

## DEAN'S MESSAGE



Dear Alumnus

Warm greetings from the verdant green campus of IIT Bombay. I hope you are having a wonderful new year so far.

IIT Bombay celebrated India's glorious history and the diverse and rich cultural heritage of our beautiful nation during the 74th Republic Day celebrations held on January 26, 2023, on campus. Prof. Subhasis Chaudhuri, Director, IIT Bombay, unfurled the Indian National Flag at the Institute's Gymkhana ground on this very august occasion.

The Institute announced the Distinguished Alumni Awards (DAA) and the Young Alumni Achiever Awards

(YAAA) for 2022. My hearty congratulations to all the recipients of these prestigious awards. Please look for the details of the awardees in the News section of the newsletter.

Continuing with its theme of pushing the boundaries of research and pedagogy, IIT Bombay inaugurated SCAN – the Sunita Sanghi Centre for Research in Ageing and Neurodegenerative Diseases – on campus. I would like to thank our very own Distinguished Alumnus, Mr. Sharad Sanghi (B. Tech., Electrical Engineering, 1989) who set up the Centre in memory of his mother. Please do look for more details in the Special Report section of the newsletter.

IIT Bombay's Desai Sethi School of Entrepreneurship (DSSE) hosted the entrepreneurship symposium where thought leaders from the government, academia, and industry came together to discuss the evolving role of entrepreneurship education and the entrepreneurship ecosystem. We were delighted when Prof. Meric Gertler, President, University of Toronto, joined us as the Chief Guest and keynote speaker and spoke about the importance of innovation and entrepreneurship in nation-building.

Continuing the theme of reunions that began late last year, we welcomed the classes of 1983, 1978, and 1970 back to campus in January. It is always exciting to meet our alumni and reconnect with them as they reminisce about their wonderful days on campus as students. Please look for fun pictures of the reunions in the News section of the newsletter.

IIT Bombay's annual fun-raising campaign, GO IITB 2023, is in full swing. I urge you to consider giving back to your Institute. Our five core causes for raising funds this year are Project Evergreen, Scholarships, Institute Development Fund, IT Hardware, and Young Faculty Awards.

I would now like to share our news, awards, and accolades from around the Institute.

- Continuing with our successful start last year, the Institute rolled out the notification for the "IIT Bombay International Award for Excellence in Research in Engineering and Technology" for 2023. I encourage you to nominate researchers, scientists, and academicians who are pursuing cutting-edge research in their fields for this prestigious award. More details regarding this award can be seen in the News section of the newsletter.
- The Institute signed multiple MoUs over the past month

- The Institute signed an MoU with the Directorate of Higher Education and the Director of Technical Education, Government of Maharashtra. Under the UDAAN initiative, we will undertake the translation of all professional courses into the Marathi language.

- IITB signed an MoU with our alumnus, Mr. Bala Chandrasekharan (B.Tech, Civil Engineering, 1997), and his wife, Mrs. Jayshree Chandrasekharan to set up a Chair Professorship for Research and Teaching in Chemistry for Women Faculty. The establishment of this Chair is a step forward in the Institute's resolve to foster top-quality research and teaching for IITB's women faculty.

- An MoU between IIT Bombay and alumnus, Dr. Jaynarayan Hotchand Lala (B.Tech, Aerospace Engineering, 1971), Senior Principal Engineering Fellow, Raytheon Technologies, will see the building of a high-speed Flow Diagnostics Lab on campus.

IIT Bombay is deeply thankful to Bala Chandrashekhar and Dr. Jay Lala for their vision and kind support towards the Institute's growth.

- IIT Bombay honoured the memory of Prof. K.C. Khilar, a former Institute faculty member (Department of Chemical Engineering) and Dean (R&D) at IIT Bombay by hosting the Institute Distinguished Lecture Series in January. Dr. Ravi M. Shanker, renowned Senior Research Fellow at Pfizer Worldwide R&D delivered a lecture on 'Novel Drug Technologies from Benchtop to Commercial Products.'
- We also hosted the Honourable Shri Justice Uday Umesh Lalit, Former Chief Justice of India, for an Institute Lecture on 'Administrative Law and Policy Framing.' Justice Lalit also interacted with the IIT Bombay students and faculty members during his visit.
- IIT Bombay has launched a new Economics Department on campus to address the growing importance of Economics as a discipline and its emphasis on rigorous quantitative and analytical reasoning.
- Hearty congratulations on the extraordinary work done by IITB's faculty who continue to bring glory and accolades to the Institute. Please find more details in the News section of the newsletter.

As always, the Institute cherishes your continued commitment and support towards your alma mater. We would love to see you on campus and hope you can come by and visit us. I can assure you that you will be delighted to see the various changes that our campus has seen over the years.

I look forward to meeting you soon.

Sincerely,

Prof. Ravindra D. Gudi, Ph.D., FNAE and FIChE

Dean – Alumni and Corporate Relations

Institute AI & ML Chair Professor



## GIVING

### **GO IIT Bombay Campaign**

<https://youtu.be/FbyYQJMzy5w>

Do you remember...?

...the swagger with which you told your extended family and friends that you were a student of IIT Bombay?

Or the transformative world-class education and mentorship from professors that you received?

What about your hostel mates and batchmates that you met and made lifelong connections and friendships with? Remember

sneaking in a hotplate and making hot masala chai and Maggi inside your hostel room? Shhh! Don't worry! Your secret is safe with us!

Do you still choke up when you remember the tears you quietly brushed aside as you bid goodbye to your friends the day you graduated?

How about the promise you made to yourself that you would never ever lose touch with your beloved Institute that had now become your alma mater?

## DONATE

<https://acr.iitbombay.org/campaign/go-iitb-annual-fund-raiser/>

### Of course, you remember!

Wouldn't you like to help the current group of students studying at IIT Bombay have the same priceless experiences that you had?

Well, you can.

Introducing the 2022-2023 edition of IITB's annual fundraising campaign – GO IIT Bombay.

In this edition of the newsletter – we spotlight two initiatives that are part of the GO IITB 2023 campaign – Hostels and Scholarships.

In our recent social media polling campaign on LinkedIn – the following were the two topmost causes chosen by our alumni community.

### 1. Hostels: Project Evergreen



Remember how inspired you were when many of IITB's alumni visited campus and regaled you with their tales of innovation, entrepreneurship, and a drive to change the world? And the promise you made to yourself that you would do the same when you graduated?

Many of your Institute-mates are doing just that with Project Evergreen – a project that is of alumni, by alumni, and for future alumni. Project Evergreen will replace the Institute's over-50 years of hostel infrastructure and build new housing for current students on campus.

