



**KUMARAGURU**  
COLLEGE OF TECHNOLOGY



Department of Mechanical Engineering

Newsletter

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**Editors:**

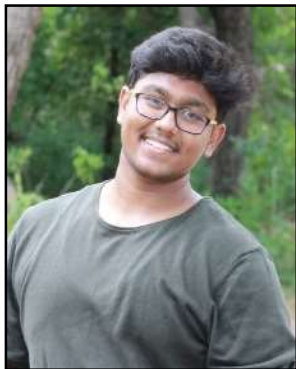
**Dr. C. Velmurugan**  
**Dr. B. N. Sreeharan**

**Associate Editors:**

**Mr. Nitheeshwar R K**  
**Mr. Praveen B**  
**Ms. Rushethra P N**

# Associate Editor's Folio

## THE GREEN ENERGY STICKERS



**Mr. Nitheeshwar R K**  
**19BME067**  
**II Year Mechanical - B**

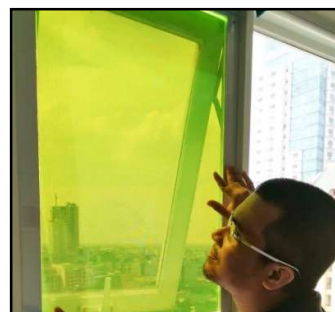
Solar energy is becoming more popular, but there is one major drawback. Carvey Ehren Maigue, a Mapua University student, has developed a solar panel that addresses the renewable resource's frequent efficiency issue. So, what is it that solar energy doubters point to? Its reliance on excellent sunny weather. Fortunately, Maigue's AuREUS technology is intended to gather light even in overcast conditions. Because of this increased capability, the new panels can create energy nearly half of the time, compared to 15-25 percent for present panels.

Maigue discovered that his system may function similarly to the Northern Light s, which impressed him tremendously. (The name AuREUS is taken from the term "aurora borealis.") "High energy particles are absorbed by luminescent particles that re-emit them as visible light," he says of the naturally occurring form. Maigue collected the luminous particles present in certain food waste and confined them in a resin substrate in his manufactured version—the solar panel. When UV light strikes these particles, they absorb and reflect it. Visible light is focused at the edges of the panels, where PV cells catch it and convert it to DC power. This is the basic concept underlying AuREUS's Borealis Solar Window and Astralis Solar Wall systems.

The bioluminescent particles are extracted by crushing the fruits and vegetables and continuously straining the resultant mixture. Surprisingly, despite the fact that this resource aims to prevent global warming, the food waste utilized in its creation is a result of climate change. Millions of hectares of flora have been destroyed as a result of the Philippines' changing weather,



resulting in fruits and vegetables that are unsuitable for human consumption. This is where Maigue discovered a supply of materials for his innovation. The AuREUS panel is three feet tall and two feet broad, making it an excellent choice for building facades. Maigue hopes that this implies his method may help buildings become intrinsically sustainable while maintaining the functionality of architecture and design. He points out that the manufacturing method is adaptable, leaving plenty of space for experimentation. "We can make curved panels, more complex wall forms, or any design customers desire without sacrificing efficiency," Maigue explains. He uses the Montreal Convention Center as an example of how these colored panels can be both attractive and practical. "By doing so, we can demonstrate to people that adapting sustainability to combat climate change benefits both current and future generations, and by doing so, we can enlist more people in the battle against climate change." The first-ever James Dyson Sustainability Award was recently given to the AuREUS system, allowing it to increase manufacturing.



# Departmental Activities

## Programmes organized

A Ph. D. seminar titled “Experimental Investigations on the Lubricated wear behaviour of aluminium hybrid composites” was arranged by **Dr. C. Velmurugan**, Professor and HoD for his research scholar Mr. K. Raghupathy on 20-07-2021.



## Faculty as Resource Persons



**Dr. V. R. Muruganantham**, Associate Professor, was invited to be a resource person to deliver contents towards – TRIZ – 76 Solutions, in the AICTE-ATAL FDP organized by Sri Shanmuga College of Engineering and Technology – in the title of Multi objective optimization and product innovation by TRIZ theory, Salem during 12th to 16th July 2021 and around 60 faculty from all over India, attended this FDP. Further, he also become a certified Lead Auditor for Environment Management systems on 25.07.2021.

**Dr. S. Bhaskar**, Associate Professor was the resource person for an online Session (02 hours) on 14.07.2021 in a Two-day national level seminar (14th and 15th July 2021) on “Revised Accreditation Framework for Quality Enhancement in Higher Educational Institutes” delivered on the topic: Identification of best practices and its implementation, for Sairam College, Chennai, sponsored by NAAC and Organised by IQAC of Sairam Engineering College for around 300 faculty from across India.



He also was a resource person for another online Session (02 hours) in AICTE ATAL (AICTE Training and Learning Academy) sponsored FDP on “Recent Innovations in Concrete Technology” delivered on the topic: Stress Management (3Ps and 7Qs approach) – For Sakthi Polytechnic College, Sakthi Nagar -638315, Organised by Sakthi Polytechnic College for around 125 faculty from across India on 15.07.2021.

Further, **Dr. Bhaskar**, handled a three-hour session on 19.07.2021 on “Outcome Based Education” during the 5th Online Faculty Induction Programme (15-07-2021 to 13-08-2021) organised by UGC - Human Resource Development Centre (UGC-HRDC) Sardar Patel University Mota Bazar, Opp. SICART, Vallabh Vidyanagar-388 120, Gujarat.



**Mr. B. Jeeva**, Assistant Professor was an approved teacher and final exam supervisor for International Astronomy and Astrophysics Competition conducted on 05.07.2021.



## Departmental Activities



**Dr. P. S. Samuel Ratna Kumar**, Assistant Professor invited as a resource person for ISTE & SAE sponsored 7 Days Virtual Faculty Development Programme on "Unconventional Machining Processes" by Department of Mechanical Engineering - Sri Sairam Engineering College (Autonomous), Chennai on 27/07/2021. Over 100 participants from various parts of India have participated in this FDP.

