DEAN'S MESSAGE

Dear Alumnus,

Greetings from IIT Bombay!

The famous poet T. S. Eliot once wrote, "What we call the beginning is often the end. And to make an end is to make a beginning. The end is where we start from."

I am writing this email to inform you that my journey as the Dean of Alumni and Corporate Relations at IIT Bombay has come to an end. I shall be commencing a new chapter in my professional life as the Director of IIT Indore. While I am elated to step into the new role, leaving behind the IIT Bombay family will be extremely difficult. There are few endeavours that cannot be undertaken without forging deep bonds and a sense of belonging to a community, and my journey here at IIT Bombay is one such example. During my 22 year-long tenure, I have seen the Institute grow tremendously, supported by the hard work of the entire IIT Bombay ecosystem.

Today, we are recognised as an "Institution of Eminence" and continue to be the top ranked engineering institution in India. IIT Bombay has achieved significant goals in recent years, which include the establishment of Centres of Excellence in emerging areas, such as the Koita Centre for Digital Health, the Wadhwani Research Centre for Bioengineering, the Technocraft Centre for Applied Artificial Intelligence, the Pramod Chaudhari Alumni Continuing Education Centre and the Ashank Desai Centre for Policy Studies, as well as chair professorships, and several projects in the pipeline. In addition to this, we have also come a long way in upgrading the infrastructural facilities on campus using the generous contribution of our alumni; these include revamping of Hostel 5, establishment of Café 92, the Executive Education Complex at the Shailesh J. Mehta School of Management (SJMSOM), and several other projects in the pipeline. Yet another notable contribution to infrastructure came from Bajaj Foundation for Rahul Bajaj Technology Innovation Centre (RBTIC).

We are where we are today, thanks to your generosity, as evidenced from the Rs. 77 Cr. that the Institute received in donations in 2021, up from Rs. 18 Cr. in 2017. I am confident that IIT Bombay will reach the donation targets that it has set for the near future. And with your unwavering faith and support, we will soon break into the top 50 institutions in the world. Needless to say, this is just the beginning for us.

As I move on from IIT Bombay, I assure you that I leave our alma mater in very good hands. I am happy to announce that the Institute has appointed Prof. Ravindra D. Gudi as the new Dean ACR (dean.acr@iitb.ac.in). He is also an alum of the Institute who received his B.Tech. in Chemical Engineering from IIT Bombay in 1985 and he has already had a very distinguished career at the Institute.

Also, the IIT Bombay Development and Relations Foundation (IITBDRF), which manages the Institute's outreach and engagement with the donors and corporates, and works with the Dean ACR office, continues to be led by Mr. Ravishankar Gedela, CEO, IITBDRF. Ravi is also an IIT Bombay alumnus and is well acquainted with the Institute's functions, goals and aspirations. He is supported by an extremely competent and professional team with representation from diverse backgrounds, such as corporate, IT, media, marketing and social development. I have no doubt that Ravi and his team will do a splendid job in the smooth functioning of the Dean ACR office. I urge you to please email him at ceo.drf@iitb.ac.in or call him at +91 96194 42290, should you require anything.

Being associated with IIT Bombay has been an absolute pleasure and an honour. As I commence this new phase of my life, I leave the wellness of my second home in your hands. I am certain that you will continue to support IIT Bombay like you have through all these years. I look forward to the Institute's continued growth and success.

Regards,

Prof. Suhas Joshi

My email address for communication will be: ssjoshi.iitb@gmail.com

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SUCCESS STORY

Yash Mandhana Shares the Secrets of his Success

*There are no shortcuts to success, and our student Yash Mandhana's hard work and dedication are testimony to that. Yash Mandhana topped CAT 2021 by scoring **99.99 percentile** in his first attempt by repeatedly solving multiple mock tests. In our recent conversation, he shares how he accomplished this incredible milestone and gives tips on how others can replicate his success. Read on to know more.*

Q: You're studying to be a mechanical engineer at IITB and have successfully completed internships and projects in your core field; what made you change tracks and try for an MBA?
Yash: I learned and experienced the technical aspect of an enterprise during my undergraduate years at IIT Bombay. However, I always had the urge to understand the business elements and in-depth functioning of a company. I realised that pursuing an MBA will help me gain the desired expertise and help me navigate my future endeavours.

