

Mechanical  
Engineering

## Aspire

Achievements in Sports, Projects, Industry, Research and Education

All About Nobel Prize - Part 84

## GERHARD ERTL

[Source](#)

**Gerhard Ertl** is a German physicist and a professor emeritus at the Department of Physical Chemistry, Fritz-Haber-Institut der Max-Planck-Gesellschaft in Berlin, Germany. Ertl received the 2007 Nobel Prize in Chemistry for his studies of chemical processes on solid surfaces. His research laid the foundation of modern surface chemistry, which has helped explain how fuel cells produce energy without pollution, how catalytic converters clean up car exhausts, and even how iron rusts.



Ertl was born on 10 October 1936 in Bad Cannstatt, Stuttgart, Germany. At the age of 3, his family moved to the nearby village of Schmiden, where he entered elementary school in 1942. In summer 1946, he joined the Johannes Kepler Gymnasium (high school) in Bad Cannstatt, where he passed the final examination in spring 1955. Ertl had been a good student with some interests in science and history. Computers were not yet available, and it was hence quite common for boys to do some chemical experiments at home. He had a good book on this topic, and he enjoyed following up its prescriptions in his bedroom. There were, however, times when some strong smell or strange noise would erupt out of his room, scaring his mother. Fearing for his health, his mother asked him to stop these activities. As a result, Ertl turned his interest to radio sets and therefore shifted from chemistry to physics. He entered the Technical University of Stuttgart in 1955 and obtained his diploma in 1961, after spending some time in between at the universities of Paris and Munich.

For his diploma thesis work, Ertl decided to return to chemistry, and hence physical chemistry became his subject of choice. He was fortuitous to find a mentor who was not only an outstanding scientist but also an inspiring person - Heinz Gerischer. Just before Ertl joined Heinz's group, Manfred Eigen in Göttingen had developed novel techniques for studying the kinetics of very fast reactions in solutions, for which he received the Nobel Prize in Chemistry in 1967. Heinz had the idea that such a method could also be based on rapid heating of an aqueous phase by a short pulse of microwave

radiation. This project was Ertl's first contact with real research, and he became fascinated by the challenge to develop an apparatus that could measure the rate constant of one of the most fundamental reactions in chemistry - the recombination of  $\text{H}^+$  and  $\text{OH}^-$  to  $\text{H}_2\text{O}$ . Ertl knew he could solve this task, but it became evident that the applicability of this technique would be limited, and hence he asked Heinz for another project. After briefly considering some more conventional problems of electrochemistry, Heinz told him: "If you want to enter a field on which we know only a little, instead of studying the solid/liquid interface, think about what you could find out about the solid/gas interface. I have no idea about this field, but you will have full freedom and my support."

Around this time, Heinz accepted an offer from the technical University of Munich, and Ertl joined him as an assistant. Ertl considers this to be his first step in the emerging area of surface science. In order to keep a surface clean for a long enough time, ultrahigh vacuum (UHV) was required, which in those days could only be achieved by sealed glass systems evacuated by mercury diffusion pumps and baked to  $450^\circ\text{C}$  – a real adventure. Ertl managed to build such an apparatus and was studying the reaction  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$  at the surfaces of Germanium single crystal surfaces – not the best choice, but at least sufficient to provide him a Ph.D. degree in early 1965.

During his thesis work, the first stainless-steel UHV system and low energy electron diffraction (LEED) technique became commercially available, and the German Science Foundation (DFG) was soon willing to fund such an apparatus. It was during this time that the real surface science era began.

Ertl first studied the interaction of oxygen with various Cu single crystal surfaces and made the first attempt to study the progress of a surface reaction with this approach. He continued this study with his first Ph.D. student, P. Rau, where they combined the structural information from LEED with the thermodynamics and kinetics in the interaction of  $\text{O}_2$  and CO with a Pd (110) surface. In 1967, Ertl received his next academic degree (Habilitation) and was appointed as a professor of physical chemistry at the Technical University of Hannover. There the studies on adsorption and reactions of small molecules at metal single crystal surfaces continued, new techniques were incorporated, and the group continuously grew up till 1973, when Ertl accepted an offer from the University of Munich.

Practically all coworkers joined Ertl in Munich. In this period, they elucidated the mechanism of catalytic ammonia synthesis. They also investigated physical problems, such as the study of the electronic properties of the outermost atomic layer by de-excitation of metastable noble gas atoms, and the construction of a molecular beam apparatus initiated their studies in the field of gas/surface dynamics. This fruitful era came to an end when Ertl received an offer from the Max-Planck Society to become the successor of his teacher, Heinz Gerischer, as the director of Fritz-Haber-Institut in Berlin.

In Berlin, Ertl took over the fairly large department of Physical Chemistry, which grew even further when all his coworkers arrived from Munich. After official retirement in October 2004, Ertl is still active in writing and giving lectures.

## Campus Update

### HCL's Shiv Nadar tops givers list

#### Azim Premji, Shiv Nadar head list of top philanthropists in India

HCL Technologies chairman Shiv Nadar is India's most generous philanthropist, according to the EdelGive Hurun India Philanthropy List.

Shiv Nadar, 75, ranked second with Rs 795 crore donation. As of 2019, Nadar has invested over \$800 million through the Foundation, impacting over 30,000 students directly. Nadar's wife, Kiran Nadar chairs the Kiran Nadar Museum of Art, India's first private philanthropic art museum exhibiting modern and contemporary works from India and the subcontinent.



Year	Shiv Nadar	Azim premji	Mukesh Ambani
Donations in Crores			
2019	826	453	402
2020	795	794	458
Cause	Education	Education	Disaster Relief

### 2 SSN faculty members among top 2% scientists in the world, based on career-long citation impact



Dr. P. Ramasamy and Dr. P. Senthil Kumar from Sri Sivasubramaniya Nadar College of Engineering have figured among the top two percent scientists of the world in a list compiled by the prestigious Stanford University, USA.



The University has recently released the global list that represents the top two per cent of the most-cited scientists in various disciplines. The exhaustive list has 1,59,683 scientists, doctors and engineers.

The list classified the scientists based on career-long citation impact until the end of 2019 and also for the single year (2019). The Stanford ranking was prepared according to subject-wise analysis conducted by the University based on standardized citation indicators such as citations, H-index, co-authorship adjustment and a composite indicator.

## “Best Woman Professional (Early Career)” Award for the year 2020

Dr. Esther Florence S of ECE dept, was announced as the joint winner (co-winner-Dr. Anupama Kowli,IIT Bombay) of this years’ Shri Pralhad P Chhabria “Best Woman Professional (Early Career)” Award for the year 2020 by Hope Foundation and Research Centre, IEEE India Council and IEEE Pune Chapter.