With Project Evergreen, IIT Bombay, together with the IIT Bombay Alumni Association, will lead from the front and take its first tangible step toward incorporating sustainable measures for on-campus housing and reducing its own carbon footprint on the planet. Project Evergreen will implement several sustainable measures including site development, energy efficiency, indoor environment quality, water conservation, recycling, and use of green materials.

The cost of making Project Evergreen a reality is Rs. 150-160 Cr., or USD 20M. It is a critical and extremely important initiative that needs immediate and ongoing support from all of you. Contribute generously to this cause and help us provide a wholesome living environment to our students and enhance the quality of their lives on campus.

## DONATE

<https://acr.iitbombay.org/causes/hostel/>

### 2. Scholarships



Read the following testimonials from students who received a scholarship to pursue their education at India's premier institute and how it completely changed their and their families' lives.

IIT Bombay's Scholarship initiative is critical to the overall ongoing success of the Institute. Make the dreams of more students at your alma mater come true by starting a cycle of philanthropy. Your

generous donation to IITB's Scholarship initiative will ease the financial strain on our current deserving students and they will have the same chance to become the next generation's leaders, researchers, innovators, and business owners. Your donation will allow them to flourish in IIT Bombay's vibrant and competitive academic atmosphere. Every thankful recipient of the scholarship will pay it forward to another deserving student in the future.

**DONATE**

<https://acr.iitbombay.org/causes/scholarship/>

Think back and reflect on your joyous memories of the time you spent at your cherished alma mater. The Institute taught you about building relationships. It gave you your best friends. It gave you an unparalleled education that kickstarted your career. It gave you the drive to succeed. It gave you connections that you were able to leverage in the years after you graduated. It gave you another family and a home away from home.

Do the same for the current students at IIT Bombay!

Support the GO IIT Bombay annual fundraising campaign and help your beloved alma mater grow!

**DONATE**

<https://acr.iitbombay.org/campaign/go-iitb-annual-fund-raiser/>

**FACULTY INTERVIEW**



**Prof. Parag Bhargava: Bridging The Divide**

Prof. Parag Bhargava is a Professor, Metallurgical Engineering and Material Science, at IIT Bombay. Apart from his stellar career working with powders, he is also deeply passionate about children's causes and giving back to his country. We are delighted to speak to him for the Dean ACR Newsletter – Knowledge Tree.

**Prof. Bhargava, thank you for speaking to us today. To begin with - can you quickly take us through your academic and career trajectory?**

It all sort of started at IIT Bombay. I did my undergraduate here at IIT Bombay from 1987 to 1991 in Metallurgical Engineering. And, I'm now back in the same Department! I completed my Master's and Ph.D. at the University of Alabama at Birmingham. From there I went to Rutgers University in New Jersey for my postdoctoral work.

But while I was at Rutgers, I started to think about returning to India. I vaguely remember writing to IIT Bombay but they did not have any vacancies in the department. I then wrote to IIT Kharagpur. For some reason, I was very curious about West Bengal inspired by the writings of Swami Vivekanand and many such personalities and the rich Bengali culture. So I applied to IIT Kharagpur. And I was there for seven years in the Material Science Centre before I moved to IIT Bombay.

### How was it working at another IIT?

I got to do a good mix of teaching, academic and industry-relevant projects. As I was starting out as a faculty member, I chose an area that was not capital-intensive because I did not want to buy expensive equipment early on, and before I acquired more experience and confidence. It's hard to imagine now but I think I got a seed grant of Rs. 50,000! Today, at IIT Bombay, the standard seed grant is Rs. 20 or 25 lakhs. At that time, I chose a field that was very new to me but was application-oriented (fabrication of ceramic components) and that I felt would be more useful.

### So how did you come to IIT Bombay then?

Well, I stayed in Kharagpur for seven years. Many things happened around the same time. For one, my wife had been an artist and a theatre person. And Kharagpur is a campus town and she could not pursue her dreams there. Around the same time, some of my students there were very entrepreneurial and interested in starting a small company. Coincidentally, one of my former teachers from IIT Bombay called me and said that the department was interested in my profile and asked me if I was interested to move to IIT Bombay. I was thrilled. It was like a homecoming of sorts for me. Also, my wife would have many more opportunities in Mumbai as well. So even as I shifted to IIT Bombay in 2005, I, along with former students, started a small company called ANTS Ceramics in Nasik. I've been here since.

### I am so curious...how is it that unlike many of your peers, you chose not to stay back in the US? Why did you return to India?



<https://youtu.be/44LOYnmq0OE>

That's fantastic to hear, prof. Bhargava. So, shifting gears, can you talk about your research pursuits? And can you explain them in layman's language? And what are their implications in the real world?

Oh, I see. That's very interesting!

You head the Particulate Materials Lab (PML) at IIT Bombay. Can you tell us more about the Lab? What were some of the challenges you faced setting it up? Can you elaborate on some of the key highlights/accomplishments of the PML? How did the IIT Bombay ecosystem help

you with it?



### What advice would you give to the next generation of students at IIT Bombay who want to pursue academia and/or research?

'Creating, Spreading, and Sustaining Wild Fires' - Prof. Bhargava gives a passionate TedX Talk on "How do we build a country of our dreams?"

<https://youtu.be/TonwUMZi5DU>

### Finally, what does the future hold for you, Prof. Bhargava?

On that very positive and enlightening note, we thank Prof. Bhargava for taking the time to speak with us for the Dean ACR newsletter. IIT Bombay is very lucky to have someone like Prof. Bhargava who goes beyond his own ambitions to be passionate about making the lives of those around him better. He is a true role model to our students and we wish him the very best in all his future endeavours.

## DONOR INSTITUTED CHAIR PROFESSORSHIPS



## **Prof. Vinay Ribeiro Appointed the Shridhar Shukla Chair Professor in Digital Trust**

### **About the Donor:**

IIT Bombay alumnus, Dr. Shridhar Shukla, established the IIT Bombay Trust Lab, as well as the Shridhar Shukla Chair in Digital Trust. The vision of the Chair is to support and augment the research activities in the area of Digital Trust. The Chair Professor will initiate new academic programmes, elevate R&D programmes and improve industry interactions in the broad areas of Digital Trust.

### **About the Appointee:**

Prof. Vinay Ribeiro, Associate Professor, Department of Computer Science

Engineering

Professor Vinay Ribeiro is currently the Shridhar Shukla Chair Professor in Digital Trust at IIT Bombay.

Prof. Ribeiro is currently an Associate Professor in the Department of Computer Science and Engineering at IIT Bombay. He received his B.Tech. from IIT Madras (1997) in Electrical Engineering and his M.S. (1999) and Ph.D. (2005) degrees from Rice University, Texas, USA, in Electrical and Computer Engineering.