Q: How is JEE different from CAT, and are there any specific methods for both that you used during your preparation?
Yash: I would say that preparation for JEE revolves around understanding new concepts of Physics, Chemistry and Mathematics. Usually, students aren't exposed to these concepts before their JEE preparation. On the other hand, preparation for CAT majorly focuses on developing question-solving abilities, applying math and logical reasoning skills.

I committed most of my time in understanding the subject in detail during my JEE preparation, whereas the commitment shifted towards practising mock tests during my CAT preparation.

Q: We are in awe of your success. How did you prepare for CAT?
Yash: My approach studying for the CAT focused on improving each section independently. For the Verbal and Reading Comprehension (VARC) segment, I focussed all my efforts into English reading skills, whereas for Data Interpretation and Logical Reasoning (DILR) section, I concentrated on attempting section tests to improve my problem-solving abilities.

I emphasised on improving my accuracy and speed for the question-and-answer section. I even attempted numerous mock tests and paid particular attention to analysing my tests.

Q: In this current era, coaching classes play a vital role in students' academic success; what made you to opt-out of coaching classes?
Yash: Post my JEE clearance, I gained the confidence to prepare for CAT independently. In due course, I have been able to develop my problem-solving skills and exam mindset.

Q: Could you address the challenges of studying and prepping for CAT on your own and how you overcame them?
Yash: In my opinion, the biggest challenge one faces while independently preparing for CAT is the commitment to carve out a few hours every day for preparation. It is difficult owing to the many commitments a student has to juggle as part of his undergraduate education.Initially, I specifically allocated a few hours in my timetable towards CAT preparation and ensured that I honoured the commitment every day.

Q: How did IIT Bombay's ecosystem help you achieve your goals?
Yash: IIT Bombay provides an ideal environment for students to explore their passion, and student networks act as a backbone for their endeavours. The overall framework of the undergraduate curriculum, competitive environment and support system encourages students towards their goals. Moreover, the alumni network acts as an extended family, and their willingness to mentor and support students has helped me immensely to firm up my overall career path.

Q: You could've applied for your management degree in business schools abroad, but you chose to stick with CAT and IIM. Could you share your thoughts on the same?
Yash: It was a tough decision. However, considering my desired career path and future aspirations, I felt that pursuing my management education at IIM is appropriate.

Q: Now that you have cracked CAT, how are you preparing for your IIM entrance interviews?
Yash: I am focussing on my interpersonal skills and articulating the overall purpose and motivation for pursuing management education for my IIM interviews. I am also working on understanding current affairs and megatrends globally.

Q: What advice would you give students aiming to crack CAT? Any secrets/tricks of the trade you'd like to share with us?
Yash: Be consistent with your preparation despite any difficulties you might face. I would recommend attempting sufficient mock tests and focusing on analysing them.

Q: What are your plans going forward?
Yash: I want to pursue a career that allows me to create value by utilising my core management knowledge.

INNOVATIVE PRODUCT AND TECHNOLOGY

ideaForge Technology

Inventor Names: Ankit Mehta, Rahul Singh, Vipul Joshi, and Ashish Bhat

ABOUT

ideaForge Technology bagged a $20 million project from the Indian Military to supply high altitude SWITCH UAVs. A product-focused UAV systems company, ideaForge is developing drone solutions for various applications. ideaForge drones are generations ahead of other OEMs when it comes to safety, reliability, autonomy and performance. Founded by IIT Alumni, IdeaForge is India's largest drone-maker and the firm has over 20 patents .ideaForge also received the 2020 Indian National Intellectual Property Award.

Endimension Technologies

Inventor Names: Bharadwaj Kss and Ankur Mittal

ABOUT

Endimension Technologies, an AI-powered healthcare startup, raised Rs. 2.3 crore in a seed funding round by Inflection Point Ventures in 2021. The founding team consists of machine learning researchers, software engineers and medical doctors from reputed institutions. Their mission is to build healthcare AI technology products that reduce misdiagnoses in patients.

This IIT-Bombay incubated startup stands strong with an in-house AI technology team and a combined experience of over 35 years. Endimension develops AI algorithms to detect abnormalities and diseases from medical scans automatically. It also helps reduce patient misdiagnosis and increases efficiency levels of radiologists.

Society for Innovation and Entrepreneurship (SINE)

The Innovative Product & Technology section carries a series of articles showcasing the latest technology and product development activities at IIT Bombay.