Her credentials and merit were evaluated by jury members. The award carries a prize money of Rs. 1,25,000, a medal and a citation. The award was bestowed during the award Ceremony at the IEEE Women in Engineering, International Leadership Summit (WiE ILS 2020) on 8th November 2020. The award was conferred for research done majorly in developing a number of microwave components and testing devices for various applications in healthcare and the development of a loom that can introduce technical functionalities in cloth fabric.

## Murugan Ashwin (Mech’ 2012 Batch) – spinning it big

Murugan Ashwin has arguably the most potent googly in contemporary Indian cricket, and if they say spinners mature late then his best years could be ahead of him.



Murugan Ashwin has arguably the most potent googly in contemporary Indian cricket. Spin legend Anil Kumble and coach of Kings XI Punjab, had a quick look at him and decided what he wanted from the 30-year-old Tamil Nadu bowler.

Kumble told Murugan, “There is a fair amount of venom in your googlies. And you spin it big. I want you to bowl more googlies, not just against the left-handers but right-handers too.”

Having Kumble as coach was a ‘blessing’ for Murugan. “He wanted me and Ravi Bishnoi, a leg-spinner who has come from under-19 ranks, to be attacking, be looking for wickets. Our role definition was very clear,” he said.



## Department Update



### One faculty member in the department among top 2% scientists of world based on single year 2019 citation impact

**Dr. A K Lakshminarayanan** is listed in top 2% scientists of the world based on single year citation impact (2019) along with Dr. Senthil Kumar P and Dr. Ramasamy P in the Institution. The release stated that the scientists were grouped under 22 scientific fields and 176 sub-fields using indicators.

The researchers at Stanford University, California, USA, have created a database of 1,59,684 top scientists (nearly 1,500 Indians in it) of the world on the basis of standardized citation indicators which include information on citations, H-index, co-authorship and a composite indicator, etc., to conduct the study, the release added.

There is no large scale database that systematically ranks all the most-cited scientists in each and every field to a sufficient ranking depth. There are some like Google Scholar that allow scientists to create their profiles and share them in public. This large database created by experts at Stanford University led by Dr John Ioannidis is also based on data from Scopus that ranks journals and gives a citation index.



### Project Proposals Submitted

**Dr. Satheesh Kumar Gopal and Dr. S. Vijayan** as Co-Principal Investigators along with Dr. Vijayalakshmi (PI), ECE and Dr. T. Nagarajan (Co-PI), IT submitted a proposal on "Speech and Gesture enabled Robotic arm for Wheelchair" towards the AWS scheme for a budget of **USD 17,525** on 11.10.2020.

Dr. S. Vijayan, Associate Professor, Mechanical Department as the Principal Investigator, **Dr. I. Jayakaran Amalraj**, Associate Professor, Mathematics Department, and Dr. Satheesh Kumar Gopal, Associate Professor, Mechanical Department and as the Co-Investigator has submitted a Funded project entitled "Tribal syndicate: One stop solution for Tribal community" to Division: SEED, Programme Scheme: STI Hub for ST Community.



## ISHRAE Research funded project Sanctioned

The Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE), was founded in 1981 at New Delhi by a group of eminent HVAC&R professionals. ISHRAE has over 28,780 HVAC&R professionals and Student-members. ISHRAE operates from over 42 Chapters and sub Chapters spread all over India, with HQ in Delhi.



**Chemmal Swami Durai C**, ME (Final Year -Energy Engineering) under the guidance of **Dr. A S Ramana**, Asso. Prof. with assistance of **Mr. Faris Ahmed** AICTE NDF Research Scholar sanctioned for a initially funding amount of Rs.50,000/- on project titled Experimental Analysis of Energy Recovery ventilator combined with UVGI for IAQ Enhancement under ISHRAE –PG student Research Project Grant.



## Resource person for eWorkshop

A One Day National Level e-Workshop on  
**REFERENCING WITH MENDELEY**  
organised by  
**DEPARTMENT OF MATHEMATICS**  
**23<sup>rd</sup> November 2020**  
03.00 pm - 04.30 pm

**RESOURCE PERSON**  
**Mr Raja S,**  
Senior Research Fellow,  
SSN College of Engineering  
Rajiv Gandhi Salai (OMR)  
Kalavakkam - 603 110

Presentation by Mr.S.Raja, Senior Research Fellow, SSN College of Engineering.

Mr. S Raja, SRF/Mech was invited to deliver a speech in a National level e-workshop on "[Referencing with Mendeley](#)" on 23 Nov 2020. The presentation is Streamed online on Youtube. About 1000 participants registered for the program.



## Publication in International Journal of Biological Macromolecules- Elsevier- Impact Factor:5.162

P. Sabarinathan, K. Rajkumar, V.E. Annamalai, K. Vishal, Characterization on chemical and mechanical properties of silane treated fish tail palm fibres, International Journal of Biological Macromolecules, 2020



A novel cellulosic fibre was extracted from the peduncle portion of the fish tail palm tree and the extracted fishtail palm fibre was treated with different concentrations (1%, 5%, and 9%) of silane solution. The characteristic analysis on chemical, functional, mechanical and surface property of the extracted fishtail palm fibres were investigated through chemical composition analysis, Fourier Transform InfraRed spectroscopy (FT-IR), single fibre tensile test, and Scanning Electron Microscopy (SEM). Chemical analysis results indicate that silane treatment improved the cellulose content of the fish tail palm fibre.



The highest cellulose content of 72.51% was observed in the 9% silane treated fish tail palm fibre. Also, it improved crystallinity index value of 62.5% for 5% silane treated fibre, which is confirmed through the X-ray diffraction analysis. FT-IR result indicates the removal of hemicellulose at characteristic wavelength of  $1745\text{ cm}^{-1}$  for 5% silane treated fishtail palm fibre. Tensile property of the silane treated fishtail palm fibre (1, 5, and 9%) shows an increased tensile strength of 7.3%, 12%, and 6.6% as compared to raw fish tail palm fibre. Moreover, this type of novel natural fibres can reduce the cost while offering competent performance during the polymer-based product development.



## International Publication – Science Citation Index Expanded

**C.Arun Prakash, B.Anand Ronald**, Study of heat transfer behaviour of various mould materials used in casting, Fourrages, 244 (11) and 89-98, 2020

Casting is one of the commonly used techniques in industries for the manufacturing of metal products. Although sand (Ceramic) is used as a mold material for casting, it is a poor conductor of



heat and hence it affects the microstructure and mechanical properties. Therefore using alternate material for mold can help in better heat transfer rate and thereby better properties. This paper deals with the effect of various mold materials on the temperature distribution and heat transfer during the casting process. Three mold materials namely Sand, Steel and Copper were chosen and the mold that was cast was aluminium alloy. From the studies it was found that the copper mold gave better heat



transfer rate compared to steel and sand owing to high thermal conductivity. But since copper is not commercially available in the form of shots, the next commercially available alternative of steel shots can be considered for mold material.

