recipient of innovation unlike the space rockets, rovers and satellites since 1976 other than small modification. Now it's finally about to receive its biggest change in the year 2023. LSU Mechanical Engineering alumnus Kevin Murrell, a mechanical design engineer has been working with a team of about 100 NASA engineers since 2019 to design the new xEMU (Exploration Extravehicular Mobility Unit) spacesuit. The suit will serve as a prototype if aerospace companies choose to design their spacesuits using it. Since 2008, NASA has spent \$420 million on spacesuit development.

Previous Space suits came only in one size, and the new suit is a solution to that. Safety being the next criteria or to be more precise the most important criteria is one of the boastful features of this suit. the greatest danger is the Lunar soil's is composition of tiny glass-like shards that could enter the suit and endanger the astronauts. The xEMU suit has a suite of dust-tolerant features to prevent inhalation or contamination of the suit's life-support system or other spacecraft. It is also designed to withstand temperatures of minus 250 degrees Fahrenheit in the shade and up to 250 F in the sun.

The design of lower torso design includes advanced materials and joint bearings that allow bending and rotating at the hips, increased bending at the knees, and hike-style boots with flexible soles and the upper torso includes updated shoulder placement and enhancements that allow astronauts to move their arms more freely and easily lift objects over their heads or reach across their body. The new rear-entry hatch allows astronauts to climb into a spacesuit from the back, allowing the shoulders to remain closer together to enable a better fit and reduce the risk of shoulder injuries

The helmet features a protective visor that shields from wear and tear and includes multiple voice-embedded microphones that automatically pick up the astronauts' voices when they speak to a fellow spacewalker, their crewmates, or mission control in Houston. Astronauts must undergo a full-body 3D scan so that NASA and the vendors can match the astronaut to the modular spacesuit components that will provide the most comfort and broadest range of motion.



## ALUMNI WRITE-UP

DEEPAKRAM (MECHANICAL ENGINEERING ALUMNI 2014-18)



Hello. My name is Deepakram, and I am an alumnus of the Mechanical Engineering department (2014-18 batch). After graduating from SSN, I pursued the Teach for India Fellowship program (2018-20 Cohort) and I currently work as a Makerspace consultant for the Heritage group of international schools. In this article, I wish to share about my fellowship experience. Drawing inspiration from Richard Feynman's learning technique of mastering a concept by teaching and

Einstein's quote "If you can't explain it simply, you don't understand it well enough", I comprehended concepts by imagining myself teaching in front of an audience and I challenged myself to elucidate complex ideas to my peers in simple language. I have found it easy to answer questions like "Calculate the stress induced when a load is

applied....". But, during the fellowship, the kind of questions which I often faced in my daily class were open-ended like "Sir, how did our Earth form? What is happening behind the computer screen?". The more I delved into these open-ended questions, the more I unlearned about my previous assumptions and started approaching concepts and problems through first principle thinking. I strongly believe in student leadership, student driven learning and constructionist learning theory which advocates that students learn by constructing their own meaning out of the experiences by exploring and making connections to their prior knowledge. Thus, I focused on curating learning experiences for students where they can engage, explore, construct their own meaning and leverage their learning to create something

meaningful for them. In this spirit, I have curated and designed a Makerspace in one of our classrooms where students can create and tinker with products and conduct and analyse Science experiments. Makerspaces fosters creativity, inquisitiveness and provides an environment where innovation can thrive. I believe that students should have the opportunity to create as much as they consume. Check out these clips (What we do, how we learn, Makerspace, Student Musical production). By working with key stakeholders like students, parents, Government teachers and officials and IAS officers I had an opportunity to understand the grass-root level realities of our public education system. In my opinion, although the national schemes and policies appear good, the breakdown happens in the implementation of policies due to political pressure, lack of technical infrastructure, poor investment, communication protocols and human resource. The sad reality is that almost 50% of a teacher's time goes into admin work, most of which are redundant and could be enhanced by technology. One of my biggest learning during the fellowship is the power of collective action.

During my fellowship, I have established and nurtured partnerships with a lot of organizations like Just For Kicks to nurture leadership in kids through football, American International school to train our students in Model United Nations, SpaceKidsIndia to provide an opportunity and resources for our students to build their own micro-satellites, Young Entrepreneur Academy to train students in Entrepreneurship, Reap benefit to train our students in solving civic problems through design thinking and so on. As a school team of 4 fellows, have invested and mobilized our stakeholders like parents, volunteers, donors, partner organizations, government teachers, government officials, janitors, watchman and shopkeepers in creating a rich ecosystem of support for our students.