Prof. Ribeiro worked at IIT Delhi before moving to IIT Bombay in 2019.

His areas of study and research include Computer and Network Security (blockchain, IoT security, Ransomware), Wireless Networks, and Indoor Positioning and Navigation.

Over the years, Prof. Ribeiro has received multiple awards and accolades. He received the best student paper award at the Internet Passive and Active Workshop 2003 – a paper that now amassed over 1,000 citations. He was awarded the Microsoft Outstanding Young Faculty Fellowship, IIT Delhi (2008-12). He was elected as a member of the prestigious Eta Kappa Nu, the honour society of IEEE (1998). He was also awarded the Texas Instruments fellowship, Rice University (1997). He has performed research internships at AT&T Labs, Sprint ATL, and Institut Mittag-Leffler. His recent research on the scalability and security of blockchain systems, such as Bitcoin and Ethereum, has appeared in top-tier CS conferences and resulted in a US patent.



## **Prof. Pushpak Bhattacharyya Appointed the Major Bhagat Singh Rekhi Chair Professor**

### **About the Donor:**

IIT Bombay alumnus, Mr. Kanwal Rekhi, established the Major Bhagat Singh Rekhi Chair Professorship in honour of his father. It will promote novel research in the Department of Computer Science Engineering and support the activities of the Chair Professor.

### **About the Appointee:**

Prof. Pushpak Bhattacharyya, Professor, Department of Computer Science Engineering

Professor Pushpak Bhattacharyya is currently the Major Bhagat Singh Rekhi Chair Professor at IIT Bombay.

Prof. Bhattacharyya's stellar academic background includes receiving his B. Tech. from IIT Kharagpur, in 1984. He then got his M. Tech from IIT Kanpur in 1986. He pursued his Ph.D. at IIT Bombay between 1989-1994. He was also a Visiting Research Fellow at the Massachusetts Institute of Technology, USA, in 1990.

Prof. Bhattacharyya's areas of study and research include Natural Language Processing, Machine Learning, and AI- of international renown. He has published around 400 high-quality publications, authored/co-authored six books, and has advised more than 300 students so far. These include 50+ at the Ph.D. level, 150+ at the Master's

level, and 100+ at the undergraduate level. He has also consulted on over Rs. 20 Cr. worth of sponsored and consultancy projects.

Prof. Bhattacharya has a long, veritable list of awards and accolades that he has received. He was inducted as a Member at Large of the Asian Association of Computational Linguistics in 2022. He became the Editor of the Journal of Natural Language Engineering (Cambridge University Press) in 2021. He won the H. H. Mathur Research Excellence Award from IIT Bombay in 2021 and became the Abdul Kalam National Fellow in 2020. He was the Associate Editor (Natural Language Processing) at Neurocomputing Journal, Elsevier, in 2020.

He served as the Director of IIT Patna from 2015-2020.

He was made a Member of the Advisory Committee on Artificial Intelligence, NITI Ayog, and a Member-at-Large (MAL) of the Asian Federation of NLP – both in 2019. He served as the Chairman of the Academic Advisory Committee, NIELET, in 2018.

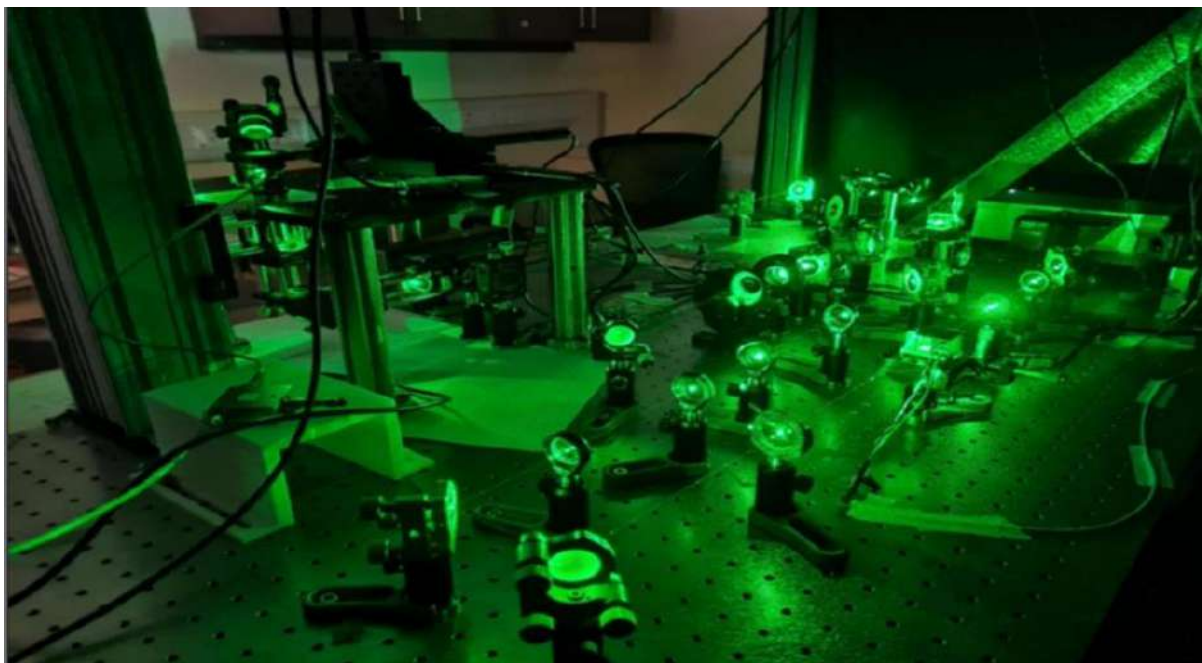
His alma mater, IIT Kharagpur, recognised and celebrated his many accomplishments and awarded him with the Distinguished Alumnus Award in 2018.

After serving as the Vice President of ACL in 2015, he became its President in 2016.

He was elected as a Fellow of the Indian National Academy of Engineering in 2015. IIT Bombay awarded him with the Vijay and Sita Vashee Chair Professorship, Computer Science and Engineering Department, in 2015. He won the VNMM Award 2014 from IIT Roorkee which is usually given to “an eminent Engineer for Innovative and Creative work in the field of Engineering in India.” He was the Vice President-elect of the Association of Computational Linguistics (ACL) from 2014-15.

In 2009, he won the Manthan Award for Hindi Wordnet and Associated Software and the P.K. Patwardhan Award for Technology Development in 2008. The then Prime Minister of India made him a Member of the National Knowledge Commission: Task Force on Translation from 2005-6. He was also a Member of the Committee on Language Technology, set up by the Planning Commission of India, in 2006.