**Arun Prakash C, Anand Ronald B**, Title: Image processing based analysis of surface properties of composite produced using magnetic moulding, Fourrages, 244 (11) and 54-60, 2020

In recent years, Metal Matrix Composites (MMC) is being used in many industries especially in automobile and aerospace industries because of the improved properties exhibited by them. Although various methods are employed in the processing of composites, casting is the most widely adopted method. This paper discusses image processing techniques for analysis of surface roughness parameters of Al/SiCp cast produced using magnetic moulding, sand casting and permanent die casting. Magnetic moulding is a processing method similar to sand casting in which steel balls of very small diameters are used instead of sand. The surface roughness of the cast produced using three different methods is analysed using a 3D surface roughness tester and the surface roughness parameters are determined and compared. An image processing algorithm is also developed to determine the number of pores and pore density on the surface of the cast produced using three different casting methods and a comparison is made.

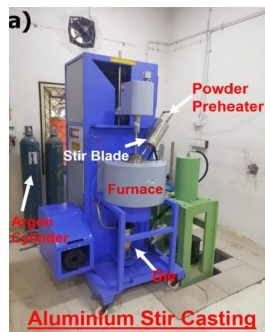


### International Publication–Emerging Sources Citation Index

**P. Naveen Kumar, R. Prakash**, Palanivelu Sangeetha, Analytical study on the behaviour of composite space truss structures with openings in a concrete slab Civil and Environmental Engineering Reports 3(30) ,265-280, 2020.



## Publication in Metals and Materials International : Springer



Fabrication setup of Aluminum stir casting



Pin-on-Disc Setup (a) Chamber heating (b) Heating Coil and Display unit

S. Ayyanar, A. Gnanavelbabu, K. Rajkumar, P. Loganathan, Studies on High Temperature Wear and Friction Behaviour of AA6061/B4C/hBN Hybrid Composites, Metals and Materials International, 2020



This present work deals with the use of hexagonal boron nitride (h-BN) as a solid lubricant for AA6061/B4C composite due to its special features of self-lubricating property, thermal and chemical stability. The wear behaviour of composites at elevated temperature test, varied from 27 to 300 °C, was performed for AA6061 alloy with boron carbide (B4C) 5–15 wt% and h-BN 5–15 wt% reinforced hybrid composites under a load of 10 and 45 N at constant

sliding velocity and sliding distance of 2.2 m/s and 2500 m. The prepared composites were characterized using X-ray diffraction, scanning electron microscopy with energy dispersive X-ray analysis. The mechanical properties of hybrid composites were evaluated using tensile testing and hardness. The microstructural results revealed a homogenous distribution of reinforcement particles and grain refinement in the composites up to 10 wt% of h-BN. The tensile test results showed a significant improvement in the tensile strength up to 82% attained for the 15% B4C and 5% h-BN hybrid composite compared to AA6061 matrix alloy. The wear behaviour and different wear mechanisms under various testing conditions were explored. The mild-severe wear transition is noticed with increasing load and temperature for AA6061. The wear properties of a hybrid composite of C10N10 exhibited superior wear resistance due to the complete lubrication effect on the entire worn surface. The predominant wear of abrasive and adhesion occurred at room and elevated temperatures and low load conditions. Oxidative wear, plastic deformation, and delamination wear were operating with an increase in load and temperature.

## Journal Publication in Science Citation Index Expanded



Aspire December 2020

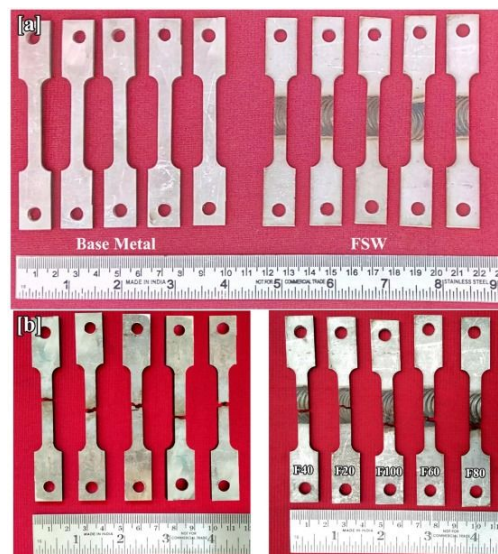
V. Vignesh , S. Vijayan and G. Selvakumar, Experimental Investigation And Mechanism Analysis: Effect of Concentration And Temperature on The Viscosity of Novel Mwcnt-mustard Oil Nanofluid, Journal of Chilean Chemical Society, Vol 65, No 4, 2020





## Journal Publication in Engineering Failure Analysis - Elsevier

R Rajasekaran, AK Lakshminarayanan, R Damodaram, V Balasubramanian, Stress Corrosion Cracking Failure of Friction Stir Welded Nuclear Grade Austenitic Stainless Steel, Engineering Failure Analysis, <https://doi.org/10.1016/j.engfailanal.2020.105012>, 2020



## Journal Publication in Science Citation Index Expanded

R Rajasekaran, AK Lakshminarayanan, Probing the stress corrosion cracking resistance of laser beam welded AISI 316LN austenitic stainless steel, Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, <https://doi.org/10.1177/0954406220965635>, 2020

## PhD Viva Voce

The Ph.D. Viva-Voce Examination of Part Time Research Scholar Mr. Narendranathan.S.K was completed on 06.11.2020. His thesis Entitled "Experimental study on appropriate methodologies for fuelling compression ignition engine by using punnai oil" guided by Dr. Sudhagar.K, Murugappa Polytechnic College and

Dr. Prakash R, SSN.

The viva voce examination was held through the online platform zoom. The examiners are Dr. R Anand, NIT Trichy and Dr. N Alagumurthi, Pondicherry Engineering College.

## Faculty Write up

### Faculty Development Program attended

**Dr. M.Nalla Mohamed** attended the one week faculty development program on the topic Recent Advances in Manufacturing Processes and its Research Perspectives (RAMPR 2020) through online mode organized by the SRM institute of technology, Kanttungalathur, Chennai from 16.11.20 to 21.11.20. Around 50 faculty and research scholars from various engineering colleges participated in this FDP.



### Key takeaways from the ACM India Education Webinar delivered by Prof. Pankaj Jalote on the topic “Building a Successful and Satisfactory Academic Career”



**Dr. K.S. Vijay Sekar writes :** I had the opportunity to attend this webinar on a topic of interest for those in academics, particularly those who wish to scale the ladder of success, despite the rigours of balancing Academic and Administrative workload. Prof. Pankaj was the founding director of IIITD and brings in a deep experience in his diverse roles as Microsoft Chair at IITD, HOD CSE at IITK, VP – Infosys, Teacher at University of Maryland, where he had to keep his passion for teaching intact, despite the myriad roles he was required to essay.

In Academics, he says that Faculty have the freedom to decide on their goals, less frequent job changes but the role requires multi-tasking, self-motivation and has a limited monetary growth. He says that an Academic derives satisfaction from values attached to contributions, impact on Science and Technology and external recognitions and must see his job as a synergy between teaching, research and service to society.