## RESEARCH NEWS & FORTHCOMING EVENTS

### PROJECT PROPOSAL SUBMISSION

## COMPETITIONS UPDATE

### CASE STUDY COMPETITION:

Link: [Case Study](#)



Programs/ Schemes		Call opening date	Call closing date
1.	Start-up Research Grant (SERB-SRG)	01-02-2022 (Tuesday)	01-03-2022 (Tuesday)
2.	Core Research Grant (SERB-CRG)	01-02-2022 (Tuesday)	18-04-2022 (Monday)
3.	Teachers Associateship for Research Excellence (SERB-TARE)	10-02-2022 (Thursday)	15-03-2022 (Tuesday)
4.	SERB-MATRICES	23-02-2022 (Wednesday)	22-03-2022 (Tuesday)
5.	Scientific and Useful Profound Research Advancement (SERB-SUPRA)	11-04-2022 (Monday)	10-05-2022 (Tuesday)
6.	Accelerate Vigyan – ABHYAAS (For Winter Events)	02-05-2022 (Monday)	31-05-2022 (Tuesday)
7.	National Postdoctoral Fellowship (SERB-NPDF)	02-05-2022 (Monday)	01-06-2022 (Wednesday)
8.	Empowerment and Equity Opportunities for Excellence in Science (SERB-EMEQ)	01-06-2022 (Wednesday)	30-06-2022 (Thursday)
9.	Science and Technology Award for Research (SERB-STAR)	15-06-2022 (Wednesday)	28-07-2022 (Thursday)
10.	Technology Translation Award (SERB-TETRA)	04-07-2022 (Monday)	03-08-2022 (Wednesday)
11.	SERB International Research Experience (SERB-SIRE)	01.08.2022 (Monday)	30.08.2022 (Tuesday)
12.	Promoting Opportunities for Women in Exploratory Research (SERB-POWER)	01-09-2022 (Thursday)	30-09-2022 (Friday)
13.	National Science Chair	01-09-2022 (Thursday)	31-10-2022 (Monday)



## SUMMER PROJECT CONTEST:

Link: [Contest Link](#)

The banner is for the NITIE Summer Project Contest. It features a purple and pink color scheme. On the left, there is a circular graphic with a laptop, gears, and a brain. The text reads: "NITIE National Institute of Industrial Engineering Mumbai - India", "SHOWCASE YOUR SUMMER INTERNSHIP EXPERIENCE AT THE", "SUMMER PROJECT CONTEST", "PRESENTED BY NITIE PRERANA MANAGEMENT GROUP", "PRIZES WORTH", and "INR 1,00,000". On the right, there is a graphic of three people working at a table with laptops and charts. The text "aavartan ORCHESTRATING CORPORATE EXCELLENCE" and "OCTOBER 8<sup>TH</sup> - 14<sup>TH</sup>, 2022" is also present.

## STEEL-A-THON:

Link: [Steel-a-thon](#)

The banner is for the Tata Steel Steel-a-thon. It features a light blue and white color scheme. On the left, there is a graphic of a person in a hard hat. The text reads: "TATA STEEL", "WeAlsoMakeTomorrow", "Be more, with us", "DO MORE | LIVE MORE | GROW MORE", and "steel-a-thon Prove your Metal Season 9 2022". On the right, there is a graphic of three people (two men and one woman) wearing hard hats and holding a plant. The Tata Steel logo is also present.

## CORPORATE WISDOM

### From the desk of Ramki — Aspire to Inspire

#### Happy Morning

We keep drawing from outside, what keeps happening inside of us. Subconsciously, we keep either drawing into our life or keep repelling from our life, various possibilities. Life synchronizes itself to our dominant thought patterns.



- You hit what you seek.
- You see what you want to see.
- You become what you keep thinking all day long.
- If your focus is the shadow, then you can never see the sun.
- Keep thinking problems and you will keep missing opportunities.

You can focus on something. But you cannot 'not' focus on something. When your dominant thought is that you will not find a place to park, you will certainly not find a place to park your car. And the one who found a slot to park, magnetized it with this dominant thought: "I will find my slot to park."

Keep visualizing not just what you are but what you will be. It's both science and faith: "What you want is already waiting for you. You need to magnetize it into your life."

Start now. Start believing that everything about your life is about to change for the better. Go to sleep with your last thoughts as everything about my life is moving to another orbit. Wake up with the first thoughts being... I am a breakthrough away from humongous possibilities. And of course, back up your beliefs with action. FUTURE IS WAITING FOR YOU.

#WishingMostAndMore

Have great day & wonderful weekend

Ramakrishnan Ramamurthy

GMR Group India, Email: [r.ramakrishnan@gmrgroup.in](mailto:r.ramakrishnan@gmrgroup.in)

## **EDITORIAL TEAM**



**Dr. Alphin M S**



**Dr. Satheesh Kumar G**



**Shivani S**

**G**



**Rufus Derrick**



**Vallikannan M**



**Nithin**



**Ponroshan D**



**Kavya s**



**Harish**



feedback to [\*\*aspire @mech.ssn.edu.in\*\*](mailto:aspire@mech.ssn.edu.in)