### Papers Presented

In the international Conference on Materials Research in Science and Engineering conducted during 23 – 25<sup>th</sup> July 2021, following faculty members presented their papers.



**Dr. V. R. Muruganantham**, Associate Professor presented a paper titled "Six Sigma - DMAIC Method for Choice of Material in Natural Fibers in Polymer Composite Based Wall Brick".

**Dr. B. N. Sreeharan**, Assistant Professor – II, presented following titled papers



- An Investigation on Selection and Validation of Suitable Material to a Steering Knuckle of Quad Bike
- Optimization of GMAW control factors over weld bead parameters of AA 6351 material using Taguchi L16 Orthogonal Array
- Cutting Process Parameter Optimization of CF8M Steel
- An Investigation on Selection and Validation of Suitable Material to A Roller of An Automated Solar Panel Cleaning System Using DEAR Algorithm
- Application of DEAR Algorithm in selection of material for making a flexible fixture for ATV Control Arms



**Dr. S. Sivakumar**, Assistant Professor – III presented following titled papers

- Thermal Analysis of Stacked type Supercapacitors for Different Material Structures
- An Investigation on influence of Battery Materials for Efficient Lithium-Ion Battery Pack Design
- Effect of Ferromagnetic and Diamagnetic Coil Materials on a Wireless Energy Transfer System
- Exploring the Efficacy of Nano fluid (Al<sub>2</sub>O<sub>3</sub>) Based Battery Thermal Management System using CFD
- An Investigation on the performance of Permanent Magnet Brushless DC Motor based on different materials

## Departmental Activities



**Dr. M. Balaji**, Associate Professor, presented a paper titled Exhibiting MCDM in Material Processing of Tea for Sustainable Productivity.

**Dr. S. Thirumurugaveerakumar**, Associate Professor presented a paper titled Experimental Investigation on Turning Process Parameters for AA7075 by Taguchi's Orthogonal Array.



**Mr. P. D. Devan**, Assistant Professor, presented a paper entitled Prediction of Mechanical Characteristics of Al7075 Metal Matrix Composites.

**Dr. T. Karuppusamy**, Assistant Professor – II, presented couple of paper entitled Experimental analysis of EDM parameters on machining Aluminium hybrid composites with Taguchi method and Study on Ageing Behaviour of Silicon Carbide, Graphite Reinforced Hybrid Al6061 Composites.



**Dr. K. K. Arun**, Assistant Professor – III presented a paper titled Investigation of Optimum Machining Parameters in Milling Machine by Using Taguchi Method.

**Dr. S. Balasubramanian**, Associate Professor, presented a paper titled Prediction of thermal disruption and microstructure study on Cast Iron Pump casing in Metal removal process.



**Mr. R. S. Mohan Kumar**, Assistant Professor presented a paper titled A Study on Influencing Process Parameter on Product quality.

**Mr. S. Rajesh**, Assistant Professor, presented a paper titled Influence on Alumina, Graphite, And Red Mud Particle with Aluminium Hybrid Composites Materials for Automobile Brake Rotor Application.



## Departmental Activities



**Mr. B. Jeeva**, Assistant Professor presented the following titled papers

- Numerical study of heat transfer characteristics of graphite Nanofluid in Flat tubes
- Drying Kinetics of Turkey Berry Using Solar Tunnel Dryer: Natural Convection
- Two-Phase Numerical Analysis of Graphite Nanoparticle in Circular Pipe
- Experimental Study on Heat Transfer Enhancement for the Multi-Channel Flow of Graphene Nanofluid

### Papers Submitted

Following faculty members submitted their papers in the various Scopus / Web of Science / SCI indexed journals.

Name of the Faculty	No. of Papers Submitted
Dr. S. Bhaskar, Associate Professor	1
Dr. N. Sangeetha, Associate Professor (SRG)	1
Dr. S. Balasubramanian, Associate Professor	1



### Papers Published



**Dr. V. Manivelmuralidaran**, Assistant Professor- II published a paper titled "Optimisation of Parameters Influencing Cold Crack Resistance of SAE 950A Steel in the Sadhana Academy Proceedings in Engineering Sciences. He also published another paper titled "A Review on Braking System in Automobiles" in the International Journal of Scientific and Engineering Research.

**Mr. R. S. Mohan Kumar**, Assistant Professor, published a paper titled "Study on Recent Additive Manufacturing Techniques and their Distinctive Applications" in an international journal.



## Departmental Activities

### Papers Reviewed



**Dr. P. S. Samuel Ratna Kumar**, Assistant Professor, reviewed following papers for various international journals as detailed below.

- Heat treatment T4 and T6 effects on tribological properties of sillimanite mineral reinforced LM30 aluminium alloy composites at elevated temperatures for Part J: Journal of Engineering Tribology
- Thermal kinetics of SiCp reinforced Al-Zn-Mg-Cu alloy composite for Silicon Journal
- Comparative Analysis on Tribological Characteristics of Thermal Sprayed Coatings Prepared from Conventional and Nanocomposite Mixed Ceramic Powders for Advances in Materials Science and Engineering Journal.
- Research Progress of Clay Transformation in Drilling Fluids for IOP Conference Series: Materials Science and Engineering Journal.



**Mr. B. Jeeva**, Assistant Professor reviewed a paper entitled "A Performance Investigation of a Multi-Staging Hydrokinetic Turbine for River Flow" for progress in Energy and Environment Journal.

### Patent Applied / Patent Published

**Mr. M. A. Vinayagamoorthi**, Assistant Professor - II, **Dr. V. Muthukumaran**, Professor, and **Mr. T. V. Abinash**, 18BME059, published a patent titled "An apparatus for holding and dispensing water from a water can" vide patent application no.: 202041001486 dated January 13, 2020.