## NAGARAJAN S, Lab Instructor, Mechanical Engineering writes:

### Completed Coursera - Courses

1. Mechanics of Material III: Beam bending.
2. Oil & Gas Industry Operations and Markets



### National & International Webinars Attended

1. Attended International Webinar "Engineering A Sustainable Future" by Institution of Mechanical Engineers, One Birdcage Walk, London, UK on 10/11/2020.
2. Attended the National Seminar "Ancient Indian Education System" by National Institute of Technical Teachers' Training and Research, Kolkata, during 11-12<sup>th</sup> November, 2020.
3. Attended the National Seminar "National Education Policy-2020" by Dept. of Mathematics Janta College, Bakewar, Etawah (U.P.) on 20/11/2020.
4. Attended the Webinar "Opportunities in Construction Management" by Raja Rajeshwari College of Engineering, Bangalore & Sri Venkateswara College of Engineering, Sriperumbudur, on 13/11/2020 & 20/11/2020 respectively.
5. Attended the Webinar "Infrastructure Series" by Construction Management Training Institute, Bangalore on 21/11/2020.
6. Attended the Webinar "Food Planet Health" by Eco Club of Dyal Singh College, Delhi and Vegan Outreach on 21/11/2020.
7. Attended the Webinar "Interior Fit out Lecture Series" by Construction Management Training Institute, Bangalore on 25/11/2020.
8. Attended the International Webinar "Garrett Motion E-Turbo Enables More Efficiency, Better Performance" by Institution of Mechanical Engineers, One Birdcage Walk, London, UK on 26/11/2020.
9. Attended the International Webinar "OJS-Journal Management in the Field of Nutrition and Halal Food Scientific Study" by OJS-Journal Management in the Field of Nutrition and Halal Food Scientific Study, Jakarta, Indonesia on 26/11/2020.
10. Attended the Webinar "Environment, Climate Change & DRR" by NIDM & APHRDI, Govt. of Andhra Pradesh on 27/11/2020.



### E- Conference Attended

Attended International E-Conference "Philosophy, Culture and Value" held on the occasion of World Philosophy Day" by Krishna Kanta Handiqui State Open University, Guwahati, Assam on 19/11/2020.

### National & International level of Quizzes Participated

Participated and got certificates from "36 Nos. of National & International level of Quizzes " in various topics like Manufacturing process, Computer Networks, IT, General Knowledge, Sports, and National Cyber Security Awareness conducted by Ministry of Electronics and Communication Technology Government of India , during the month of November 2020.

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## Monthly Activities and Publications

**Mr. D. Ebenezer**, Asst. Prof/ Mech, Application of principles of Artificial Intelligence in Mechanical Engineering, Co Author:Anush Lakshman S, IOP Conf. Series: Materials Science and Engineering Vol. 912, 1-7, 2020

**Mr. Ebenezer D**, presented a paper in international e-conference on Advancements in materials science and technology along with student Mr.Anush Lakshman. Title of the paper is "Integration of Internet of things and Quadcopter", 30 Nov 2020.

**Dr. M Selvaraj**, S Suresh Kumar, Ankit Kumar, Ballistic Performance of LightWeight Magnesium (AZ31B) and Aluminium (AL 6061) Plates Using Numerical Method, Trends in Mechanical and Biomedical Design, 2020/8/20, 231-238, Springer, Singapore

**Mr. Ebenezer D, Dr. M Selvaraj**, Authors: D Vivek, R Praveen, A Sanjay Krishnan, YK Sabapathy, D Ebenezer, M Selvaraj, 2020/8/19, Trends in Manufacturing and Engineering Management, 409-418, Springer, Singapore

**Dr. M Selvaraj**, Authors: MM Metro, M Selvaraj, Effect of Nano and Microfillers in Basalt/Epoxy Composites, 2020/8/19, Trends in Manufacturing and Engineering Management, 419-432, Springer, Singapore

**Dr.K Rajkumar, Dr. M Selvaraj**, Study of Hexagonal Boron Nitride Particulate as Vibration Behaviour Modifier of Alternate Stacked Glass–Natural Fibre Polymer Composite Laminate, 2020/8/19, Trends in Manufacturing and Engineering Management, Springer, Singapore.451-460.

**Dr. D. Ananthapadmanaban**, as a DC member attended the DC meeting conducted by Dr.A.K.Lakshminarayanan for his full time research scholar-Mr.Rajasekaran. This was conducted on Tuesday 24/11/2020 between 10.00 A.M and 11.30 A.M via Zoom platform.

**Dr. D. Ananthapadmanaban**, attended a webinar on Patent Rights and Copyright conducted by the The Tamil Nadu Teachers Education University, Centre for Intellectual Property Rights ,on November 21st,2020 from 11.30 A.M to 1.30 P.M.

**Dr. C. Arun Prakash**, completed successfully AICTE Training And Learning (ATAL) Academy Online FDP on "Robotics" from 2020-11-2 to 2020-11-6 at Motilal Nehru National Institute Of Technology Allahabad, Prayagraj.

**Dr. M. Nalla Mohamed**, attended one week online FDP on "Recent Advances in Manufacturing Processes and its Research Perspectives (RAMPR 2020)" Conducted by SRM Institute of Science and Technology, Kattankulathur, Chennai from 16th to 21st Nov 2020

**Dr. R. Damodaram**, attended one-week FDP on " Recent Advances in Manufacturing Process and Its Research Perspective" Conducted by SRM Institute of Science and Technology, Department of Mechanical Engineering, Kattankulathur, Chennai from 16-11-2020 to 21-11-2020.

**Dr. R. Vimal Samsingh** attended AICTE Training And Learning (ATAL) Academy Online FDP on "Internet of Things (IoT) conducted by JNTUA College of Engineering from 2020-11-9 to 2020-11-13

**Dr. A. K. Lakshminarayanan**, AICTE-ISTE Sponsored Six Days ONLINE FDP on "Design and Development of products and services" scheduled on 16 – 21 Nov 2020 organized by the Department of Mechanical Engineering, R.M.K. Engineering College, Chennai from 16.11.2020 to 21.10.2020.


**Dr. M.S. Alphin**, Attended a Doctoral Committee Meeting for PhD Scholar Mr. Palani Ganesa at SRM Institute of Science and Technology Chennai through Zoom Video conferencing on 27 Nov 2020.

**R. Vasanthi**, Junior executive, Sr.Grade/ Mech, Coursera certification course on Brand Management: Aligning Business, Brand and Behavior.

**Dr. D. Ananthapadmanaban**, Associate Professor attended a webinar on Patent Rights and Copyright conducted by the The Tamil Nadu Teachers Education University, Centre for Intellectual Property Rights ,on November 21st,2020 from 11.30 A.M to 1.30 P.M.