This month, we present start-ups that were fostered at the Society for Innovation and Entrepreneurship (SINE), IIT Bombay, and made significant headway in 2021. SINE is an umbrella organization of IIT Bombay and is a business incubator that provides ‘Start to scale’ support for technology-based entrepreneurship and tech start-ups and facilitates the conversion of research activity into entrepreneurial ventures.

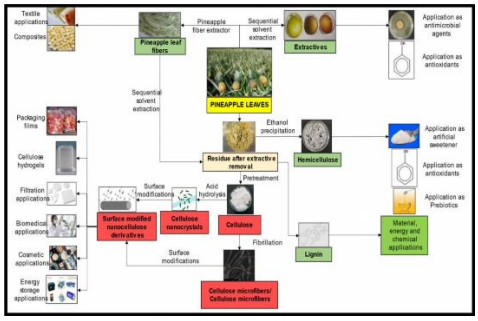
GUPSHUP

Inventor Names: Beerud Sheth and Rakesh Mathur

ABOUT

Gupshup, a conversational social platform, became the first SINE startup to join the Unicorn Club with a valuation of $1.4 billion after having raised $100 million from Tiger Global Management. It’s also the tenth Indian startup to join the Unicorn club during 2021. Founders of Gupshup Beerud Sheth and Rakesh Mathur are IIT Bombay grads and serial entrepreneurs who began their journey with SINE in 2004. They have since achieved enormous success in their business endeavours, thanks to their perseverance and well-planned initiatives.

STUDENT RESEARCH ARTICLE



Cellulose nanofibers recovery from pineapple leaf waste: a green biorefinery approach

Name: V B Poornima
Department: CTARA (IITB-Monash Research academy)
Program: Ph.D.
Contact Number: 9944834300
Name of supervisors: Prof. Amit Arora (IITB); Prof. Warren Batchelor (Monash University), and Prof. Antonio Patti (Monash University)

Significance / Applications of research

India is the fifth largest pineapple producer globally (after Costa Rica, the Philippines, Brazil, and Thailand), with an annual output of 1.2 million tonnes. In 2019, the global production of pineapple was estimated to be 28.18 million metric tons. Pineapple waste (peels, stems, pulp residue, and leaves) contributes to a tremendous amount of waste generated annually. Observation from field visit studies confirms that 60% of the weight of the pineapple plant is contributed by leaves, leading to a considerable amount of unutilized on-farm waste. It is usually left for decomposition or incineration. The high Biological and chemical oxygen demand (BOD and COD) of the discarded waste, lack of appropriate cold storage facilities, and inefficient and uneconomic waste management methods lead to the accumulation of pineapple waste in landfills, resulting in the spread of diseases and methane emission. Incineration is not considered suitable for fruits due to their high moisture content and potential for releasing toxic products such as particulate matter and dioxins. The utilization of these wastes in an eco-friendly and economical manner is of utmost importance.

My research aims at an integral valorisation of pineapple leaf waste to generate high-value products. The composition of extractive free pineapple leaves containing a high amount of dietary fibres such as cellulose (45%) and hemicellulose (38%), along with a low amount of lignin (<10%), makes it an ideal candidate for the preparation of cellulose nanofibers (<100 nm). Various advantages of cellulose nanofibers such as high specific strength, mechanical properties, reinforcing potential, high thermal stability, flexibility, aspect ratio, optical transparency, easy availability, and renewability makes them excellent candidates for applications across various sectors such as for the preparation of food packaging films for smart packaging, super absorbent hydrogels, and composites for various biomedical applications.

Novelty

In the present work, pineapple leaf waste is utilized as a new source for cellulose extraction using an economical and green hydrothermal pre-treatment method. Hydrothermal pre- treatment method produced >80% yield of cellulose, comparable to that of conventional pre- treatment method (90% yield). Furthermore, there was recovery of another value-added product, hemicellulose, which has potential applications in food, cosmetics, and papermaking industries, along with pineapple leaf fibres (textile and composite applications) and high-value extractives (food and therapeutic applications).

Methodology

The conventional pre-treatment techniques use hazardous chemicals that lead to toxic products and require a large amount of energy, thus increasing the overall cost of the process and contributing to environmental pollution. The results indicate that hydrothermal treatment helps significantly remove hemicellulose and lignin from the biomass, thus facilitating effective cellulose extraction. Hemicellulose is the primary constituent of the liquor obtained after hydrothermal pre-treatment and, therefore, can be utilized for the recovery of hemicellulose. Following the extraction of cellulose, ultrasonication technique was utilized for the fibrillation of cellulose.