**Dr. S. Balasubramanian**, Associate Professor, **Mr. B. Praveen**, 18BME092, **Mr. M. Prasanth**, 18BME059, and **Mr. L. Krishna Prasad**, 18BME105 filed a patent titled "An Apparatus for Disinfecting Biometric System and a Method Thereof" vide patent application no.: TEMP/E1/32836/2021- CHE dated July 30, 2021.



# Departmental Activities

## Online Courses / Programmes attended / participated / completed

**Dr. A. P. Arun**, Assistant Professor - II participated in an FDP on "ATAL FDP on Green Technology and Sustainability Engineering" from 05-07-2021 to 09-07-2021.



**Dr. B. N. Sreeharan**, Assistant Professor - II completed trainings on

- "Excel Crash Course – Spreadsheet Formulas for Finance" on 01-07-2021
- "Statistics Fundamentals" on 07-07-2021
- "Data Science Fundamentals" on 14-07-2021.
- Guest lecture on "KLDA - Strategies to Enhance Classroom Engagement" on 22-07-2021
- Webinar on "Recent trends in Product Design" on 31-07-2021.
- FDP on "Open-Source Software used in Drafting Modelling & Analysis" from 28-06-2021 to 02-07-2021.
- FDP on "Simulation of Welds and Optimization Techniques" from 12-07-2021 to 16-07-2021.

**Dr. K. K. Arun**, Assistant Professor - II participated in

- Guest lecture on "KLDA - Strategies to Enhance Classroom Engagement" on 22-07-2021.
- FDP on "ICT academy" on 12-07-2021 to 16-07-2021.



**Dr. M. Balaji**, Associate Professor participated in an FDP on "ATAL FDP on Green Technology and Sustainability Engineering" from 05-07-2021 to 09-07-2021.

**Dr. M. Thirumalaimuthukumar**, Assistant Professor - II participated in

- Guest lecture on "KLDA - Strategies to Enhance Classroom Engagement" on 22-07-2021.
- FDP on "ATAL FDP on Plastic products and mould design" from 20-07-2021 to 24-07-2021



**Dr. N. Sangeetha**, Associate Professor participated in a webinar on "Machine Learning for signal processing" on 22-07-2021.



## Departmental Activities

**Dr. P. S. Samuel Ratna Kumar**, Assistant Professor participated in

- FDP on "ATAL FDP on Green Technology and Sustainability Engineering" from 05-07-2021 to 09-07-2021.
- FDP on "ATAL-AICTE FDP on Manufacturing: Hindsight to Foresight by BITS Pilani - Pilani" from 16-07-2021 to 20-07-2021.



**Dr. S. Balasubramanian**, Associate Professor participated in



- Guest Lecture on "NIIT 3D printing" on 17-07-2021.
- FDP on "IIC Innovation Ambassador Training - MHRD" from 30-06-2021 to 30-07-2021.

**Dr. S. Bhaskar**, Associate Professor participated in an FDP on "AICTE sponsored - NITTTR Chennai organized FDP on "Orientation Training Program for Mentors" on 07-05-2021.



**Dr. S. Sivakumar**, Assistant Professor-III participated in an FDP on ""AICTE ATAL Sponsored FDP on 'Design and Development of Electric Vehicle' AICTE Training and Learning (ATAL) Academy, AICTE, New Delhi"" on 07-09-2021.

**Dr. V. Manivelmuralidaran**, Assistant Professor - II participated in

- FDP on "Simulation of Welds and Optimization Techniques" from 12-07-2021 to 16-07-2021.
- FDP on "ATAL FDP on Green Technology and Sustainability Engineering" from 05-07-2021 to 09-07-2021.



**Mr. B. Jeeva**, Assistant Professor participated in



- Seminar on "Future of On-Line & Blended Learning & Degrees - A Game-Changer" on 17-07-2021.
- Seminar on "Techno spotlight- 2 event organized by NDRF, IEL." on 24-07-2021.
- Seminar on ""4th 'Knowledge-Sharing Webinar for Sustainable Skills Competition System' organized by Global HRD Cooperation Department, GIFTS, HRD Korea (Human Resources Development Service of Korea)" on 22-07-2021."

## Departmental Activities

**Mr. M. A. Vinayagamoorthi**, Assistant Professor - II participated in

- Seminar on "4th 'Knowledge-Sharing Webinar for Sustainable Skills Competition System' organized by Global HRD Cooperation Department, GIFTS, HRD Korea (Human Resources Development Service of Korea)" on 22-07-2021.
- FDP on "AICTE Training and Learning (ATAL) Academy Programme on "Advances in Manufacturing" (AIM 4.0)" from 26-07-2021 to 30-07-2021.



**Mr. P. D. Devan**, Assistant Professor participated in a Training on "Six Sigma White Belt" on 07-02-2021.

**Mr. S. Rajesh**, Assistant Professor participated in a conference on "MRSE" on 23-07-2021.



**Mr. S. Sivakumar**, Assistant Professor - II participated in



- Guest lecture on "KLDA - Strategies to Enhance Classroom Engagement" on 22-07-2021.
- FDP on "CT Academy- organized FDP on Central Air Conditioning of a house using Revit" from 28-06-2021 to 02-07-2021.

### Others details

**Mr. P. D. Devan**, Assistant Professor, acted as a co-chairperson for KMRSE 21 virtual conference on 24-07-2021.



**Dr. B. N. Sreeharan**, Assistant Professor - II is in Publication committee as one of the editors in KMRSE'21.

**Dr. N. Sangeetha**, Associate Professor, acted as a co-chairperson for KMRSE 21 virtual conference on 24/07/2021.



## Departmental Activities



**Mr. M. A. Vinayagamoorthi**, Assistant Professor - II, acted as a technical session co-ordinator (5 Parallel Sessions) for KMRSE 21 virtual conference on 24/07/2021.