## **RESEARCH SPOTLIGHT OF THE MONTH**



**Image: Set up of the experiment (Credit: Prof. Kasturi Saha)**

### **Using Diamonds as Probes to Explore Fast-Changing Weak Magnetic Fields**

**Exploiting quantum defects in diamond to image fast-changing weak magnetic fields**

The following article was originally written for the IIT Bombay website by Ms. Kshitija Kelkar: (<https://www.iitb.ac.in/en/research-highlight/using-diamonds-probes-to-explore-fast-changing-weak-magnetic-fields>)

The motion picture has evolved phenomenally over decades, giving us a more real-to-life video grab than the choppy and blurry video which we all have grown up watching. This evolution in practice is due to the advancement of imaging technologies over the years, beginning with modest ~16 frames per second (FPS) video by the 18th century Lumiere brothers to the immersive gaming environments with ~150 FPS. In addition to entertainment, can we utilise this technology to image and understand the human body's complex microscopic workings, such as neuron activity in the human brain?

In an innovative step taken by the Photonics and Quantum Enabled Sensing Technology Lab, Indian Institute of Technology Bombay, the laboratory lead Prof. Kasturi Saha, and her team exploit the capabilities of a specialised high FPS camera to get time-changing or 'dynamic' pictures of very weak magnetic fields, typical of what is found in neurons. A study based on this work was published in the journal Scientific Reports.

We use neuroimaging techniques such as magnetic resonance imaging (MRI), magnetoencephalography (MEG), and functional magnetic resonance imaging (fMRI) for studying the internal structure of the human brain. These techniques measure electromagnetic signals that provide a snapshot of combined neuron activity and help us study specific brain functions. Moreover, these signals are weak, so we need bulky, extremely powerful magnets in these technologies to detect them. Thus, how to increase our ability to detect such weak neuron signals using efficient technology is one of the urgent questions that the neuroscience and medical community at large are striving to answer.

Often, we find imperfections in the crystal lattice structure of diamonds, one of which includes a nitrogen atom located next to a vacancy in the diamond lattice. These nitrogen-vacancy (NV) defect centres have 'unpaired' electrons that are extremely sensitive to external triggers like magnetic fields and temperature, making them unique quantum probes to measure weak yet ultra-sensitive magnetic fields at microscopic levels. These changes can be directly measured by sensing low-intensity light, also known as 'photoluminescence', emitted from the interaction of these electrons with magnetic fields. The researchers harness these unique properties of NV centres into highly sensitive, atomic-size magnetometers that can map magnetic fields at such smaller physical scales.

The neuronal magnetic fields change much faster than how quickly the current NV-based magnetometers can capture the changes. With the current NV magnetometers, the capture takes a few minutes to a few hours for high-resolution images, and hence anything changing faster than that cannot be videographed and essentially gives us only a snapshot. Prof. Saha and her team are the first group of researchers to present a unique and experimentally efficient improvement by using a specialised readily available 'lock-in' camera in a magnetic field microscope setup bringing down the acquisition times from several minutes per frame to an order of 100 FPS. Globally this is the first time anyone has shown sub-second magnetic field microscopy with this technique.

They set up the experiment by mounting a very thin sheet of pure diamond crystal with NV defects on two types of magnetic field sources – a very thin microscopic wire (or a 'microwire') and a microscopic coil of wire (or a 'microcoil'). They introduce variation in the magnetic field by manipulating NV centre spins with microwave frequencies that change on the scale of milliseconds. This rapidly changing magnetic field is caught through the interaction in the NV defect centre within the diamond crystal layer, which results in low-light photoluminescence.

The ingenuity of this experiment, however, lies in how Prof. Saha's team utilised the high FPS lock-in camera to capture the changing magnetic field. As opposed to a conventional camera, in a lock-in camera, each pixel detects only light fluctuations that contain specific frequencies or oscillations of a fixed time period and 'rejects' light fluctuations of other frequencies. This enhances the signal for the lock-in camera and hence, is suited in ultra-low light imaging scenarios like the photoluminescence from NV centres. As a result, they were able to get a 'motion picture' of the magnetic field from the microwire and the microcoil by capturing each change of magnetic field by tuning the lock-in camera to capture the light emitted by NV centres. Says Madhur Parashar, the lead author of this work, "The experimental imaging setup is a magnetic field microscope, analogous to a standard light microscope. Therefore, it renders the ability to image microscopic (1 micron to around 100-



micron scale) magnetic fields found in microcircuits with a current flow and can potentially be extended to imaging dynamic magnetic fields from biological cells like neurons.”

NV-based microscopes thus have the potential to be a promising alternative technology for probing mammalian brain activity. Such a way of pushing the accuracy of sensing electromagnetic fields at the microscopic level using quantum properties of atomic constituents forms the crux of the upcoming new field of ‘Quantum sensing’. “In the context of India – Quantum Sensing is completely new, and our lab is the first to build such a quantum diamond microscope in the country. We can perform not only biological sensing but also explore quantum materials and many more,” concludes Prof. Saha.

## **STUDENT SUCCESS STORIES**



### **Using ‘Jugaad’ to Forge Ahead: IIT Bombay Places 7th at Robosub 2022**

*The Autonomous Underwater Vehicle team from IIT Bombay overcame several hurdles including lack of funding and lack of awareness of the technology by adopting the very Indianised ‘Jugaad’ system to forge ahead. And move ahead they did. In the recent Robosub 2022 competition, IITB’s AUV team placed seven from a total of 39 participants.*

*We are delighted to speak with Sidharth Mundra, who is in his fourth year, Mechanical Engineering Department, and is the current leader of the AUV team.*

**Hi Sidharth! Congratulations to you and your team’s success in Robosub 2022! Tell us a bit more about the**

**competition and how does it feel to have placed so high in this competition?**

After having worked tirelessly throughout the year and through the summers, we’re elated to have been able to perform so well in the competition. It was a tumultuous year for all of us, and it was especially hard to come back to normalcy after the setback from the pandemic. In the end, however, we managed to pull through, thanks to the efforts of all the team members.

RoboSub 2022 ran from July 27 to August 2. It was held at the University of Maryland, MD, with over 39 teams participating from more than 14 countries across the continents. The competition involved several tasks that mimic realistic naval tasks – shooting torpedoes, hitting buoys, locating pingers, etc. We were the best team in the wild card entry for the finals and managed to come 7th overall in the competition.