Significant results

In the present work, pineapple leaf waste was utilized for the extraction of cellulose using a green hydrothermal pre-treatment method that produced an 85% cellulose yield and crystallinity index of 75. The conventional alkaline pre-treatment method produced a yield of >90% with a crystallinity index of 79 using alkaline pre-treatment. Furthermore, there was recovery of another value-added product, hemicellulose (50% recovery), which has potential applications in food, cosmetics, and papermaking industries. Fibrillation studies have produced cellulose microfibers with a diameter in the range of 1-4 um. Future studies shall focus on nano fibrillation of the extracted cellulose to form nanofibers (<100 nm).

Along with cellulose, other valorisation steps result in high value-added products such as pineapple leaf fibres and high-value extractives. Pineapple leaf fibres (2-3% of leaves) are extensively used in textile applications and to produce bio composites, apart from being known as a popular source for cellulose (>70%) with an application as reinforcing agents in composites. High-value extractives (32%) obtained using sequential solvent extraction were found to contain a high phenolic content (94 mg GAE/ 100g) and antioxidant scavenging potential of

around 65% and IC50 value of 194, and antibacterial activity against gram-positive bacteria, with the potential market in medical and food processing sectors as therapeutics and functional food development respectively. A techno-economic analysis assesses the biorefinery approach's economic feasibility to producing cellulose nanofibers and other value-added products from pineapple leaves.

Conclusion

In essence, the study shows that the high amount of under-utilized pineapple leaf waste that causes environmental pollution could be utilized entirely as a potential feedstock for the recovery of high-value products (Cellulose nanofibers, Pineapple leaf fibres, Hemicellulose, and Extractive compounds such as phenols and organic acids) with a potential market in food and therapeutic sectors. The developed model can be expanded to utilize other agricultural waste biomass to obtain value by developing a large-scale facility. This will help in sustainable value generation, economic benefits, and environmental protection and help rural development through employment generation and waste utilization.

NEWS FROM IIT BOMBAY

Prof. Bhaskaran Murlidharan appointed as Editor of Materials of Quantum Technology Journal

Materials for Quantum Technology is a multidisciplinary, open-access, journal devoted to publishing cutting-edge research on the development and application of materials for all quantum-enabled technologies and devices, and is published by the prestigious Institute of Physics (IOP).

IIT Bombay's Prof. Bhaskaran Muralidharan, Department of Electrical Engineering, has been selected to join the esteemed editorial board of Materials for Quantum Technology. The domain of Quantum technology is an emerging field and as an editor Prof. Muralidharan will address critical issues in the field.

IIT Bombay Alumnus appointed Vice-Chancellor at GIPE

IIT Bombay Alumnus, Ajit Ranade, has been appointed Vice-Chancellor of Gokhale Institute of Politics and Economics (GIPE). Established in 1930 by the Servants of India Society and founded by Gopal Krishna Gokhale, GIPE is India's oldest institution dealing in the field of economic research.

Dr. Ranade will take over from Prof. Rajas Parchure, the acting director and Vice-Chancellor, on February 04, 2022.

Dr. Ranade is currently the President and Chief Economist at the Aditya Birla Group. His academic background includes teaching stints at the Indian Council for Research on International Economic Relations, New Delhi, and the Indira Gandhi Institute of Development Research, Mumbai. He has also served on various committees of the Reserve Bank of India and is a member of the Board of India Today Economists.

IIT Bombay Celebrates 73rd Republic Day

IIT Bombay celebrated the 73rd Republic Day of India on Tuesday, January 26, 2022. Director Prof. Subhasis Chaudhuri hoisted the flag and addressed the Institute community, alongwith a few Institute dignitaries.

The celebration also included awarding of merit certificates to students, teachers, faculty, and Institute staff for their outstanding services, especially within the context of Covid-19. Since the Institute followed strict protocols owing to the ongoing pandemic, only a handful of people attended the physical function.

Prof. G. Siva Kumar Receives National Award for Best Electoral Practices

Prof. G. Siva Kumar from CSE, IIT Bombay, and a member of the Technical Advisory Group (TAG), received the national award for best electoral practices in the special category for IT initiatives.

He was presented with the award on National Voters Day, January 25, 2022, by the Election Commission of India, in the presence of the Hon'ble Minister of Law and Justice, Shri. Kiren Rijiju, Chief Election Commissioner Shri. Sushil Chandra, Election Commissioners Shri. Rajiv Kumar and Shri. Anup Chandra Pandey.

