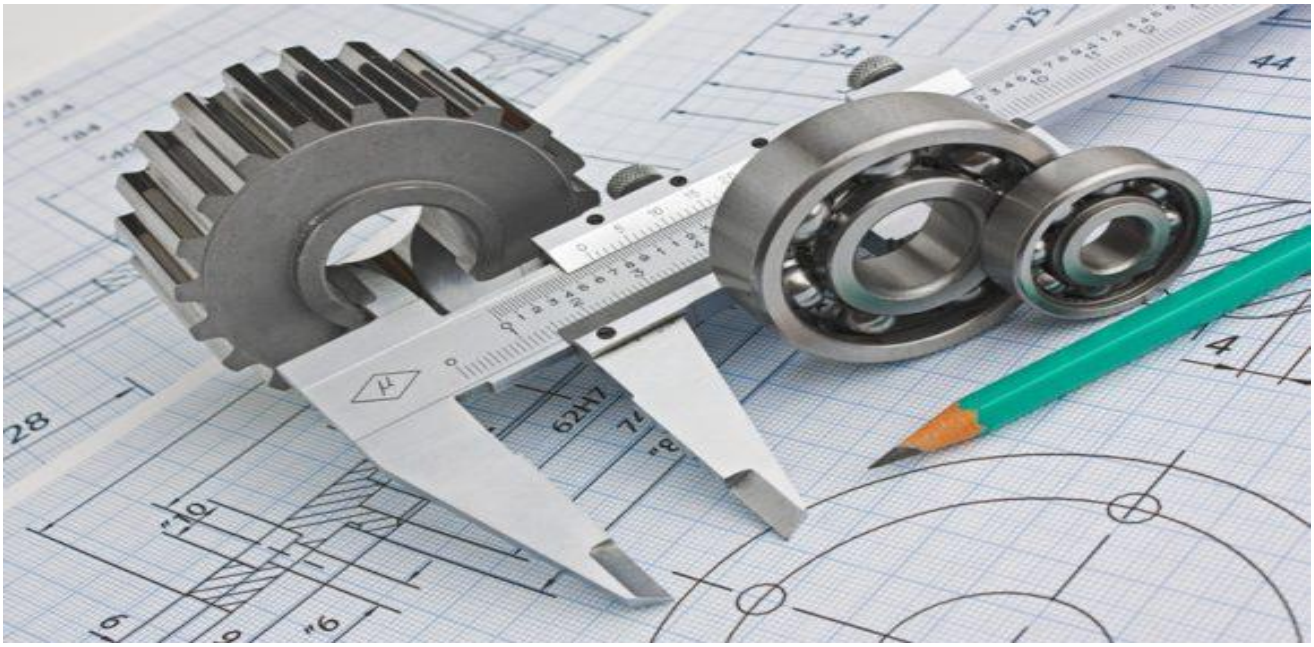
ECHELON INSTITUTE OF TECHNOLOGY

NEWS LETTER July-Dec 2022

DEPARTMENT OF MECHANICAL ENGINEERING



FROM THE DESK OF EDITIOR IN CHIEF

It gives me immense pleasure to present the latest issue of Buoyant. The period has been packed with variety of activities in the hectic and tight academic schedule. This edition of the newsletter summarizes the achievements and highlights of the semester. I would like to take this opportunity to present the readers with the glimpses of the week and other activities of the Mechanical Engineering Department. In this quest, I would like to keep you up –to-date with the happenings of the department. And hence, present you with this quarterly newsletter. You can know the details as you go through the newsletter. Department was strengthened with two new faculties including me through stringent selection process. Every effort was made to avoid the boredom of class room lectures and ample opportunities were provided for personality development of the students and enhancement of their skills as per their choice/ area of interest through hobby clubs and industrial visits. This approach helps maintaining a very healthy and conducive atmosphere of learning, keeping the students in an excited state eager to grasp knowledge at all times. The department is scaling new heights with such positive approach.

Dr.Jaivir Singh

Associate Professor

Department of Mechanical

EngineeringEIT Faridabad

ENDEAVOUR BY HOD

The main motto of our department is to provide quality education. The process of learning is extremely important in life. What you learn, how you learn and where you learn play a crucial role in developing ones intellectual capability, besides career. I am proud to see that the students and faculty of our department have put in appreciable effort into creating this newsletter. This newsletter highlights the academic and nonacademic activities of both faculty and students of the Department of Mechanical Engineering.

I congratulate the editorial team for their brilliant and original efforts. I wish all the students and faculty a great academic career

HOD Mechanical Engg.
EIT, Faridabad

ACTIVITIES IN MECHANICAL DEPARTMENT

- Project Presentation by Students on the Current Development in Infrastructure on 8 May.
- Webinar on How to do Well in Personnel Interview by Mr. Sunil Dua(Chief Knowledge Expert with TIME Education) on 22th April 2021.

Departmental Updates

Welcoming New members

The department extends a very warm welcome to the faculty members who joined us in this semester.

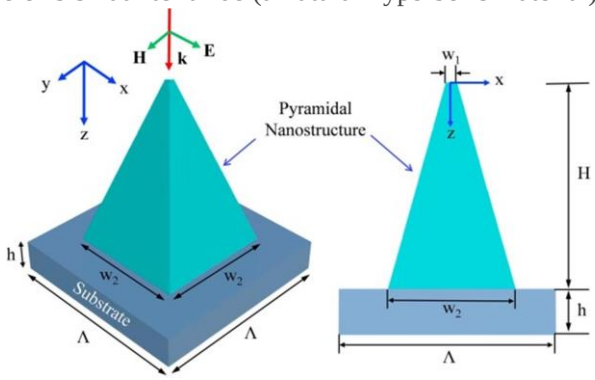
Sr. No.	First Name	Last Name	Date of Joining	Department
1	Gaurav	Kumar	12-09-2022	MECHANICAL ENGINEERING

We are sure they will enjoy their journey at Echelon.

