

Yaantrika Newsletter



Department of Mechanical Engineering

Volume 3

Issue 2

June 2018

Vision and Mission of the Institute

VISION

- To be one of the premier Institutes of Engineering and Management education in the country.

MISSION

- To provide Engineering and Management education that meets the needs of human resources in the country.
- To develop leadership qualities, team spirit and concern for environment in students.

OBJECTIVES

- To achieve educational goals as stated in the vision through the mission statements which depicts the characteristics of the Institution.
- To make teaching-learning process an enjoyable pursuit for the students and teachers.

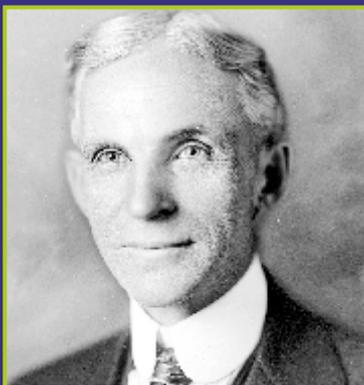
Vision and Mission of the Department

VISION

- To be a premier department for education in Mechanical Engineering in Karnataka State, that moulds students into professional Engineers.

MISSION

- To provide teaching - learning process that prepares engineers to meet the needs of industry and higher learning.
- Provide environment for self learning to meet the challenges of changing technology and inculcate team spirit and leadership qualities to succeed in professional career.
- To instill professional ethics and concern for environment for the benefit of society.



Yaantrika from the Department of Mechanical Engineering is dedicated to the American industrialist Henry Ford "Founder of the Ford Motor Company" and sponsor of the development of the assembly line technique of mass production.

What's inside.....!

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- ✓ Students' achievements



B. N. M. Institute of Technology

(Approved by AICTE, Affiliated to VTU, ISO 9001:2008 certified and accredited as grade A Institution by NAAC)

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From Editor's Desk

Dear Readers,

Welcome to the June 2018 issue of 'Yaantrika'

The team of Yaantrika, likes to give our readers an intellectually stimulating news letter. The newsletter endeavors to reflect the values and the quality of our esteemed Institution. The presentation of the entire newsletter shows the creative indulgence of our students.

We would like to appreciate all the students who contributed the articles for the issue. It is the willingness to put effort, share knowledge, concerns and special insights that have made this issue possible.

Knowledge is treasure which appreciates when we share and depreciates when accumulated. Never stop sharing knowledge and helping others.

ABOUT ME DEPARTMENT

Department of Mechanical Engineering started in the year 2011-2012 with an intake of 60 students and the department offers undergraduate program in Mechanical Engineering is headed by Dr. Mukesh Patil. All the laboratories have been established procuring state of the art equipments. The department has a team of talented and well qualified staff members, with a blend of industrial and academic experience. Faculty members with Master's and Doctorate degree qualification having specialization in Machine Design, Thermal and Manufacturing Engineering are rendering their service to academics. The department has started R&D centre from academic year 2017-2018. Numerous research activities have been planned through the R&D centre.

BNMIT-Toyota Centre of Excellence was inaugurated on 14th May 2018. It is the state of the art lab equipped with cut section model of engine and transmission assembly along with clutch plate and differential gear box. The centre has been provided with separate engine and transmission systems, which can be assembled and dismantled completely. From academics point of view, this type of exposure to the students of Mechanical Engineering plays vital role in their understanding of majority of core subjects by correlating the theoretical aspects of learning with hands-on sessions on the machines in the centre.

"3D Painting" Structures in Space

Speculating about life on other planets has fueled science fiction novels and movies for decades. But how often do we consider our own lives on another planet, seeing ourselves as the visitors from space? Just how would humans live their lives and meet all of their needs on another planet?

A team at Northwestern University believed being able to manufacture many of the goods needed ourselves was the key, in particular our housing and shelter. And several members of the team went on to found Dimension Inx, in Chicago, IL, where they are creating a way to do just that and more. Even if the chance to apply or test their concept on other planets may be many decades away.



Developing a method called "3D painting," the team's work involves new inks that are infused into green bodies, a weakly bound clay material.

"We can take these green bodies and we sinter the particles together by putting them into a furnace after the printer. It burns off the polymer and makes these ceramic-type structures," says co-founder Ramille Shah, also assistant professor at Northwestern University. "The material is no longer flexible but stronger, and the iron oxide in there can make it magnetic because metal parts are in there."