**For the uninitiated, can you tell us more about the AUV Team, at IIT Bombay?**

AUV-IITB is one of the oldest tech teams at IIT Bombay, and we have been around for 11 years now. AUV stands for Autonomous Underwater Vehicle. Basically, we make submarines that run by themselves and are designed to perform tasks that are analogous to what naval submarines can perform, albeit, on a smaller scale. Currently, there are around 40 of us grouped into 4 subdivisions – Mechanical, Electrical, Software, and Business. Each subdivision handles various aspects of the vehicle including overall team presence and the team’s smooth functioning. If you see a bunch of people with laptops and a big hunk of metal at the swimming pool, chances are, they’re one of us! 😊

**What inspired you to be a part of this team and how has your experience been so far?**

I, personally, joined the team in my freshman year. At that time, I was simply exploring everything that caught my eye, and well, AUV was one of them. I was amazed that people worked on underwater robotics at all. You hear about drones, rovers, and spacecrafts – and while that is all well and good, I felt that to be a tad mainstream. I wanted to do something different, so I joined the AUV club.

I'll say it was one of the best things I've done since coming to the institute. My experience has been absolutely phenomenal. The team, and the bond I've developed with the members here, is something I'm going to cherish throughout my life. We're practically family. Even now, we often have someone from our team's alumni network visiting us, and reminiscing about some of the best memories they had during their stay. Learning about tech and practical engineering is one thing. That much is to be expected in any tech team. But these other aspects while working on the project made my time here so special. All those endless hours working on some or the other thing in that small lab – oh, that's something to look back upon for sure.



**What are the challenges you and your team faced and how did you overcome them?**

One of the most fundamental challenges that we often face is funding. A lot of the technology we use to build our AUVs is exorbitantly expensive, and we cannot always use the best-in-class tools due to budget constraints. However, we being Indians, worked our way out by prototyping and building several components “in-house,” in somewhat of a “jugaad” manner. These work fairly well in practice, and are budget-friendly as well!



**IIT Bombay has a vast alumni network, what would you like to say to the alumni who will read this interview? How can they be a part of this success?**

One of the first things I'd like to highlight would definitely be our team. Our team is diverse and represents several departments, and I think we're doing something really unique and amazing here. We're 20-year-olds that have managed to become one of the best AUV designers in India,

and we take pride in this feat of ours. But the underwater robotics domain is still quite a niche market. We don't get noticed too much, nor do we have that “hype” associated with us.

**So, firstly, we would like to increase our reach to a wider audience. This will hopefully get us more traction from the industry.**

Secondly, we're really tight on funding here, and any help that the alumni could get us – be it monetary funding, sponsorship of components, software licenses, travel/stay for international competitions - we could use that to forge ahead and make our mark in the world.

Thirdly, we'd love to collaborate with the industry and help them solve some of the challenging problems that they work on. We're always curious to learn new things, and getting exposed to the industry and real-life problems is what will make us better engineers.



**Where do you see the AUV team in the future?**

In the future, we plan to make AUV-IITB known to both parts of the tech world: the industry as well as academia. We're currently working on several immensely difficult research problems that have tremendous potential for applications in the underwater robotics domain, and we're striving to get results as soon as we can. On the other side,

we plan to expand our reach among the industry including defence, public sector, research, etc.

## **In what area/field do you feel there is still a need for improvement?**

As a forward-looking need, we need to improve more on our outreach. We need to find sustainable sources of funding for our future endeavours if we are to expand the team's project portfolio and technical expertise. We will also need to standardize and improve upon some of our testing procedures to ensure we reduce the number of last-minute mishaps that occur during actual runs, and to build more reliable and consistent vehicles.

What an outstanding accomplishment by the young Robosub team. Congratulations to them and we wish them the very best and more success and accolades moving forward. May their hope of making AUV more visible come true in the upcoming years!

## **SPECIAL REPORT**



### **IIT Bombay Launches SCAN – The Sunita Sanghi Centre Of Ageing And Neurodegenerative Diseases - A Foundational Initiative To Combat Neurodegenerative Diseases**

IIT Bombay recently inaugurated the Sunita Sanghi Centre of Ageing and Neurodegenerative Diseases (SCAN) on January 09, 2023. The centre has been set up with a generous donation from IITB's Distinguished Alumnus, Mr. Sharad

Sanghi (B. Tech., Electrical Engineering, 1989). SCAN will focus on creating novel tools and biomarkers for the early detection, diagnosis, and prognosis of neurodegenerative disorders. The Centre will pursue research on the onset of molecular, cellular, and biochemical mechanisms and the progression of neurodegenerative diseases. It will also develop novel tools and biomarkers for early detection, diagnosis, and prognosis of diseases such as Parkinson's, Alzheimer's, and Frontotemporal Dementia (FTD).

Speaking during the inauguration of SCAN, Prof. Subhasis Chaudhuri, Director, IIT Bombay, said, "Neurodegenerative diseases are likely to rise with the ageing Indian population. Therefore, early detection and decelerating the onset of such disorders is pivotal for effective therapy. This centre will assist us in meeting this challenge. IIT Bombay is grateful for Sharad's generous contribution which will play an instrumental role in our endeavour."

### **IIT Bombay to Trial its Patented Blood-Test Technique for Early Detection of Parkinson's**

Already, researchers and scientists at IIT Bombay took a definitive first step toward the early detection of Parkinson's disease. They have developed a blood-based assay as an alternative to imaging techniques such as MRIs. The team, led by Prof. Samir Maji, Department of Biosciences and Bioengineering, has seen a 98% accuracy in detecting the disease and is in the process of conducting large-scale clinical trials for the patented technology.

Neurodegenerative diseases are caused by a toxic protein aggregate,  $\alpha$ -synuclein, which kills neuron cells in the brain. The protein aggregates also cross the brain and enter the bloodstream in small amounts. IIT Bombay's technology entails a substrate that is added to blood samples and amplifies the protein aggregate if present. As the aggregate amplifies, it can be easily measured and thus detect Parkinson's.

The team hopes to leverage the facilities provided by SCAN to take their technology to the marketplace.

### **Panel Discussion During the Launch of SCAN**



Dr. Pratima Murthy, Director, the National Institute of Mental Health and Neurosciences (NIMHANS), was the Chief Guest during SCAN's launch.

Dr. Murthy delivered an insightful keynote address, drawing on her 30+ years of extensive experience in the field of mental health. The gathering also witnessed a well-rounded panel discussion on the challenges and solutions of healthy ageing and combating neurodegenerative diseases, moderated by Prof. Samir Maji, Professor-In-Charge, SCAN.