**Mr. B. Jeeva**, Assistant Professor, Coordinated the following Institution level awards and competitions.

- AICTE Visvesvaraya Best Teacher award 2021- submitted on July 7th, 2021
- AICTE Dr. Pritam Singh Foundation Award 2021- submitted on July 7th, 2021
- CII Industrial Innovation Award 2021–Research institution Category, submitted on July 29th, 2021.
- INAE Student Projects Award 2021- submitted on July 31st, 2021.
- TANSA- Tamil Nadu Scientists Award (TANSA) 2020- Submitted on July 23rd, 2021.
- ONGC Foundation Online Competition Swachhata Pakhwada 2021 - (Project Proposal submission by students)- Submitted on July 13th, 2021.
- Government of Tamil Nadu- Dr. A. P. J Abdul Kalam Award 2021- Submitted application on July 14th, 2021.
- Hack3D Summer challenge for the students- Application submitted on July 20th, 2021.



**Dr. S. Balasubramanian**, Associate Professor, acted as a technical session co-ordinator (5 Parallel Sessions) for KMRSE 21 virtual conference on 23/07/2021.



**Dr. S. Thirumurugaveerakumar**, Associate Professor, acted as a technical session co-ordinator (5 Parallel Sessions) for KMRSE 21 virtual conference on 24-07-2021.

# The SUCCESS stories

## JOURNEY TOWARDS BOSCH



**Mr. A. Arunkumar**  
**17BME088**

I am Arunkumar. A (17BME088), 2017 – 2021 Batch of Mechanical Engineering. I am very delightful to share with you all that I have placed in Robert Bosch Engineering and Business Solutions. Let me share my experience and thoughts on getting placement in Bosch.

As many of the mechanical engineering students dream is to get placed in core companies, with the same dream I also opted for Bosch. There were 3 rounds in the placement process of Bosch. The first round was the aptitude and technical test. The aptitude test, which was easy to prepare, as the placement cell arranged training program. The technical test which consists of basic concepts, formulas, and some problems. As I was preparing for a gate exam it was so easy to clear the technical test.

The second round which was technical interview. It happened around 40 mins. At the beginning the interviewer started with the resume. The interviewer asked about the projects which I have done. I had mentioned some NPTEL and Coursera courses in the resume, he checked my learnings from that course. Then it comes to my area of interest, as my area of interest is manufacturing the questions are moving around the basic concepts in manufacturing, industrial engineering, basic tool usage in solid works.

The third round was HR interview. They checked that I really wanted this opportunity, whether I knew some basic details about Bosch.

And this is not the first interview I had attended. Before Bosch I have already attended two IT companies which gives me an experience of attending interviews. After Bosch I have also attended the technical interviews of Rane and Sanmar. Some persons are don't like to get placement in IT companies, so they haven't opted in for those companies. But keep applying and attend number of interviews and tests which gives you more experience and confidence of facing the interviewer.

From attending the technical interviews of Core Company, I came to know that all they don't look for expertise in ourselves. They want whether we know the basic concepts of our academics (Fluid mechanics, Strength of materials, Engineering mechanics, Manufacturing, Heat and mass transfer, Engineering graphics) and we are ready to learn. If you have good academic score and good resume, then expressing our knowledge in interviews took major part. To clear the technical round, revise your basic concepts and keep on touch with your basics regularly.

Getting placement in a core company is not a big thing. If you have courage and remembering of basic concepts, it leads to a success. Before going to the interview have a glance about the organization. Core companies is not the only opportunity for us. Keep preparing for GATE exam which leads to lot of opportunity. If you prepare for the GATE exam, then no separate preparation needs for placements. GATE gives me some knowledge for clearing the technical tests and interviews of core companies. As I said things related to GATE, all of them have a question whether I have cleared a gate. And the answer is yes, I have cleared the GATE 2021, but the sad part is I didn't score well.

Hard work or Smart work if you really need it then work on it.

All the Best!



# The SUCCESS stories

## Journey towards RBEI (Bosch)



**Mr. Gowtham S**  
**17BME109**

Hello. I am Gowtham S (17BME109) from mechanical engineering of batch 2017-2021. I am elated to share you that I got placed in Robert Bosch Engineering and Business Solutions Private Limited. I would like to share my thoughts and personal experience on grasping the placement from Bosch.

Being a mechanical engineer looking for placement, getting placed in a core company is an aspiration. In the way, I got that opportunity and went for Bosch. There were of three rounds in the placement process of Bosch.

The first round was the aptitude and technical test. The aptitude test, which was so easy, as I have prepared from YouTube videos, training programs conducted by Placement cell (this is more than sufficient). As aptitude test is the first gateway for most of the companies, try to take mock tests as much as possible. This will improve your speed and reduces time during the test. If you are preparing for CAT exams, it will be very useful for placement purpose as well. The technical test which evaluates the knowledge of basic concepts, formulas, and some important problems. As I was also preparing for gate exam it was simple to clear the technical test. My suggestion here is to prepare for the competitive exams even if you are looking for placement from your second year itself, like CAT, GMAT, GATE, IES and so on. It will improve the necessary skills and enhances the knowledge. For this, you don't need to go for coaching centres and all. Self-preparation with hard work and dedication bears you the fruit in an easier manner.

The second round was technical interview. It took place for an hour. At the beginning, the interviewer started asking questions with the things mentioned in resume. So, put the things which you are sure about in the resume. Don't exaggerate the things you don't know. Be prepared with the things mentioned in resume. The interviewer asked about the projects and in-plant trainings which I have done. I had mentioned some courses done in NPTEL, Coursera and LinkedIn in the resume, he asked some questions based on my learnings from that course. Then the questions based on the area of interest, which is design & thermal, the questions are moreover like the basic concepts in design, Strength of materials, fluid mechanics, thermodynamics, and basic tool usage in solid works and ANSYS.

# The SUCCESS stories

The third round was HR interview. They asked me some general questions and verified whether I need that opportunity or not and asked me some basic stuffs about departments available in Bosch which I know.