Prof. Rajat Moona, Director, IIT Bhilai, is the current Chairman of TAG. Other TAG members include Shri. H. Krishnamurthy, Chief Research Scientist (Retd), IISc Bangalore and Shri. R.S. Mani, Deputy Director-General of NIC.

INSTITUE HIGHLIGHTS

IIT Bombay Professors appointed as Directors of IIT Delhi and Indore

IIT Bombay's Prof. Suhas Joshi, Mechanical Engineering Department, has been appointed as the Director of IIT Indore. Prof. Joshi played an exemplary role as the current Dean of ACR (Alumni and Corporate Relations) and spearheading its fundraising initiatives.

Also, Prof. Rangan Banerjee from the Department of Energy Science and Engineering has been appointed as the Director of IIT Delhi. Prof. Banerjee played a stellar role at IITB as the former Dean of Research and Development.

Prof. Joshi and Prof. Banerjee join other esteemed directors at IITs Kanpur, Dharwar and Patna – all of whom hail from IIT Bombay. All five directors were HoDs at IIT Bombay, Fellows of the Indian National Academy of Engineering, and well-renowned research scholars.

IIT Bombay presents Distinguished Alumnus Awards (DAA) 2022

The Distinguished Alumnus Awards (DAA) recognises the immense professional contributions and impact made by IIT Bombay alumni in various areas such as business, public sector, social sector, academic and research scholarship and entrepreneurship, and have reached positions of eminence based on these outstanding contributions.

Our heartiest congratulations to all the DAA awardees for this year! The awards will be presented during the Institute's Foundation Day.

IIT Bombay's stellar ARIIA ranking

IIT Bombay ranked second in the country among Technological Institutes of National Importance in the Atal Rankings of Institutions on Innovation Achievements (ARIIA) under the CFTI's category 'Institute of National Importance (Technical).'

Atal Ranking of Institutions on Innovation Achievements (ARIIA) was initiated by the Ministry of Education (formerly Ministry of Human Resource Development), Government of India, on August 30, 2018, to systematically rank all major higher educational institutions and universities in India on parameters related to "Innovation and Entrepreneurship Development" amongst students and faculty members.

IIT Bombay was placed second in the ARIIA rankings for the third consecutive year. In the 2020 and 2019 ARIIA rankings, IIT Bombay placed second under the 'Publicly-Funded Institutions' category.

Prof. Sunita Sawaragi appointed as Fellow of the ACM

Prof. Sunita Sawaragi, Professor of Computer Science and Engineering, and Professor in- charge of the Centre for Machine Intelligence and Data Science (C-MInDS), IIT Bombay, has been named Fellow of the Association of Computing Machinery (ACM).

The ACM Fellows program recognizes the top 1% of ACM members for their outstanding computing and information contributions. ACM has named 71 members as ACM Fellows for their wide-ranging and fundamental contributions in areas including cloud database systems, deep learning acceleration, high-performance computing, robotics, and theoretical computer science ─ among other areas. The accomplishments of the 2021 ACM Fellows underpin important innovations that shape the technologies that we use every day.

IIT Bombay's Finance Club successfully conducted Cryptonite

IIT Bombay's The Finance Club conducted Cryptonite, a cryptocurrency and blockchain summit, from January 07 to January 10, 2022.

The four-day pan-India cryptocurrency and blockchain summit provided students from across the country information on the new and rapidly evolving world of Blockchain, Cryptocurrencies, NFTs and Web 3.0. The summit featured numerous panel discussions led by renowned speakers and key players in the Web 3.0 and Crypto sphere.

The Finance Club collaborated with Woodstock Fund (an emerging technology investment fund), Builders Tribe (an incubator dedicated to driving blockchain-based startups), DAOMaker (an incubator DAO with a community governed fund), and Polytrade (a blockchain-based decentralized protocol), for the four-day summit.

IIT Bombay SARC students conducted Annual Crypt Hunt – SARCasm

https://www.youtube.com/watch?v=PxzCkVjdIVI&ab_channel=DeanACROffice

TECH NUGGEST

IIT Bombay team to construct Zero-D Green toilets

IIT Bombay, with support from city-based NGO Khurshid Foundation, will build Zero Discharge (Zero-D) Urinals.