## Student write-up

### Student Activities

S. No.	Date	Activity done during the month
1	20-11-2020	Rithvik JP, second year completed Kashiv infotech course for network internship program and iot hackathon
2	30-11-2020	Niranjan M, second year <ol style="list-style-type: none"><li>1. Nss-zero space farming and other activities taken part</li><li>2. Completed a Nptel course on functional and Conceptual Design ongoing</li></ol> 
3	30-11-2020	Roshan Ram Dayal D Smart India Hackathon 2020 - Finals
4	30-11-2020	Survesh S Smart India Hackathon 2020 - Finals
5	30-11-2020	Shri Harri V Smart India Hackathon 2020 - Finals
6	30-11-2020	Pydipati Praneeth Kumar Smart India Hackathon 2020 - Finals
7	30-11-2020	Vigneshwar Veeravagu Smart India Hackathon 2020 - Finals
8	30-11-2020	Vishal Mohan Smart India Hackathon 2020 - Finals

## INNOVATION DAY 2020 - Model Exhibition-cum-Competition



**Team Members:** Tharun Krishant M, Vigneshwar Veeravagu, Vishal Mohan, Vishnu Sagar – IV<sup>th</sup> year, Mechanical Dept

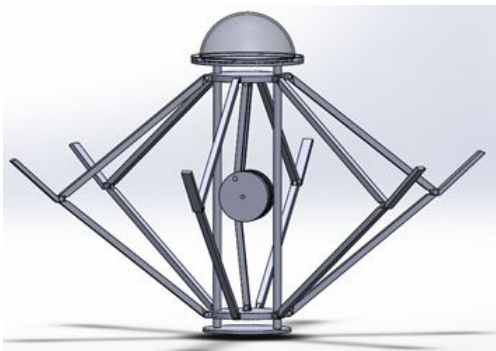
**Faculty Mentors:** Dr. R. Vimal Samsingh – Associate Professor Dept of Mechanical, Dr. S. Esther Florence – Associate Professor Department of ECE

Innovation Day 2020 is a national level exhibition cum competition, organised by Velagapudi Ramakrishna

Siddhartha Engineering College, Vijayawada on 15<sup>th</sup> of October to brace the grand occasion of Dr. A.P.J Abdul Kalam's birthday. The competition aimed to find and support worthy innovations in various fields ranging from agriculture to augmented reality. Being a national level competition, it received entries from various regions of India and finally top 6 teams were shortlisted to present their ideas virtually at the grand finale to the panellist.

We decided to work in the field of marine robotics, with an emphasis to improve the propulsion mechanism of underwater

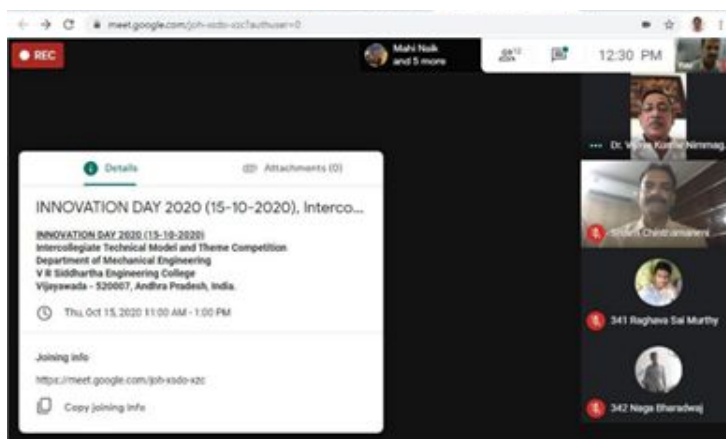
robots such as Remotely Operated Vehicle (ROVs) and Autonomous Underwater Vehicles (AUVs) that uses the traditional thrusters for its motion. Despite being a ubiquitous mode of propulsion, these thrusters are extremely inefficient and multitudes of them are required to ensure all the 6 DoFs for the vehicle. This was starkly in contrast with the propulsion mechanism of all biological marine animals that used nuanced motions of its muscles to tread through water efficiently. Captivated by the elegance and efficiency of the Jellyfishes motion we designed a propulsion system to overcome these drawbacks.



induces a wavy motion to the flaps which helps in treading of the water. As the crank rotates at much lesser RMP (around 60-150) compared to the thrusters (over 1500) the design was extremely frugal in its energy consumption.

**Result of the Presentation:** We presented this Idea to the panellist, which was headed by Dr. C. V Sri Ram, Managing Director of Perfect Electronic Systems. After a long wait, on 8<sup>th</sup> of November we were announced the winners and were **awarded the first prize**.

Aspire December 2020



We used a double piston – single crank mechanism that connected several links to the piston heads. These links mimicked the tentacles of the Jellyfish upon addition of rubber flaps. The rhythmic translation of the piston head





Vishal Mohan



Vishnu Sagar



Vigneshwar Veeravagu



Tharun Krishant M

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## Ashwin Ballal, IV-year, writes...

Hey cricket enthusiasts! Check out my engrossing article published in this renowned sports blog.

[IPL 2020 Debrief: Chennai Super Kings](#)

## Niranjan M., II-year, writes...

### Looking for Positives

Since I was a kid, even though I was not the one to fiddle much with stuff, I have always wanted to understand how simple products, like a water tap, that we use in our daily life work. I was always mesmerized on how science was applied to something as tiny as a screw without which even the largest of machines falls apart. That has been one of the major reasons that I chose to study engineering and specifically chose mechanical engineering. After completing my schooling, I really hoped that I would start applying the theories I learnt to solve problems present to us in the world. The first semester was not satisfying enough since it felt like it was just bridging the gap between theoretical sciences and engineering. During the first two months of the second semester I was reassured that I was on the right path to what I really wanted to do. Just when we were starting to learn simple engineering practices hands-on, the lockdown due to the covid-19 pandemic was announced and we had to complete the semester online.



I was disappointed that I was held back from some really interesting practical experiences in my second and third semester, but that is something we cannot control. Once we were told that the whole semester will be online, I knew that the demands and the outcomes of the third semester will be only 50% of the normal. I decided to use the time and effort I could avail in this lockdown on an

online course about **functional and conceptual design**. An added advantage is that if, after I successfully complete this course, complete another online course before I get into my seventh semester, I can do my final year project as an internship in a company which will give me more of the hands-on experience that I have always wanted.

The reason I chose this particular course is that the design of a product is really important because it should both appeal to the aesthetics while also executing the function without any flaws. It is dismaying that I often see one compromised for the other. I hoped to learn the design aspects in making a product through this course but what I am learning is rather very different. The main focus of the course is on how a company or team would go about in creating a product. Even though it is not what I was hoping for, I feel like this course is a virtual tour of how a product development team would go about creating a product. This might be very helpful to me since I want my main job prospects to be designing and developing new products.