And moreover, this is my fifth interview. The more you attend, the more we will learn and gives confidence and experience about the interview process. I had attended technical interviews of Sanmar, Rane groups before Bosch. It helped me a lot for Bosch as well.

Some companies have group discussion before technical interview. For that also, you must prepare. Don't be shy to start your conversation during GD. Do mention the things which you know regarding the title. Don't wait for the chance. Create it and speak bold and louder. It will increase our chances for subsequent rounds.

Don't get demotivated and underestimate your potential, when your friends are placed (this mind-set is happened for every unplaced student) rather try to identify where you have done mistake and prepare well for the next company. Life is of endless learning.

After attending technical interviews and general HR round, I came to know that they are looking for a candidate who has belief in himself and bold enough to tackle any situations. So, you don't need to be an expert in answering the questions. Whether the questions known to you or not, try to answer the question based on your thoughts. To tackle the interview and coming out with flying colours in the technical round, refresh the basic concepts in the area of interest you mentioned and keep on preparing for aptitude by taking mock tests in a periodic manner.

Apart from this, we are having huge opportunities in PSUs through GATE and IES exams. If you have interest in pursuing higher studies in MBA prepare for CAT exams and for MTech prepare GATE exams. Even though I was unable to crack GATE exam, it helped me to gain expertise in technical subjects which is very much useful for interviews. One with determination and hard work, can easily achieve the ambition in the life.

The future depends on what you do today!!Wishing you the best of luck in all your future endeavours. Feel free to connect with me and I am glad to help you!!

You can catch me up at:

WhatsApp: 9791664019

LinkedIn: <https://www.linkedin.com/in/gowtham070200/>

Gmail: [gowtham070200@gmail.com](mailto:gowtham070200@gmail.com)

# Student Articles

## MICRO MACHINING



**Nitheesh S V**  
**I Year Mechanical**

### Micro machining:

It is a process of machining very small parts with the tools which are smaller than 0.015 inches in diameter and tolerances. It is used in the manufacturing of very small and intricate parts, which are mostly used in our daily

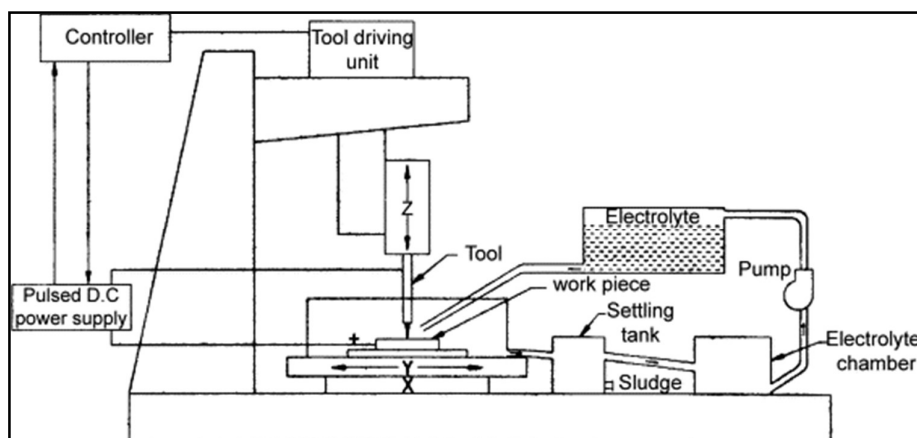


basis. Electronic and medical device markets use this micro machining in a large way. For, this manufacturing, it is necessary to have a machinery with High accuracy motion system, Sub- micron resolution, high speed spindles, high-speed cutting tools and so on. Its tools are as small as 0.001 inch (Which is nearly 1/3 diameter of human hair) in diameter to get the precision and needed outcome.

### Evolution:

This technique was started in late 1990s, to manage the increasing demand on very small and intricate parts. So, by many trial and error methods, this micro machining was finally found out. At that time, bringing out the right matched pair for tools and machines was very difficult task and Laser cutting was also not suitable to produce clean edges. Initially for cutting, they used low RPM motors with blades, but it did not bring up the expected results. Slowly, by upgrading to high-speed machines, and with high RPM spindles, it was possible to bring up the final required outcomes. Swiss-type lathes were also used, which is helpful with live tooling and helped in creating prototypes and small tuned parts.

### Setup:



# Student Articles

## Advantages:

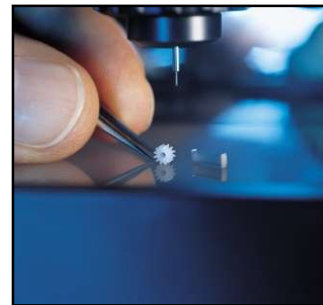
There are lots and lots of advantages in micro machining.

- The very basis important one is that it uses the specialized techniques and tools that helps in getting small and intricate products with tight tolerances.
- It is a single process method, for manufacturing small products, so that, same machine can be used for milling and turning. So that, the time and usage of parts will be reduced.
- It is an ideal for machining the prototypes and the parts with micro features in both the plastics and metals and includes many other side applications.
- Since it uses high spindle speeds and Swiss-type lathes, it has the ability of creating perfect clean cuts with more precise dimensions and tight tolerances. They offer the ability to do a single process machining for smaller parts.



## Benefits:

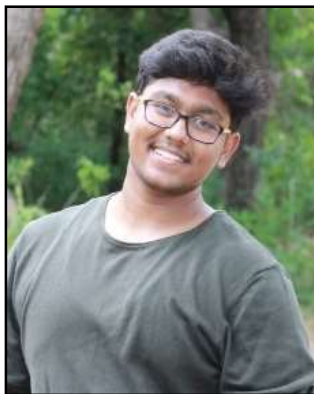
- It is cost effective and is very much flexible and can be easily configured.
- Laser micromachining is contactless machining with no tool wear and load bearing.
- It can machine almost any types of materials like, Polymers, glass, ceramics, silicon wafers, etc.