The process could be used to construct durable buildings or shelters on other planets, says co-founder Adam Jakus, who was a postdoctoral fellow at Northwestern University when he started working on the project. Housing is clearly one of the most important aspects to colonizing other worlds. "An important part of our work is that you don't have to use a powder bed. And all the materials we use can be found on the places you'd first be considering for colonization, like the moon and Mars," he says. "Even if it isn't then, you could bring the material and it can be recycled."

The materials they used to test whether the method could potentially work were NASA-approved for Mars and the moon, Jakus says. One member of the team, Katie Koube, had worked at NASA as an intern. "She was looking at our 3D printing process and painting 3D biomaterials and that's when we realized other materials could be implemented," Jakus says. "You don't change the way you paint. If you want to 3D print steel or 3D print ovary tissue, you don't change the way you do it. It's still about getting the raw materials. Then it comes down to knowing what to do with them."

Tejas Sharma B N
VIII Semester

NASA's Alien Tire



The use of shape memory alloy in radial stiffeners provides greater load carrying potential. Image: NASA

NASA is dedicated to futuristic vehicles and missions, but the agency is also setting out to reinvent the wheel. The new "superelastic tire" developed at NASA's Glenn Research Center in Cleveland is built to thrive on inhospitable planets such as Mars, where the rocky terrain is hard to maneuver and temperatures can reach -130 °C.

But the real advantage of the new tire is its ability to carry heavy loads without suffering permanent damage. For lunar and planetary rovers that are intended to explore for months or years with no hope of getting spare parts, that is a real benefit.

Tire damage became a concern for NASA engineers in 2013 after they noticed significant wheel degradation on Curiosity, the car-

sized rover that explored Gale Crater on Mars. "We wanted to ensure any wheels sent to Mars never got damaged again," says Santo Padula, a materials research engineer at Glenn.

A team led by Colin Creager, a mechanical engineer at NASA, had been developing tire prototypes based on a steel spring design. These springs could carry heavy loads but faced limits on the force and deformation they could handle. Too much, and the wheels would fracture due to excessive stretching of bonds between atomic structures.

Instead of steel, Padula recommended fashioning a wheel from a nickel titanium shape-memory alloy, which had a unique deformation mechanism that could snap a tire back into its original shape in case of deformities.

The alloy is able to reshape itself due to a unique deformation method. Rather than expanding the bonds of a crystal lattice, it rearranges the atomic structure to another crystal lattice form. That means that if the solid element needs to bend or deform when hurdling over an obstacle like a rock, it would come back to its original shape instead of separating or fracturing.

After several years of trials, the team believes it has hit on the right formula for the alloy. The nickel-titanium alloy can take a 10 percent to 12 percent strain, while the earlier materials had only a 0.3 percent strain. The engineers have tested the new tires with a load of 140 pounds—up to hundreds of times the weight of the tires—and believe they could support even more.

Though the tires were designed with space in mind, the NASA engineers have perhaps a loftier goal in sight. "We want to see this used on earth," Creager says.

Shape-memory alloy tires may someday be used in automobiles, heavy equipment, and military vehicles. The airless design could give vehicles better traction on sand and dirt, and might ultimately reduce the amount of rubber used in tires

Harshith R
VIII Semester

ENGINEERS DEVELOP FLEXIBLE, WATER-REPELLENT GRAPHENE CIRCUITS FOR WASHABLE ELECTRONICS

New graphene printing technology can produce electronic circuits that are low-cost, flexible, highly conductive and water repellent. The nanotechnology "would lend enormous value to self-cleaning wearable/washable electronics that are resistant to stains, or ice and biofilm formation," according to a recent paper describing the discovery. "We're taking low-cost, inkjet-printed graphene and tuning it with a laser to make functional materials," said Jonathan Claussen, an Iowa State University assistant professor of mechanical engineering, an associate of the U.S. Department of Energy's Ames Laboratory and the corresponding author of the paper recently featured on the cover of the journal *Nanoscale*. The paper describes how Claussen and the nanoengineers in his research group use inkjet printing technology to create electric circuits on flexible materials. In this case, the ink is flakes of graphene the wonder material can be a great conductor of electricity and heat, plus it's strong, stable and biocompatible.