These Zero-D green toilets will incorporate multiple innovative technologies targeted towards sludge management, wastewater recycling and reuse, minimisation of greenhouse gas emission from wastewater, and recovery of urea, nitrogen, phosphorus, and potassium.

The team from IIT Bombay team including Dr. Biplab R. Pattanaik, Prof. K.V. Venkatesh and Prof. Sharad Yadav will bring their expertise in sanitation chemistry towards the project. These eco-friendly toilets will be constructed at Vande Mataram colony, which is in dire need of hygienic toilets, and is expected to benefit at least 100 families.

IIT Bombay researchers develop portable patient chair for rural dental camp

Researchers at the Industrial Design Centre (IDC) School of Design at IIT Bombay have developed a portable patient chair for dental camps. Recognizing the primary concerns of hygiene and need for ease of transport, the chair is lightweight, folds to save space in dental vans, and comes with attached wheels to form a trolley.

The objective is to provide a substitute for the typical dental clinic chair which is heavy, so it can be easily transported to various camps held in urban and far-flung rural areas of the country. Primarily built to meet dentists' needs, the portable chair will allow dental camps to cater to a more significant proportion of the under-represented patient base, thereby considerably enhancing access to primary healthcare for the same.

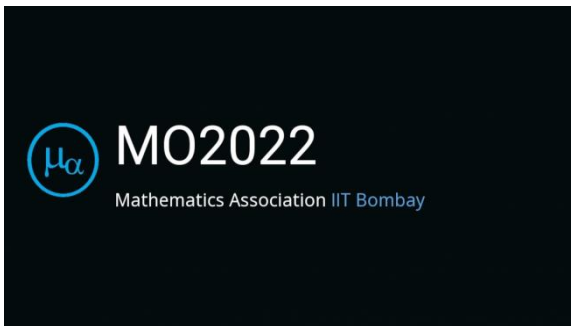
IIT Bombay helps Goa State Pollution Control Board with air pollution report

Following several agitations to stop coal activities at Mormugao Port Trust (MPT), the Goa State Pollution Control Board (GSPCB) had appointed IIT Bombay to pinpoint the cause of air pollution in the port town and has now accepted the report submitted by the Institute. The report revealed that apart from coal, marine aerosols,

vehicle re-suspended dust, biomass, solid waste burning, and road dust also significantly contribute to air pollution in Vasco.

The GSPCB held a special meeting to finalise the report and the chairman of the board will forward the report to the high court. IIT Bombay also suggested preparing an environmental management plan to control air pollution in Vasco.

UPCOMING EVENTS



Mathematics Olympiad 2022

The Mathematics Association is organizing the 37th Mathematics Olympiad on Sunday, February 13, 2022. The Mathematics Olympiad is a stage for youngsters to challenge themselves and test their mathematical knowledge and skills. The goal of the Mathematics Olympiad is to stimulate enthusiasm and love for mathematics in students, strengthen their mathematical intuition, foster mathematical creativity, and provide satisfaction, joy, and thrill of facing and overcoming mathematical challenges. Students from class 8th -12th are eligible for the Olympiad.

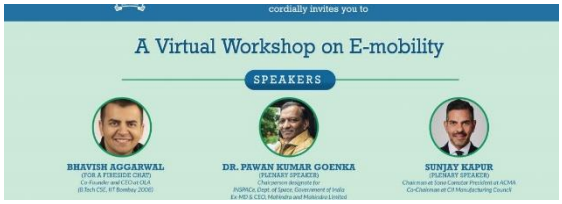
- **Day & Date:** Sunday, February 13, 2022
- **Time:** All day
- **Venue:** Virtual

Prof. N. R. Kamath Distinguished Webinar

The Prof. N. R. Kamath Distinguished Webinar will be held virtually in February 2022. Dr. Anand Garde (BTech MEMS – 1967 IIT Bombay), a Nuclear Fuel Consulting Engineer, will be the key speaker for the webinar.

Title: Current status of use of Zirconium in LWR fuel & expansion of nuclear power

- **Day & Date:** Tuesday, February 15, 2022
- **Time:** 06.00 pm IST
- **Venue:** Zoom



E-Mobility Workshop

An E-Mobility Workshop will be held virtually in February 2022. The workshop will bring together the best of technology and research undertaken in the field of Electric Vehicles, both at IIT Bombay, and globally.

- **Day & Date:** Saturday, February 19, 2022
- **Time:** 08:30 am – 05:15 pm IST
- **Venue:** Virtual