# Start-Up Corner

## THE SMART LEGGED E-TRANSFORMER



**Mr. Nitheeshwar R K**  
**19BME067**  
**II Year Mechanical - B**

In India how often do you see a wheelchair user at a school, at an office, at a shop, or a theatre? 95% of all wheelchairs sold in the country are based on a one-size-fits-all concept, and that restricts mobility, damages health, and lowers self-confidence for many people,” says Swostik Dash, a graduate of IIT Madras, and the co-founder of NeoMotion, a start-up that is focused on developing solutions for the physically disabled.

To that end, NeoMotion has developed NeoFly, a personalized wheelchair, and NeoBolt, a battery-powered clip-on device that converts NeoFly into a safe, roadworthy electric vehicle.

### About the start-up

Swostik has a BTech in Mechanical Engineering and an MTech in Product Design from IIT-Madras. During his time there, he worked on many projects which revolved around developing assistive solutions to empower the physically disabled, and they helped him understand the problems that people with disabilities face.

“While researching those projects, I spoke to many wheelchair users around the country, and learned that only a very few people with disabilities can go outdoors and be independent. Most of them needed the help of another person to use the wheelchair,” says Swostik.

He graduated in 2013 but kept working closely with projects in IIT. Finally, in 2016, along with Sujatha Srinivasan, the founder of the Rehabilitation Research and Device Development lab at IIT-M who has been working in the assistive devices space for over 25 years, he started NeoMotion.

“The product development has been supported by the TTK Center for Rehabilitation Research and Device Development and Imprint India Program of the Government of India. We received seed funding from IITM Incubation Cell and Villgro,” says Swostik.

Today, there are 16 employees working part of the organization which is headquartered in Chennai.



# Start-Up Corner

## NeoFly, the Customizable Wheelchair

NeoFly is a wheelchair that can be personalized to everyone's requirements. From adjusting its height and width, to the kind of wheels, and even color, NeoFly can be adjusted in 18 different ways to fit each person's body and environment.



"Compared to regular wheelchairs, NeoFly covers three to five times more distance for every push owing to the right posture, rigid frame, and ergonomic push-rim. The wheelchair is designed to the user's body measurements making the wheelchair compact. The overall size is 30% smaller, which enhances accessibility. Apart from that, the user can customize the color," says Swostik, adding that the seats are fitted with their trademark, NeoCushion, which has curves and grooves according to the person's legs which enhances the grip and stability.

"Every NeoFly wheelchair is customized. The customization happens remotely. First, the user would have to take measurements of their body based on tutorial videos. This is to ensure the correct dimensions. Second, they must answer a structured questionnaire about their health, medical conditions, and the environment they live in. This helps us understand their requirements better. Finally, we send them a visual representation of the wheelchair along with detailed specifications, after which we finalize the order," says Samson Daniel, User Champion at NeoMotion.

The device will be manufactured at their factory in Chennai and shipped. If the user requires any modifications to be made, Samson says it can be done by themselves with the help of detailed tutorial videos NeoMotion has prepared.

After three years of research and development, the product was launched in November 2019, and about 125 people are using it. While the base price is Rs 46,750, it varies depending on the upgrades made by the user.

## NeoBolt

After NeoFly, NeoMotion decided that they did not only want to provide wheelchair users with a personalized wheelchair experience, but also wanted to enable physically challenged people to be independent.

## Start-Up Corner

"The products presently available for wheelchair users for outdoor mobility are modified scooters or modified cars. But wheelchair users often need help in getting into and out of the vehicle. NeoBolt is a battery-powered clip-on device that converts NeoFly into a safe, roadworthy electric vehicle. It eliminates the process of the user transferring into other vehicles. Instead, it can be independently attached by the user within seconds, using their hands," says Swostik.



Apart from that, the fitting also has two front wheels which are placed at an elevated angle to make it accessible on rough terrain. The device, powered by a lithium-ion battery, can go to a maximum speed of 25 km per hour and covers 30 km per charge. The battery can be charged on residential power and takes four hours for one full charge.

"It will empower wheelchair users with a low-cost mode of outdoor mobility when compared to modified cars, or scooters," says Swostik.



Justin Jesudas, a resident of Hyderabad who works at an IT company is also a Paralympic swimmer and rifle shooter. He took part in the 2018 Asian Paralympic Games and was placed in the top 15 in the 50-meter Men's freestyle category. He started using a wheelchair 10 years ago after a spinal cord injury.

Three years ago, he started using NeoFly and NeoBolt because he wanted a solution to help him navigate with ease.

"Although I have a modified car to help me move around the city, it is not convenient when I must go to the grocery store at the end of my lane, or my parent's home which is a few streets away. It would take me 15 minutes to get into the car and load my wheelchair. With NeoBolt, within a few minutes, I can just fix the device myself and carry on with work. The wheels are of high quality which helps me navigate on bad roads, and the two wheels in front help the wheelchair climb over uneven surfaces with ease. The device is not only customized according to your physical dimensions but also based on your medical conditions."



# Biomimicry

## THE SUPER SHIELD



**Mr. Jayabalu S**  
**19BME219**  
**II Year Mechanical -A**

A person walks to work daily, and one day after finishing his work, he intended to go home, so he began walking. Suddenly, rain began to pour. He does not have an umbrella now, but he does have a cap, which he uses to cover his head from the rain. His clothes, on the other hand, are completely wet.



His buddy offers him a lift at that time, and throughout the journey, his friend advises him to wear a shirt that would not get wet even after pouring water. However, when he returned home, he began to investigate, and he discovered that it was caused by the lotus effect.

If you pour a glass water on the leaves of lotus you noticed that the water will not stick on those leaves it flow down quickly and this water will take the dusts on those leaves. This is called lotus effect.