The printed flakes, however, aren't highly conductive and have to be processed to remove non-conductive binders and weld the flakes together, boosting conductivity and making them useful for electronics or sensors. That post-print process typically involves heat or chemicals. But Claussen and his research group developed a rapid-pulse laser process that treats the graphene without damaging the printing surface even if it's paper. And now they've found another application of their laser processing technology: taking graphene - printed circuits that can hold water droplets (they're hydrophilic) and turning them into circuits that repel water (they're superhydrophobic). "We're micro-patterning the surface of the inkjet-printed graphene," Claussen said. "The laser aligns the graphene flakes vertically like little pyramids stacking up. And that's what induces the hydrophobicity."

Claussen said the energy density of the laser processing can be adjusted to tune the degree of hydrophobicity and conductivity of the printed graphene circuits. And that opens up all kinds of possibilities for new electronics and sensors, according to the paper. "One of the things we'd be interested in developing is anti-biofouling materials," said Loreen Stromberg, a paper co-author and an Iowa State postdoctoral research associate in mechanical engineering and for the Virtual Reality Applications Centre. "This could eliminate the build-up of biological materials on the surface that would inhibit the optimal performance of devices such as chemical or biological sensors."

The technology could also have applications in flexible electronics, washable sensors in textiles, microfluidic technologies, drag reduction, de-icing, electrochemical sensors and technology that uses graphene structures and electrical stimulation to produce stem cells for nerve regeneration. The researchers wrote that further studies should be done to better understand how the Nano- and micro surfaces of the printed graphene creates the water-repelling capabilities.

The current studies have been supported by grants from the National Science Foundation, the U.S. Department of Agriculture's National Institute of Food and Agriculture, the Roy J. Carver Charitable Trust plus Iowa State's College of Engineering and department of mechanical engineering. The Iowa State University Research Foundation is working to patent the technology and has optioned it to an Ames-based start-up, Nano Spy Inc., for possible commercialization. NanoSpy, located at the Iowa State University Research Park, is developing sensors to detect salmonella and other pathogens in food processing plants. Claussen and Stromberg are part of the company.



NagPoojith
VI Semester

DEPARTMENTAL ACTIVITIES



Sri. Narayan Rao R. Maanay, Secretary, BNMEI addressing the gathering during Inauguration of **BNMIT-Toyota Centre of Excellence**



Inauguration of **BNMIT-Toyota Centre of Excellence** held on 14th May 2018 by Sri.K.V.Rajendra Hegde, General Manager, EA, CSR-State, PR & BIA, Toyota Kirloskar Motor Pvt. Ltd., (TKM) Bidadi, Bengaluru and Sri.M.K.Swamy, General Manager, PCLD, Toyota Kirloskar Motor Pvt. Ltd., Bidadi, Bengaluru.



Sri. Mahadev Prasad .S, Senior Project Manager, Siemens Technology and Services Pvt. Ltd, Bangalore delivering a speech on **“Ideas to Business”** during FCD functions held on April 13th, 2018



Talk on Scope of **HVAC system** conducted by
Prinston Smart Engineers,
Bengaluru for IV and VI semester of the
Mechanical Engineering department
on 6th March, 2018 as a part of club activity.



CNC Workshop conducted by
Glisten Education
for IV and VI semester and faculty
members of the Mechanical Engineering
department on 14th February 2018
as a part of club activity.

Industrial visits



One day Industrial Visit to **Yuken India Pvt. Ltd.**
on 15th May 2018 by IV Semester Students.



One day Industrial Visit to
Volvo Construction Equipment Pvt. Ltd.
On 10th April 2018 by VI Semester Students.