Modern Advancement in Mechanical Engineering

1. An Absorber design using a natural hyperbolic material for harvesting solar energy

Researchers led by Professor Ping Cheng, from Shanghai Jiao Tong University, in collaboration with Professor Zhuomin M. Zhang, from Georgia Institute of Technology, developed a perfect light absorption structure that utilizes an array of pyramidal nanostructures made of bismuth telluride (a natural hyperbolic material) over a thin substrate to absorb incident solar radiation.



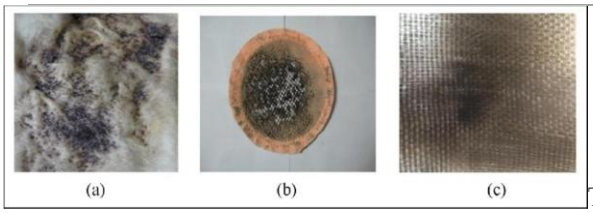
The study successfully presented a perfect absorber design that manipulates a periodic array of pyramidal nanostructures that are made of a natural hyperbolic material bismuth telluride on a metallic substrate. The results from the experimental procedure undertaken in this study have shown that the proposed structure can achieve absorptance values of almost 100% in the wavelength range of 300–2400 nm, upon which most of the solar radiation spectrum fall into. Altogether, the proposed met material has great potential application and can lead to the effective harvesting of solar energy during photo thermal conversion processes in water or aqueous solutions.

2. Windows Double as Solar Panels: fully transparent solar-power-generating windows

These windows have solar cells installed in the edges at a specific angle, which allows the incoming solar light to be efficiently transformed into electricity. The windows could generate 8 to 10 watts of power, according to Grapperhaus."Right now, we are looking for iconic projects all over the world to show that a large glass building can be made energy neutral in an aesthetic way."Photographer: Jasper Juinen

3. Experimental investigation on the performance of non-metallic flexible fire-resistance materials in flameproof diesel engine locomotive

Three kinds of flexible refractory fiber materials were used to verify the performance of fire resistance, according to explosion-proof principle and test methods of flame arrests. Then, a comparison of transmission efficiency between flexible refractory fiber arresters and general arresters was given. The aim of this is to verify the properties of non-metallic flexible fiber materials in fire resistance and transmission efficiency so that we can apply it to the flameproof diesel engine locomotive.



Theoretically, refractory fibers have good performances of air permeability and complex internal space, so it can provide with absorption area. First, irregular porous structure increases the cooling area. The temperature of the flame can decrease under the ignition point and quench after the heat exchange. Tiny pores of the porous materials, moreover, increases the probability of absorbing free radicals during chain reaction so as to prevent the combination of free radicals and premixed gas. Then, the chain reaction will slow down and even terminate.The investigation was aimed at testing the performances in fire-resistance and transmission efficiency of non-metallic flexible materials in flameproof diesel engine locomotive which may replace traditional metal flame arresters with low gas transmission efficiency. On the basis of the chain reaction mechanism, the mixed gas was burnt in the experiment, and the free radical which can be absorbed by tiny pores of flexible fiber materials and quenched was released (1School of Mechanical and Electrical Engineering, China University of Mining and Technology, Xuzhou, China2Jiangsu Collaborative Innovation Center of Intelligent Mining Equipment, Xuzhou, China-Kedi Chen, Baolin Li).Check out the ennomotive blog for **more posts about mechanical engineering innovations**, don't miss out!

4. Biodiesel Production from Waste Cooking Oil by Using an Ultrasonic Tubular Reactor

The aim of this research is to find an optimum synthesis biodiesel from waste cooking oil (WCO) using an ultrasonic tubular reactor. The experimental studies explored the variations in reaction time, molar ratio WCO to methanol (MeOH), amount of catalyst, the frequency of ultrasonic and output power ultrasonic on the ester contents. Comparisons of type ultrasonic and also the mechanical stirring method based on time reaction were investigated.  The optimum results of the biodiesel process is the reaction time of 5 minute, NaOH catalyst 1%wt of WCO, molar ratio WCO to MeOH of 1:6, frequency ultrasonic of 20 kHz and output power ultrasonic of 650 W. The reaction time reduced 12-24 times compared to both of method and the yield of ester contents was obtained at 96.54%wt.

5. Acoustic Wave Separation

FloDesign Sonics, with funding from the National Science Foundation, has developed a uniquely effective patented technology called Acoustic Wave Separation (AWS) that separates or cleans water or other liquids from other contaminants. Acoustic waves were the secret behind this breakthrough technology that divorced all foreign substances such as radioactive material, hydrocarbons, bacteria, chemical additives, salt, and more, without the use of

Current Mechanical Engineering Projects for Students

- Manufacture CNC Machine using Arduino board
- Electro-Magnetic Moulding
- Automatic Pneumatic Vice and Jack
- Design and Fabrication of Safety Lift Mechanism
- Solar operated sprayer for farming
- Design and Fabrication of solar-powered grass cutter
- Automatic animal feeding system
- Mobile operated firefighter robot
- Library books auto pickup system