If you look at a lotus leaf under a microscope, you'll see that it has little bumps called papillae. A waxy surface with a cone form can be found on the tip of the papillae. Like oil, it has a waxy surface. How is it that the oil and water don't mix like the water and the waxy surface don't mix? The water creates a spherical shape due to the low attraction force between the water and the waxy surface, as well as the cohesive force on water molecules.



If you pour a drop of water onto a glass plate, it will flatten out because the contact angle between the glass and the water is less than 90 degrees. This is what is known as a hydrophilic material. Similarly, if you pour a drop of water upon a waxy or plastic plate, it will form a spherical because the contact angle between them is greater than 90 degrees. Hydrophobic substance is the name given to this material.

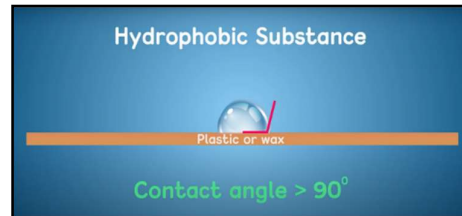


# Biomimicry



It has a contact angle of more than 150 degrees in the lotus leaf. As a result, these lotus leaves are referred to as a highly hydrophobic material. The spacing between these papillae is 10-15 micrometers at the same time. As a result, the area of contact between the lotus leaf and the water droplet is reduced.

As a result, the total contact surface area of the water droplet with the leaf is less than 5%. The water drop will be able to move freely on the lotus leaf because of this.



The researchers decided to imitate this highly hydrophobic characteristic in nature. They coated the material with substances such as Silica nano coating, Manganese oxide polystyrene, Zinc oxide polystyrene, and precipitated calcium carbonate to lower the adhesive force. The coated product became highly hydrophilic after this coating procedure. Not only water, but

also coffee, tea, and other beverages.

This chemical with extreme hydrophobic properties is available in spray form on the market. We may cover any material, such as a shirt, a shoe wall, or a wall, with this spray to make it highly hydrophobic.

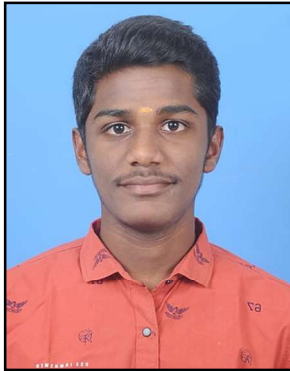


## APPLICATION

- By using this antifog spray can avoid fog in windows and specs.
- Using this coating can avoid dust in the building glass.
- This coating is used to avoid corrosion in materials,
- This is also used in aero plane glass to avoid forming ice.

# Reviewer's Point

## BMW CE 04



**Nithesh S V**  
**20BME080**  
**I Year Mechanical - B**

### BMW:

BMW is the leading manufacturer of motorcycles in the world and is trying to persuade car drivers to switch to two wheels. German automaker BMW Motorrad has now brought up its new electric scooter in the name of "CE 04", which is to be expected to come to market for sale by 2022. According to BMW, it is inevitable to change in the urban transport model.



### BMW CE 04:

First vision is on the appearance, the exterior is really an awesome work done by BMW, which gives a great look that can be described both as aggressive design and a professional one. This scooter comes with a new proposal, by saying that, this is not an offer for the typical riders, and it would be a great alternative one for cars and big IC (Internal Combustion) engines.

Generally, the electric scooters are very for many types of designs, which is better than in cars.

### Specifications:



The highlighting first feature is it comes with a good Storage compartment at the side and front, including a waterproof mobile compartment and a USB-C charging port. It comes with a 61 Ah Lithium-ion battery, which is derived from their cars. It gets an amazing Liquid cooled motor with a 41.4 bhp and a torque of 45.7 lg-ft. It has the capacity to cover a range of 80 miles or 128 km with the top speed of 75 mph or 120 kmph. It's charging time is approximately 45 minutes from 20% to 80% and without fast charging, it takes 4 hrs 20 mins for 0% to 100%.

The position of the battery is smartly integrated under the floorboards of machine, and the energy has been recovered to the battery under the technology of "Engine Braking", which is an automated process when the scooter is running. This scooter even gets a reverse gear, along with a Gimmick like sound.



# Reviewer's Point



It is then provided with a flat type of seat, which is placed on a tubular steel frame and gives a look of bulky, low-slung body with an Apron-mounted headlight setup, sleek turn indicators. It has optional panniers and rides on Blacked – out wheels. The overall weight of the scooter is claimed to be 231 kg, which is well proved to be a plus point while travelling inside city and requires less parking area.

## Instrument Cluster:



It gets a beautiful 10.25-inch TFT display with integrated map navigation and complete smartphone connectivity. The given specifications of the display like the HD resolution and gargantuan properties includes the facilities of split screen, like both riding function and navigation can be used at the same time.

The front suspension uses a tubular steel frame with 35 mm telescopic forks and a single swing arm at the rear with a preload adjustable shock absorber. There are twin discs of thickness 265 mm with four piston callipers at front to provide a good stopping force and a single piston calliper at the rear.

## Maintenance:

BMW offers the warranty for the batteries in CE 04 scooter as with a five year / 40,000 km. Also says that, if the capacity falls below 80% in this period, BMW will replace the battery with free of cost, because they say that people are mostly worries about “Liability of batteries”.

## Manufacture words:

BMW says that their target is not on a particular type of a person, rather than they aim at the people who states that there are no other plans to quit the petrol vehicles. According to them CE 04 is just their beginning. The head of BMW Motorrad, Markus Schramm states that “The name CE 04 leaves a lot of space underneath and above”. This is not their first attempt at an electric scooter, and this will continue further.

The outcome would be a good solution especially in the countries where the driving culture is at a higher level and the climate is more friendly to motorcycles.