FACULTY ACHIEVEMENTS

- Dr. Anil Kumar B S published a paper on “Computational investigation of flow separation over NACA 23024 Airfoil at 6 million free stream Reynolds number using K-Epsilon turbulence model” Materials Today: Proceedings 5 (2018), Volume/Issue 5/5P2 pp. 12598-12606.
- Dr. Anil Kumar B S delivered talk as resource person on Engineering Graphics in one day workshop on AICTE Model Curriculum at BNMIT, on 9th May, 2018.
- Dr. Anil Kumar B S presented a paper on “A comparative study of Mechanical Properties of Cast & Heat Treated Al6063-Mwcnt Composite Fabricated by stir Casting process” in Advances in Manufacturing, Materials & Energy Engineering (Icon MMEE-2018) held at Mangalore Institute of Technology and Engineering, Moodabidri on 2nd & 3rd March 2018.
- Mr. Saravanan V published a paper on “Numerical investigation of pressure drop & heat transfer in pin fin heat sink & micro channel pin heat sink” in International Journal of Heat & Technology, Vol. 36, No.1, March 2018, pp. 267-276.
- Mr. Harish A presented a paper on “Impact of Ball burnishing process parameters on surface integrity of an 2024 alloy” in Manufacturing, Materials & Energy Engineering (Icon MMEE-2018), held at Mangalore Institute of Technology and Engineering, Moodabidri on 2nd & 3rd March 2018.
- Mr. Kumaraswamy H S presented two papers on “Advances in Manufacturing, Materials & Energy Engineering (Icon MMEE-2018)” held at Mangalore Institute of Technology and Engineering, Moodabidri on 2nd & 3rd March 2018.
- Mr. Kumaraswamy HS published a paper on “Influence of Mechanical & Tribological Behaviour of Al 2024 MMC Fabricated By Stir Casting Technique-A Review” Materials Today: Proceedings 5(2018), Volume/Issue5/5P2 pp. 11928-11936.
- Mr. Arun Joshi presented a paper on “A comparative study of Mechanical Properties of Cast & Heat Treated Al6063-Mwcnt Composite Fabricated by stir Casting process” in Advances in Manufacturing, Materials & Energy Engineering (Icon MMEE-2018) held at Mangalore Institute of Technology and Engineering, Moodabidri on 2nd & 3rd March 2018.
- Mr. Sandeep K presented a paper on “Experimental Studies on Effect of Nano particle blended biodiesel combustion on performance and Emission of CI Engine” in Manufacturing, Materials & Energy Engineering (Icon MMEE-2018), held at Mangalore Institute of Technology and Engineering, Moodabidri on 2nd & 3rd March 2018.

STUDENTS' ACHIEVEMENTS



Shreyas S P and Reethan D L of 8th Sem Mechanical Engineering bagged the Third Prize in National level working model making competition at Dev Bhoomi Group of Institutions, Dehradun on 16th and 17th April 2018.

- Best outgoing student for the year 2017-18 of Mechanical Engineering Department has been awarded to Kashyap N Pandit.
- Manoj D of 4th Sem bagged the Third Prize in free style solo dance men category and Second Prize in Indian group dance held on 17th April 2018 at BNMIT.
- Kishan R of 6th Sem bagged the Second Prize in Debate held on 24th April 2018 at BNMIT.
- Nagpoojith B R of 4th Sem bagged the Second Prize in classical solo/instrument percussion solo & non percussion held on 24th April 2018 at BNMIT.
- Rakshith K and Vishakh of 6th Sem bagged the Runners Prize in Quiz held on 25th April 2018 at BNMIT.
- Daniel C and Aditya of 4th Sem bagged the First Prize in Indian group song held on 30th April 2018 at BNMIT.
- Naren P of 4th Sem bagged the Second prize in Indian group song held on 30th April 2018 at BNMIT.
- Tejas of 2nd Sem, Abhishek Patil and Paras Param of 4th Sem participated in VTU Bangalore Central Zone Inter Collegiate Cricket (Men) Tournament 2018-19 ,held at CMRIT on 3rd March 2018.
- Pruthvishri Hegde and Prem Kumar of 8th Sem, Siddharth T S, Nithin K N and Shrinidhi of 4th Sem participated in State level Inter Collegiate Memorial Tournament held at BMSCE Bangalore, on 8th and 10th March 2018.
- Kirankumar. C of 6th Sem participated in VTU inter Collegiate Inter Zone Chess (M &W) Tournament 2018-19 held at MVJCE, Bangalore on 26th to 28th March 2018.
- Omkar N Kashyap and Vighnesh Nandavar of 2nd Sem participated in Folk orchestra In State Level VTU Youth Festival held at Angadi Engineering College Premises, Belagavi, held from 11th to 13th April 2018.

EDITORIAL TEAM

FACULTY

Sucharita Mohanty
Asst. Professor

Manu A S
Asst. Professor

STUDENTS

Tejas Sharma B N, VIII Sem
Deepak Srinivas, VI Sem 'A'
Nag Poojith, VI Sem 'B'
Samarth R Hegde, IV Sem