Apart from Dr. Murthy, the panellists included:

- Prof. Vidita Vaidya, Department of Biological Sciences, Tata Institute of Fundamental Research
- Prof. Sangeeta Ravat, HoD, Neurology at Seth G. S. Medical College and KEM Hospital
- Prof. Prabhvir Vishnu Poruthiyil, Assistant Professor Ashank Desai Centre for Policy Studies, IIT Bombay



The key takeaways were that the contribution of non-communicable neurological disorders is twice what it was two decades ago. They are also a leading cause of disability in an aging population, characterised not just by the death of brain neurons but other cognitive impairments and motor disabilities. In developing this technology and commercialising it, IIT Bombay continues to lead from the front in solving challenges of national importance.

Prof. Maji, Professor-In-Charge of SCAN, said, "India's present healthcare system and standard of living have contributed to a nearly twofold increase in life expectancy since India's independence. However, ageing populations are also highly vulnerable to various types of neurodegenerative diseases. A centre such as SCAN in the unique research ecosystem of IIT Bombay may provide a platform for scientists and engineers to work jointly to tackle the challenges associated with neurodegenerative diseases."

IIT Bombay's work on SCAN was noted and reported on by many leading media outlets in the country including The Times of India, the Indian Express, and more.

**The Times of India:**

[https://timesofindia.indiatimes.com/city/mumbai/iit-bombay-blood-test-to-help-detect-parkinsons-early/articleshow/96867550.cms?fbclid=IwAR0E0o\\_OW0wZZCjyFro3kVRUi4P2GJL7tq085u12bKTD3HI7xRG0hOtzuf8](https://timesofindia.indiatimes.com/city/mumbai/iit-bombay-blood-test-to-help-detect-parkinsons-early/articleshow/96867550.cms?fbclid=IwAR0E0o_OW0wZZCjyFro3kVRUi4P2GJL7tq085u12bKTD3HI7xRG0hOtzuf8)



**The Indian Express:**

<https://indianexpress.com/article/cities/mumbai/iit-b-develops-technology-to-detect-parkinsons-disease->





## IIT Bombay's DSSE Hosts Entrepreneurship Symposium

IIT Bombay's Desai Sethi School of Entrepreneurship (DSSE) hosted a hybrid entrepreneurship symposium on campus. Thought leaders from academia, industry, and the government converged together to discuss the evolving role of entrepreneurship education and the entrepreneurship ecosystem in the country.

Prof. Meric Gertler, President, University of Toronto, was the Chief Guest and keynote speaker at the occasion. In his address, Prof. Gertler stressed universities' key roles in supporting, curating, and mentoring the local innovation ecosystems. Getting to the core of the issue, Prof. Gertler said, "It is assumed that research universities and institutes can play a more intentional role in reshaping their local economies. To help build local innovation systems, local firms and organisations such as universities and research institutes need to be encouraged to collaborate and make the boundaries more porous and permeable so that intellectual resources can circulate across these boundaries more freely. This can be achieved by reshaping the relationship between universities and industrial partners, and sometimes redefining the very essence of what it means to be a faculty member or a graduate student."



IITB's Distinguished Alumnus Mr. Bharat Desai, whose contributions and support helped set up the DSSE, joined the symposium virtually for a fireside chat. In his conversation with Prof. Ravi Gudi, Dean ACR, Mr. Desai reiterated the role played by DSSE in the entrepreneurship space in India. He recalled that while India has had a long business history, entrepreneurship was considered a fine art that only a select few possessed. "Our goal was to shatter this myth. And make it possible for smart, hardworking, young people to see a clear path to entrepreneurial success. It has been 8 years since we started and now over 200 colleges in India offer this curriculum and look to IIT Bombay as a thought leader," he said.

Mr. Desai also spoke about the role IIT Bombay can play in societal impact and nation-building. He stressed the need for the Institute to focus on deep tech, AI and ML, cyber security, and biotech and recommended the nurturing of cross-disciplinary collaboration. He also recommended building a symbiotic, robust ecosystem consisting of investors, mentors, venture capitalists, and researchers, that would help sustain the momentum and shape the future growth of the DSSE. Mr. Desai also recollected the phrase that Dr. Anil Kakodkar had used to charge IIT Bombay with the responsibility to be torchbearers for the innovation and entrepreneurship ecosystem in India: "IIT Bombay should be to India what Stanford has been to the US in these areas of research, innovation and entrepreneurship"



The event also hosted two panel discussions on the evolving role of entrepreneurship education and academic incubators, as well as fostering entrepreneurship education from research to impact. The panellists comprised a mix of illustrious faculty from national and international technology institutes (Stanford, IIT Delhi, IIT Madras); leadership from tech startups, and DSSE faculty amongst others.



Prof. Subhasis Chaudhuri, Director, IIT Bombay, stressed that the Institute’s journey of excellence includes nurturing startups and building a robust entrepreneurial ecosystem. He added, “The Desai Sethi School of Entrepreneurship has played a significant role in our endeavour and has emerged as one of the best feeders for incubators in India today. Entrepreneurship has always been one of India’s strongest vehicles for growth. Our students and the youth of this country need to be trained in entrepreneurship. IIT Bombay has delivered and will continue to lead from the front.”

The rapid growth, rising importance, and continued demand for entrepreneurship education make it essential for the DSSE to scale up and sustain its activities. These require additional resources and initiatives including full-time faculty, facilities, future programs, and funding avenues. Consequently, the DSSE will set up a new building in collaboration with the Makerspace initiative which will educate, mentor, and facilitate aspiring technology startup entrepreneurs in their journeys. It will also house design, DIY labs, prototyping, manufacturing, co-working, and pre-incubation facilities.

Prof. Anuradha Narasimhan, Head, DSSE, is extremely optimistic about the role of DSSE in the field of entrepreneurship education and its impact on India’s future. She said, “It is wonderful to engage with young students brimming with ideas and the desire to change the world. We play a small part in guiding and mentoring them along their entrepreneurial journey”.

If you would like to watch the recording of the symposium – click the link below:

<https://youtube.com/live/TM4iR7Q1qyY?si=EnSikaIECMiOmarE>

## ALUMNI NEWS



### IIT Bombay Announces the DAA and YAAA Awards for 2023

After graduating from IIT Bombay, several of our alumni have gone on to have high accomplishing careers in academia, research, the corporate world, and more. To honour their accomplishments and contributions, IIT Bombay announced the selections of the Distinguished Alumni Awards (DAA) and the Young Alumni Achiever Awards (YAAA) for 2023.

These awards will be conferred on the select alumni at the Institute’s Foundation Day on March 10, 2023.

Hearty congratulations to all the recipients of these prestigious awards.



### Recreating Memories From 45 years ago: The Class of 1978 Reunites on Campus

They returned to their alma mater after 45 years and it felt like no time had passed from back when they were students.