# Student Activities

## Online Courses / Programmes attended / participated / completed

- **Mr. E. Bhavesh Kishore** participated in a Webinar titled Application of Heat in Automotive and Mechanical Systems on 22-07-2021 and another webinar titled Additive Manufacturing: Applications, Challenges and Future Scope on 22-07-2021.
- **Mr. S. Harshit** participated in webinars titled Additive Manufacturing: Applications, Challenges and Future Scope on 22-07-2021, Application of Heat in Automotive and Mechanical Systems on 22-07-2021, Non-Destructive Testing for Industrial Applications on 25-07-2021
- **Mr. B. Ibrahim Basha** participated in webinars titled Foundation of Computational Fluid Dynamics on 25-07-2021 and Electric Mobility - The Key to A Green Future on 31-07-2021
- **Mr. K. T. Imayan** participated in a Webinar titled How to Write a Research Paper on 30-07-2021.
- **Mr. P. S. Pramod** participated in webinars titled Application of Heat In Automotive And Mechanical Systems" And "Additive Manufacturing : Application, Challenges And Future Scope on 22-07-2021

## Papers Published

- **Mr. M. Muthuvisakan**, 18BME154, **Mr. U. Mahesh Kumar**, 18BME122, **Mr. V. K. Sivadhasan**, 18BME156, under the guidance of **Dr. V. Manivelmuralidaran** published a paper titled "Review on Braking systems in Railways" in the International Research Journal of Engineering and Technology, Vol. 8, Issue 7, July 2021, pp. 2333-2339.
- **Mr. M. Naveenkumar**, 18BME125, **Mr. M. Prasanna Venkatesh**, 18BME127, **Mr. R. Saravanan**, 18BME142, **Mr. D. R. Sharan**, 18BME178 under the guidance of Dr. V. Manivelmuralidaran published a paper on "Review on Braking systems in Automobiles" in the international journal of scientific and engineering research, Vol. 12, Issue 7, July 2021, pp. 434-449.

## GATE Coaching

The following four students are attending the GATE Coaching Class organized by KCT in MS Team.

- Mr. M. Barani, 19BME091
- Mr. I. Idhayaraja, 19BME072
- Mr. R. Vijay, 19BME245
- Mr. B. Saranyan, 18BME172



## Alumni Corner



**Editors along with the faculty members and students  
congratulate**

**Mr. V Gowtham, 14BME054**

**for getting selected as Sub Inspector.**

***Congratulations***



# KUMARAGURU

## college of technology

COIMBATORE – 641 049

### Department of Mechanical Engineering

#### INSTITUTE VISION:

The vision of the college is to become a technical university of International Standards through continuous improvement.

#### INSTITUTE MISSION:

Kumaraguru College of Technology (KCT) is committed to providing quality Education and Training in Engineering and Technology to prepare students for life and work equipping them to contribute to the technological, economic, and social development of India. The College pursues excellence in providing training to develop a sense of professional responsibility, social and cultural awareness and set students on the path to leadership.

#### DEPARTMENT VISION:

To emerge as a centre, that imparts quality higher education through the programme in the field of Mechanical Engineering and to meet the changing needs of the society.

#### DEPARTMENT MISSION:

The department involves in sustained curricular and co-curricular activities with competent faculty through teaching and research that generates technically capable Mechanical Engineering professionals to serve the society with delight and gratification.


### B. E. MECHANICAL ENGINEERING

#### PROGRAM EDUCATIONAL OUTCOMES (PEO's):

- PEO 1 :** Graduates will take up career in manufacturing and design related disciplines.
- PEO 2 :** Graduates will be involved in the execution of Mechanical Engineering projects.
- PEO 3 :** Graduates will take up educational programme in mastering Mechanical sciences and management studies.

#### PROGRAM OUTCOMES (PO's):

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- 
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
  5. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
  6. **Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
  7. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
  8. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
  9. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
  10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
  11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
  12. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

#### **PROGRAM SPECIFIC OUTCOMES (PSO's):**

1. Apply the fundamentals of science and mathematics to solve complex problems in the field of design and thermal sciences.
2. Apply the concepts of production planning and industrial engineering techniques in the field of manufacturing engineering.

#### **M. E. INDUSTRIAL ENGINEERING**

#### **PROGRAM EDUCATIONAL OBJECTIVES (PEO's):**

- PEO 1 :** Graduates will be mid to higher level management / engineering professionals with responsibilities in engineering management, data analysis and business operations.
- PEO 2 :** Graduates will be engineering professionals, and technology leaders who would manage such functions as plant engineering, production, supply chain and quality management.
- PEO 3 :** Graduates would function as educators or researchers in academic institutions.



#### **PROGRAM OUTCOMES (PO's):**

- P01 :** An ability to independently carry out research /investigation and development work to solve practical problems.
- P02 :** An ability to write and present a substantial technical report/document.
- P03 :** Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

#### **PROGRAM SPECIFIC OUTCOMES (PSO's):**

- PS01 :** Graduates able to apply the engineering management and data management concepts in industrial engineering areas.
- PS02 :** Graduates able to apply industrial engineering skills and knowledge to manage the functions of production and supply chain management.

### **M. E. CAD/CAM**

#### **PROGRAM EDUCATIONAL OBJECTIVES (PEO's):**

- PE01 :** Graduates excel in Professional career and/or higher education or/ research by continuously updating the knowledge and skill in the fields of Computer Aided Design and Manufacturing.
- PE02 :** Graduates can analyze the complex problems using advanced modelling and analysis tools and thereby solve problems related to product design and manufacturing area.
- PE03 :** Graduates work individually and in a team with effective communication skills and pursue lifelong learning.

#### **PROGRAM OUTCOMES (PO's):**

- P01 :** An ability to independently carry out research /investigation and development work to solve practical problems.
- P02 :** An ability to write and present a substantial technical report/document.
- P03 :** Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

#### **PROGRAM SPECIFIC OUTCOMES (PSO's):**

- PS01 :** Graduates will be able to apply the knowledge and skill in solving the real-time problems in the Computer Aided Design and Manufacturing field.
- PS02 :** Graduates will be able to analyse complex problems and provide solutions using advanced tools in product design and manufacturing area.