I feel like this is more of a representation of what the world is all about. The year 2020 has been very different for many reasons but we always find new ways to accept the new changes and go ahead even though we see no end in sight. We embrace whatever life throws at us, even if it is unexpected, and take away the learnings and advantages from the experience.

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## Rithvik JP, II-year, writes...

I thoroughly enjoyed my internship at **KaaShiv InfoTech**, and now I have a valuable experience under my belt. I know this will help when I am looking for jobs and seeking references. I am really happy that I was a part of their program.



We all know that practical experience is the best, and internships give students the hands-on experience they need.

I think this internship is extremely valuable to students who are interested in networking. It gave me a small taste of the real world. It helped reinforce my knowledge of responsibility, focus, drive and ambition towards the networking world. Being able to utilize all

the skills that I was taught at KaaShiv InfoTech in a real-life situation is the best learning experience in the world.

I recommend every student to attend and thoroughly participate in KaaShiv InfoTech's internship on web designing, databasing, networking and CATIA.

## Mech Marvel - 72

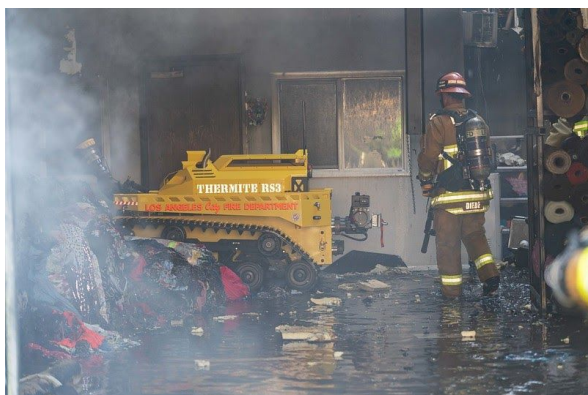
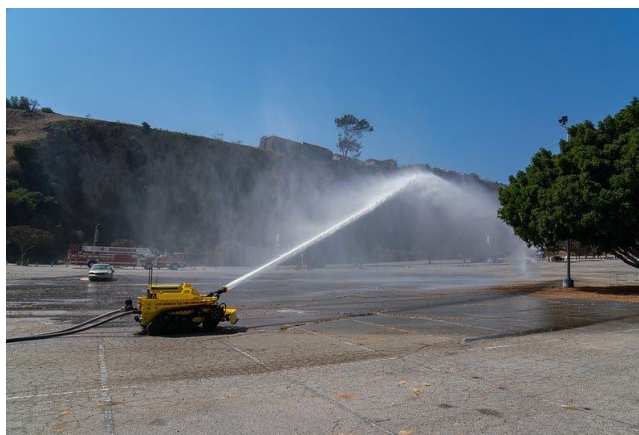
### Robots to the rescue – literally



The Los Angeles City Fire Department debuted the first robotic firefighting vehicle in the United States, putting it to use on its first day in service.

The Thermite RS3 (manufactured by Textron: [Howe & Howe Technologies](#)) is a compact, low-center of gravity, wide chassis, industrial robotic firefighting vehicle weighing in at 1,600 kg and reaching max speeds of 12.9 kmph (8 mph). It is capable of flowing 2,500 gallons per minute and is remotely operated with a controller which provides high-definition video feedback for ultimate maneuverability in difficult conditions.

Using a hose that stretches 300 ft (91-m) horizontally or 150 ft (45 m) vertically, the Thermite RS3 is built to douse flames via a nozzle that allows for 2,500 gallons (9,500 L) of water to flow per minute. Operators control the robot remotely using a belly-pack controller, which relays a HD video stream for guidance. The robot is carried to the site of the emergency in a trailer dedicated to this sole purpose towed by a pick-up truck.



New challenges continue to emerge in the fire service and the LAFD is committed to leveraging technology to enhance firefighting operations while reducing risk to firefighters. While the RS3 is not the answer to all types of firefighting, it will assist with safe interior fire operations on large commercial fires, wood-framed structures under construction, structural defense at wildfires, large animal rescues, fuel tanker fires, auto storage fires and much more.

This [YouTube video](#) shows the superbots plunging into action on the very day it was commissioned into service.



## Corporate Story - 72

### ULC Robotics



ULC Robotics is regarded as a pioneer in Robotics-as-a-Service (RaaS) solutions and technology development for the energy, utility and industrial markets. Since its start in 2001, the focus of ULC has always been the enhancement of utility operations and the support of infrastructure improvement. They combine cutting-edge design, complex custom software, world-class mechanical equipment, advanced machine learning algorithms, and top talent to create revolutionary robotics and unmanned systems to reduce operations and maintenance costs while meeting the increasingly complex demands of regulators, energy customers, and the general public.

ULC Robotics confronts energy industry challenges head-on to revolutionize utility operations. The use of their innovative technology helps their customers maintain the socially and environmentally responsible practices necessary to benefit their customers.

The CIRRIS XI™ Pipeline Inspection Robot and CIRRIS XR™ Pipeline Repair Robot were part of a larger project to develop technology capable of inspecting and repairing large diameter cast iron gas mains to avoid costly and disruptive replacement of these assets. The robotic systems are modular and share common components as well as supporting equipment like the launching system and operations vehicle.



ULC developed the Air Gap Inspector for a leading engineering company to provide inspection services for large motors and generators around the globe. With their client's expertise in engineering, constructing, deploying, and servicing motors and generators and ULC's expertise in robotic systems development,

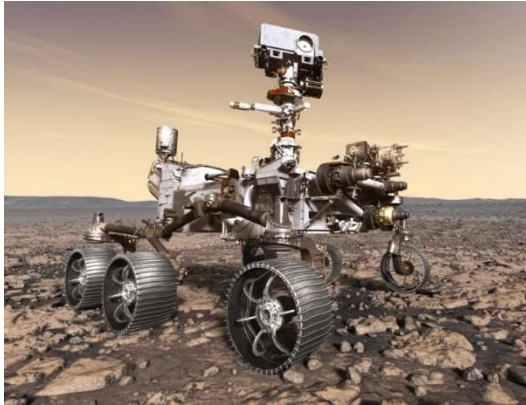
the robotic crawler was successfully developed and piloted and is now being used to service customers on a regular basis.

Take a look at [their job postings](#) here, if you see yourself working at their company to change the future of robotics and industry interaction.



## Amazing Innovation 181

### PERSEVERANCE TO PRODUCE OXYGEN



NASA's **Perseverance rover** is set to test the feasibility of producing oxygen on the Red Planet after descending to the Martian surface, with the use of its **Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE) instrument**. The toaster-sized instrument is designed to suck the plentiful supply of CO<sub>2</sub> from the atmosphere using an air pump, and electrochemically separate the greenhouse gas into its constituent parts, with each molecule yielding two atoms of oxygen and one of carbon. This process runs at a high temperature – **1,470 °F (800 °C)**

to be precise – requiring the instrument to be constructed from heat-resistant materials including 3D-printed alloy elements that help distribute the excess heat. The box-shaped experiment is also coated in gold to protect the rest of the rover from the infrared radiation being generated during the oxygen creation process.