IIT Bombay, in collaboration with the IIT Bombay Alumni Association, hosted its sixth consecutive alumni reunion over the past few months. And this time, it was for the class of 1978.

The class of 1978 returned to campus after 45 years and spent 3 days (January 13 – January 15, 2022) at their once home-away-from-home.

And they had so much fun. As the images below will testify!



**They played carrom.**



**They interacted with the director!**



**They revisited their favourite home-away-from-home – their hostel!**

And did so much more. There were entertainment nights, hangout sessions with their batch mates, and reminiscing about their joyous lives from the past. It was a fun-filled and jam-packed three days of memories, excitement, and activities for the Class of 1978..





## IITB celebrates the 40th Reunion of the Class of 1983

The new year began on a lively note for IIT Bombay as it welcomed back the class of 1983 for its 40th (Ruby) reunion between January 6 – January 10, 2023.

The class of 1983 reconnected with their alma mater and took in the various sights and sounds of their alma mater during their five-day reunion. They enjoyed a tour of the Student Activity Centre (SAC), as well as the latest research and

academic facilities established at the Institute. They were also apprised of the many strategic initiatives undertaken by the Institute and the rapid progress it has made over the years. They learned about IIT Bombay's key mission and vision to be amongst the top science and technology institutes worldwide by 2030. Alumni were also introduced to the newly launched and revamped Dean ACR website (<https://alumni.acr.iitb.ac.in/>) through which they can now stay connected with their alma mater at all times.

But that wasn't all. The Class of 1983 also engaged in several fun activities including playing sports and trekking at Garudmaachi.

IIT Bombay was delighted to reconnect with its former students and is grateful to the class of 1983 for spending their precious time with the current students and faculty at the Institute.



## The Institute Announces the IIT Bombay International Award

IIT Bombay is committed to recognising researchers, scientists, and academicians for their impactful research and scholarship in science and technology. The Institute continues to support, promote, and honour individuals who are creating tangible and visible impact whilst pursuing disruptive research that can impact and change society and humankind.

Consequently, IIT Bombay established its most prestigious award, the "IIT Bombay International Award for Excellence in Research in Engineering and Technology" in 2022.



The masterminds behind the award are IITB alumnus, Mr. Shantanu Rastogi (B.Tech., M.Tech., EE, Nanotechnology, 2002), and Mr. Sandeep Naik (Managing Director, Head of India and Asia Pacific, General Atlantic).

A key objective of the award is to encourage, recognise, and strengthen relationships with talent not just from India but also from around the world. The award will enable scholars and researchers to leverage fundamental and applied research for

societal impact and nation-building.

IIT Bombay has opened nominations for the award from India, Nepal, Bhutan, Bangladesh, Cambodia, Sri Lanka, Laos, Myanmar, Indonesia, Philippines, Malaysia, Thailand, and Vietnam. While nominations from academic professionals and industry practitioners are also invited, self-nominations will not be accepted.

To learn more about this award and the eligibility criteria, visit this link here: [shorturl.at/DQVX4](https://shorturl.at/DQVX4)

If you would like to send in your nominations, visit this link here: <https://lnkd.in/dEbYHGcU>

Nominations are open till Feb 28, 2023.





## **IIT Bombay Celebrates the Golden Jubilee Reunion of the Class of 1970**

It was as if it was their first day of college at the prestigious IIT Bombay.

And just like that – 50 years had gone by.

When the class of 1970 met for their Golden Jubilee Reunion – there was a buzz around campus just like when students come back for their first day of college after a holiday break. For decades they had been in touch with many of their batchmates virtually. But the class of 1970's excitement and big smiles on their faces during their 50-year reunion was infectious as they met one another in person after a long time and relived their glorious past at their alma mater.



## **IIT Bombay Signs an MoU to Establish a High-speed Flow Diagnostics Lab with SPIV system**

IIT Bombay signed an MoU with its alumnus, Dr. Jaynarayan Hotchand Lala (B.Tech, Aerospace Engineering, 1971), Senior Principal Engineering Fellow, Raytheon Technologies, to build a high-speed Flow Diagnostics Lab on

campus.

This lab will be housed at the Institute's Department of Aerospace Engineering and will consist of a Stereo Particle Image Velocimetry (SPIV) system. This state-of-the-art technology will perform flow diagnostic experiments in a wide range of aerospace flow systems.

The establishment of this lab is a progressive step in IIT Bombay's endeavour of nurturing world-class research ecosystems and contributing to nation-building.



## **IITB Signs MoU for Chair Professorship for Research and Teaching in Chemistry for Women Faculty**

IIT Bombay signed a Memorandum of Understanding (MoU) with its alumnus, Mr. Bala Chandrasekharan (B.Tech, Civil Engineering, 1997), and his wife, Mrs. Jayshree Chandrasekharan, to set up a Chair Professorship for Research and Teaching in Chemistry for Women Faculty. The Chair will be

called the "Dr. P.R. Sharadamani Chemistry Chair Professorship" to honour Mr. Chandrasekharan's late aunt, who was a professor in Chemistry and enabled his understanding of this discipline during his early years.

The establishment of this Chair will allow the Institute to foster top-quality research and teaching for IITB's women faculty. It will support and encourage women faculty to make significant and impactful contributions to the field of Chemistry with a focus on energy, the environment, and its societal impact. The Chair will facilitate an improved understanding of how chemical elements/pollution impact climate change and how to mitigate its effects while continuing to support India's growth & development.

## **INSITUTE HIGHLIGHTS**



## IIT Bombay Celebrates Republic Day

IIT Bombay celebrated India's 74th Republic Day on January 26, 2023. Prof. Subhasis Chaudhuri, Director, IIT Bombay, kickstarted the festivities by unfurling the Indian National Flag at the Institute's Gymkhana ground. This was followed by IIT Bombay's security staff and the National Cadet Corps saluting the National Flag. After he addressed the gathering, Prof. Chaudhuri awarded certificates to winners of an essay writing competition held during Vigilance Awareness Week 2021. Also, the security officers, guards, staff from IIT Bombay, and NCC cadets were felicitated during the event. Certificates were also presented to students as part of the "Strokes of Strength" poster-making competition which was conducted by the Gender Cell under the Elimination of Violence against Women Pakhwada 2022.



## IIT Bombay Professors Earn Accolades

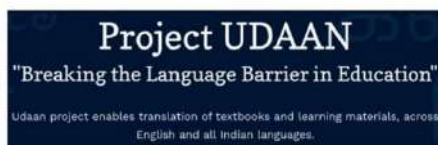


## IITB Signs MoU with Directorate of Higher Education and Director of Technical Education

IIT Bombay signed a Memorandum of Understanding (MoU) with the Directorate of Higher Education and the Director of Technical Education, Government of Maharashtra. Present during the occasion were the Honourable Governor, Shri. Bhagat Singh Koshyari; Minister of Education, Shri. Chandrakant Patil; and Principal Secretary – Directorate Of Higher Education, Shri. Vikas Chandra Rastogi. Prof. Subhasis Chaudhuri, Director, IIT Bombay, and Prof. Milind Atrey, Dean (R&D) represented the Institute at the signing.

The collaboration aims to facilitate efficient and effective translation of all books and publications concerning conventional as well as professional courses into the Marathi language. This has been outlined in the National Education Policy 2020 using the UDAAN project (<https://lnkd.in/g8cCyFkm>).

The UDAAN project (<https://lnkd.in/g8cCyFkm>) from IIT Bombay, led by Prof. Ganesh Ramakrishnan, provides an end-to-end Machine Translation Framework for the translation of technical content into Indian languages and is now being widely used.



AICTE India acknowledged UDAAN in its announcement on December 23, 2022, and said, "The UDAAN Team helped immensely in speeding up

the process of translation of technical books. The strong foundation of their data-efficient machine learning approaches organized at <http://decile.org> has immensely helped this platform. Thus their work is based on continuous research resulting in faster turn-around time for correcting errors and fine-tuning the translation models in a low-resource setting. IIT Bombay is sincerely trying to continuously upgrade and upkeep the UDAAN platform based on valuable inputs from AICTE, coordinators & translators/reviewers for translation work of technical books into different Indian regional languages.”



## IIT Bombay Hosts the Institute Distinguished Lecture Series on Campus

IIT Bombay hosted the Institute Distinguished Lecture Series on January 19, 2023, on campus. The topic for the lecture was ‘Novel Drug Technologies from Benchtop to Commercial Products.’ The lecture honoured the memory of Prof. K.C. Khilar, a former Institute faculty member (Department of Chemical Engineering) and Dean (R&D) at IIT

Bombay.

The lecture was delivered by Dr. Ravi M. Shanker, renowned Senior Research Fellow at Pfizer Worldwide R&D. The presentation provided an overview of the development of multiple drug delivery technologies spearheaded by Pfizer through various approaches.

To learn more about this lecture and the speaker, visit this link here: <https://www.shorturl.at>



## IIT Bombay Hosts Institute Lecture on "Administrative Law and Policy Framing"

IIT Bombay hosted the Honourable Shri Justice Uday Umesh Lalit, Former Chief Justice of India, on January 23, 2023, for an Institute Lecture at the IIT Bombay campus. Shri Justice U. U. Lalit spoke on ‘Administrative Law and Policy Framing’ and also interacted with the IIT

Bombay students and faculty members during his visit.

Click on the link for a recording of the talk: <https://www.youtube.com/watch?v=ue4h9L8xCOw&t=1449s>



## IIT Bombay Offers Python Course Exclusively for IITB Alums

The Pramod Chaudhari Alumni Continuing Education Centre (PCACEC), IIT Bombay, will launch a course exclusively for IITB alums called “Introduction to Python with Application” curated by Prof. Kumar Appaiah, Department of Electrical Engineering, IIT Bombay.

This is the first course in the AI/ML area being offered by the centre. Python has emerged as one of the most popular programming languages in use today. It is applicable in various fields including web development, data analysis, artificial intelligence, software development, programming, and more.

The specialty of this course is its “learning by doing” concept where participants will be expected to solve test questions using Python.

The last date to register is Thursday, February 12, 2023, at <https://acr.iitb.ac.in/PCACEC/Python1>



## IIT Bombay Launches the Department of Economics on Campus

IIT Bombay launched its new Economics Department with 13 faculty members across varied specializations. The Department will address the growing importance of Economics as a discipline and its emphasis on rigorous quantitative and analytical reasoning.

Over the past few years, the Economics group at IIT Bombay was housed as part of the Department of Humanities and Social Sciences. The four-year BS (Economics) degree program was launched in 2017 and has successfully attracted some of the top IIT Joint Entrance Exam (JEE) rankers. Since then, the group has been in sync with the modern developments of the subject and produced high-quality research, as well as a dominant student pool of researchers.

But the setting up of the new department will take it a step further. The importance of economics for businesses and the government has grown over the years. Cutting-edge and disruptive research in the field by well-trained young economists will help enhance data-driven policy-making for government and government bodies and aid with decision-making for businesses.

While IIT Bombay's global presence in Economics will be enhanced by the department, it will also significantly increase interest from prospective faculty members and Ph.D. scholars. It will also aid faculty members and students while applying for research grants, internships, exchange programs, and higher studies.



In addition to the existing BS Economics programme, a Minor and an Inter-Disciplinary Dual Degree Program (IDDDP) for undergraduates will be designed and offered. Also, an MS in Economics will soon be offered in near future.

Prof. K. Narayanan will be the first HoD for this new department.

## UPCOMING EVENTS

### **Institute Lecture on "Flow Physics and Computation at the Intersection of Mechanics and Bioengineering"**

The Indian Institute of Technology Bombay is organizing an Institute lecture in February 2023.

Title: "Flow Physics and Computation at the Intersection of Mechanics and Bioengineering"



Speaker: Professor Rajat Mittal, Professor of Mechanical Engineering and Professor of Medicine, Johns Hopkins University, Baltimore, USA.

Prof. Mittal has done pioneering work in the development of computational methods for fluid dynamics, in particular, immersed boundary methods, and applications of these methods in several interdisciplinary fields. He is a fellow of the American Physical Society and American Society of Mechanical Engineers and a recipient of several notable awards such as ASME Freeman Scholar in 2021.

Day & Date: Monday, February 13, 2023

Time: TBA

Venue: IIT Bombay Campus



**Indian Institute of Technology Bombay**

**Interim Session of 61<sup>st</sup> Convocation**

**Chief Guest:**  
**Dr. Anand Deshpande,**  
Founder, Chairman and Managing Director,  
Persistent Systems Limited

**Day and Date: Saturday, 25<sup>th</sup> February 2023**  
**Time: 3.00 pm**  
**Venue: Convocation Hall, IIT Bombay**



**Live Broadcast:**  
<https://www.youtube.com/IITBombayOfficialChannel>

**Public Relations Officer**

## Interim Session of 61st Convocation

Interim Convocation Day is one of IIT Bombay's most prestigious and eagerly awaited annual events. The ceremony is held for students who receive their graduate degrees before the main Convocation Day, basis their requirement to pursue advanced degrees and/or find jobs elsewhere.

Day & Date: Saturday, February 25, 2023

Time: 3:00 pm onwards

Venue: IIT Bombay Campus