**Source:** <https://newatlas.com/space/perseverance-rover-oxygen-mars-atmosphere>

## Amazing Innovation 182

### CARBON NANOFIBERS ACT AS HARDNESS BOOSTERS



While 3D-printed aluminum parts are becoming increasingly common in the aerospace industry, any weaknesses in those parts can cause them to fail catastrophically. A new additive could help, by making the aluminum 1.5 times harder. Developed by scientists at **Russia's NUST MISIS university**, the additive is made up of tiny carbon nanofibers. These are produced as a by-product of the processing of natural gas. They're added to powdered aluminum. In an existing process

known as **selective laser melting**, a laser beam is used to melt that powder in a specific pattern, building objects up one layer of melted (and subsequently fused) aluminum at a time. Ordinarily, temperature differences between those layers may cause the microstructure of the finished product to be inconsistent, with some layers ending up more porous than others. Because the carbon nanofibers are very thermally conductive, however, they're reportedly able to distribute the laser heat more thoroughly and evenly. As a result, the 3D-printed aluminum has a uniform low porosity, and is thus claimed to be 1.5 times harder than aluminum printed from powder without the added nanofibers.

**Source:** <https://newatlas.com/3d-printing/carbon-nanofibers-hardness-3d-printed-aluminum>

## Alumni Info

### ASK THE EXPERTS!

As a part of Alumni engagement activity, the students were given an opportunity to interact with the alumni and seek answers for their confounding questions.

Three questions were picked for this month and three qualified alumni were selected to answer those questions. The following are the questions with corresponding answers:



### Ask the experts!

Pose your questions here 

Let it be academic, non-academic, curricular, co-curricular, extra curricular, technology, career, job, higher education, competitive exams or any thing else you are dubious about.

We have our supportive alumni network to guide and mentor you.

Your question(s) will reach the relevant subject expert(s) (i.e., alumni) and you will get a convincing answer in two shakes, assuredly.

Alumni Team  
Department of Mechanical Engineering

- ★ Do internships make an application whether it be for placements or higher studies more appealing? Also, how do we as students secure internships and many times companies don't allow for individual applications and online offerings especially in the space of mechanical are quite few.

**Question from Eshwar D, 181002043**

"Yes. In my view, internships definitely make your application more appealing for higher studies and placement. As a MS student, the foreign universities value your practical experience as much as your course works. Additionally, it offers better edge to your application in an international competition. Research based Universities consider internship from reputed Indian educational institutions such as Indian

Institute of Technology (IITs) and Indian Institute of Science (IISCs) National Institute of Technology (NITs) etc. These institutions offer a wide range of opportunities and learning platform to the Mechanical students through their summer internship programs. The application and the procedure can be found on their websites."

➤ *Sakthi Vigneshwaran S.C. (2016-2020 batch), Master's Student, Saarland University, Germany*

★ My doubt is that what are the preparations that I have to do, so that I can get placed in good company. How to get started? What are the things that I have to know? What are the things that I have to learn? How I have to start preparing for placements?

**Question from Mohamed Saajid N, 181002083**

Below answers almost cover all the above questions.

"First preparation would be to understand the company very well about their products, history and recent news. Little homework about the company will show your willingness and interest to work. The recruitment process for all the companies is generally the same.

- **Aptitude** - Prepare for general aptitude questions. The difficulty of questions varies from company to company. Schedule a certain time everyday to prepare specifically on the aptitude questions.
- **Technical** - For technical questions, start with the basic concepts, formulas and theorems of all the subjects. I would suggest using GATE exam book, which would cover all the necessary subject for preparations.
- **Group discussions** - Group discussion comes with practice, try to attend many mock discussions. Concentrate on your point of view in the discussion. Language fluency is only second priority. Avoid dominating the discussion, be respectful in disagreement, make excuse to interrupt and discuss your views. Google for many tips and tricks. Spend some time preparing with friends and in front of mirror to avoid fear and enhance confidence.
- **Interview** - Make a list of points about yourself, skills and brownie points and prepare diligently in such a way you convey all the points you want. Prepare for every details mentioned in your resume. Interviewers would be interested in knowing your approach in solving a problem, the difficulties you have faced and how you overcome. Make the interview as a discussion, and try to get the interviewer ask questions to your advantage. For eg, in explaining your project, start with brief summary of your

project and let the interviewer ask questions on how did you do, now explain the calculations and steps taken.

Prepare in depth on the interested subjects which you have mentioned in the resume.

If you don't know the answer for a question, please say you don't know openly and do not beat around the bush trying to answer the question.

- **What are the things that I have to be good at?**

For a core company, you need to exhibit good technical knowledge. Pick your favourite subjects and prepare in depth on all the subjects learnt. Apart from the favourite subjects, learn at least the basic concepts and theorems in rest of the subjects."

➤ *Nanda Kumar (2011-2015 batch), Product Development Engineer, Brakes Team, Ford, India.*

★ **What should I do between now and the time of placements to ensure I get chosen by a top company? Also, does working maybe 2 years and then going abroad for further studies make sense as an option?**

**Question from Eshwar D, 181002043**

"Rigorous aptitude preparation and technical skills preparation is a must. I used to understand and go through all the concepts, latest trend based on industry. Work exp in India will help a lot if you are planning to do MS in same/ closely related field. 2-3 is good. 3+ is quite helpful to get internships."

➤ *Vivekanand S.R.(2008-2012 batch), Product Quality, Apple, USA*

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## ALUMNI DOCUMENTATION SERIES

- Why to choose New Zealand over countries in the East?
- How are the tuition costs, living expenses in NZ?
- How are the prospects of Aerospace Engineering in NZ? Can students without a citizenship work in Aerospace Industries?

For more such questions with answers, read this [document](#).

This document is from : **Akhil Ramesh - Batch '16**

Akhil got placed in Brakes India and worked for 3 years before going to do his MS. He is presently pursuing Ph.D in New Zealand.



## Research news and Forthcoming events



**Shiv Nadar University, Chennai invites applications for faculty positions across levels and in different streams of its program offerings. The applicants must have an excellent academic record and should have demonstrated potential for excellence in research.**

SNU Chennai is inviting 'Founding Faculty' to join an exceptional journey of building a pioneering institution of higher education creating new global academic standards and revolutionizing the education landscape in the country. As the Founding Faculty of SNU Chennai, you will be leading the path of being the custodians of the University's core values, culture and learning traditions while being instrumental in establishing lasting collaborations, driving cutting-edge innovations and taking industry leadership.

Your vision and commitment will play a pivotal role in shaping the heart and soul of the University. The Founding Faculty will lead a sought-after research mechanism to bridge the gap between the classroom and global demands, fostering experiential learning and academic and intellectual growth in the students.

This University is designed to be a futuristic platform that envisions helping both students and faculty flourish. Therefore, it is inviting progressive academicians, who are leading thinkers and innovative educators to join the University's exciting journey.

Check below Link for open positions and application process :

<https://shivnadaruniversitychennai.edu.in/careers.html>

## Call for Proposals (From multiple sources)

### **National Endowment for the Humanities**

Scholarly Editions and Scholarly Translations

Last date for submission of project proposal: **02-Dec-20**

<https://www.grants.gov/web/grants/search-grants.html>

### **National Aeronautics and Space Administration**

NASA Headquarters

Use of the Nasa Physical Sciences Informatics System Appendix G

Last date for submission of project proposal: **15-Dec-20**

<https://www.grants.gov/web/grants/search-grants.html>

**Department of Science and Technology (DST)**

I4F CALL FOR PROPOSAL (CFP – 6) 2020

The India-Israel Industrial R&D and Technological Innovation Fund (I4F)

R&D projects in all areas but will prioritize the areas of:

- Agriculture
- Energy
- Healthcare
- Information & Communication Technologies (ICT)
- Water

Last date for submission of project proposal: **07-Dec-20**

<https://www.gita.org.in/OnlineRfp/ProgramInfo.aspx?GITA=kZdo4yRVS4gRExygXA1GyqVbyWB3io23meK0IVIdjpY=>

**Science and Engineering Research Board (SERB)**

Call for Nominations for “National Science Chair (NSC)

Mode 1- “Science Excellence”

Mode 2- “Science Leadership”

Last date for submission of project proposal: **15-Dec-20**

[http://www.serb.gov.in/pdfs/what-new/Second%20Call%20For%20Nomination%20\(NSC\)-SERB.pdf](http://www.serb.gov.in/pdfs/what-new/Second%20Call%20For%20Nomination%20(NSC)-SERB.pdf)

**Science and Engineering Research Board (SERB)**

To reward young women scientists (below age 40) who have excelled in science and got recognition from any of the National Science Academies (given below) in India, Science & Engineering Research Board (SERB) has launched a scheme called “SERB Women Excellence Award”.

1. Indian National Science Academy, New Delhi
2. Indian Academy of Science, Bangalore
3. National Academy of Science, Allahabad
4. Indian National Academy of Engineering, New Delhi
5. National Academy of Medical Sciences, New Delhi
6. National Academy of Agricultural Sciences, New Delhi

Nature of Support Research grant of Rs. 5 lakhs per annum and Rs 1 lakh per annum as overhead charges for a period of three years.

Last date for submission of project proposal: **15-Dec-2020**

[https://www.serbonline.in/SERB/Women\\_excellence?HomePage=New](https://www.serbonline.in/SERB/Women_excellence?HomePage=New)

**Department of Science and Technology (DST)**

Government of India Ministry of Science and Technology Department of Science and Technology Gender Advancement for Transforming Institutions (GATI), KIRAN Division Call for Expression of Interest to Participate in Pilot of GATI

Last date for submission of project proposal: **17-Dec-2020**

<https://dst.gov.in/sites/default/files/Call%20for%20EoI%20under%20GATI.pdf>

**Tamil Nadu State Council For Science And Technology (TNSCST)**

Programme For Bridging The Gap In Research Funding For Research Scholars In Colleges

Last date for submission of project proposal: **20-Dec-2020**

<http://tanscst.nic.in/pdf/FRSPINVITED20.pdf>

**Biotechnology Industry Research Assistance Council (BIRAC)**

BIRAC SITARE – APPRECIATION GRANT AWARD

Last date for submission of project proposal: **30-Dec-20**

[https://birac.nic.in/cfp\\_view.php?id=42&scheme\\_type=23](https://birac.nic.in/cfp_view.php?id=42&scheme_type=23)

**Department of Agriculture**

Utilities Programs

Solid Waste Management Grant Program

Last date for submission of project proposal: **31-Dec-20**

<https://www.grants.gov/web/grants/search-grants.html>

**Department of Agriculture**

Utilities Programs

Technical Assistance and Training Grant Program

Last date for submission of project proposal: **31-Dec-20**

<https://www.grants.gov/web/grants/search-grants.html>

**Biotechnology Industry Research Assistance Council (BIRAC)**

BIRAC Announces Call For Under Proposal Product Commercialization Program Fund

Last date for submission of project proposal: **31-Dec-20**

[https://birac.nic.in/cfp\\_view.php?id=39&scheme\\_type=29](https://birac.nic.in/cfp_view.php?id=39&scheme_type=29)

**Department of Science and Technology (DST)**

National Innovation Challenge Awards for Designing and Developing Energy Storage

Last date for submission of project proposal: **31-Dec-20**

<https://dst.gov.in/sites/default/files/National%20Awards%20Call%20Doc.pdf>

## Inspiring Life Stories

### The Wise Man

People have been coming to the wise man, complaining about the same problems every time. One day he told them a joke and everyone roared in laughter.

After a couple of minutes, he told them the same joke and only a few of them smiled.

When he told the same joke for the third time no one laughed anymore.

The wise man smiled and said:

**“You can’t laugh at the same joke over and over. So why are you always crying about the same problem?”. Is it not a matter of choice?**

**Moral of the story:** Worrying won’t solve your problems, it’ll just waste your time and energy.

**Source:** <https://wealthygorilla.com/best-short-moral-stories/>



## Corporate Wisdom

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

**Happy Morning!**

Mind is a thought flow. Thoughts by itself are just dissipated energy. It is only when a dynamic thought is provided with physiological manifestation it becomes a thing. Eiffel Tower or Taj Mahal are just thoughts that were acted upon.

Similarly, books are just thoughts of great minds. The wise thoughts of messiahs and prophets frozen in print became the Holy scriptures. The primary purpose behind publishing these books is to freeze in the print the expressions of growth conscious human beings.

Readers and people who are reading this are those who ardently desires breakthroughs and I suggest when you read:

1. Only when you are alone and sure not to be disturbed, read. Reading is not for glancing, and





superficial reading. It is absorption, contemplation, assimilation and implementation.

2. It is not the question of how many books you read, it is a question how many times you read. Then only absorption, assimilation can happen leading to implementation thus leading to transformation.

3. Read in multiple sittings across a timeframe and never in one sitting. The purpose is not to assimilate information but gain transformation.

4. Underline or highlight, whatever you feel to be profound and soul stirring. It will help future reading and also facilitate quick re-reading.

5. As you read, pause frequently and dwell on what you have comprehended. It is never about what the author is saying but it is always about what is your comprehension.

6. Share your understanding and the growth experienced with your friends. Knowledge grows only through sharing

**Keep going up, Keep going. - Growing up is natural and Going Up is optional.**

#WishingMostAndMore

Have a great day & wonderful week

R. Ramakrishnan

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**Send all your submissions to: [editorssnmech@gmail.com](mailto:editorssnmech@gmail.com)**