



IIT BOMBAY



**ANNUAL REPORT
2019-20**



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Director's Report

By
Prof. Subhasis Chaudhuri,
Director, IIT Bombay

Indian Institute of Technology Bombay (IIT Bombay) has a rich tradition of pursuing excellence and has continually re-invented itself in terms of academic programmes and research infrastructure. Students are exposed to challenging, research-based academics and a host of sport, cultural and organizational activities on its vibrant campus. The presence of world-class research facilities, vigorous institute-industry collaborations, international exchange programmes, interdisciplinary research collaborations and industrial training opportunities help the students of IIT Bombay to excel and be ahead in the competitive professional environment.

I am pleased to state that the Institute continues to be ranked as one of the top universities of the country and among the best in the world. IIT Bombay attracts the brightest students from the country for its Bachelor's, Master's and Doctoral programmes. In the 62 years of its existence, about 60,000 students have graduated from IIT Bombay. The alumni of the Institute have made their alma mater proud through their achievements and contributions in diverse fields and our engagements with them are steadily growing. Research, along with its translational opportunities, is an increasing focus of activity of the Institute. The Institute has been able to attract outstanding faculty members from not just India but other parts of the globe also. I am happy to inform that we have 681 faculty members on roll – with many of them globally

acknowledged for their research contributions. We have also been able to further our links with international and national peer universities, enabling us to enhance research and educational programmes at the Institute.

IIT Bombay continues to make forays into newer territories pertinent to undergraduate and postgraduate education. At postgraduate level, a specially designed MA+PhD dual degree programme in Philosophy under the HSS department has been introduced. IDC, the Industrial Design Centre, celebrated 50 years of its golden existence earlier this year. At its 58th Convocation - specially created, first-of-its-kind virtual reality-based convocation, held on August 23, 2020, the Institute awarded 2343 degrees (including 376 PhD degrees along with undergraduate and postgraduate degrees) to its students who have completed all their degree requirements during the current academic year.

In the recent past, IIT Bombay has raised the quality of its research and training to a greater height and now is focused on improving its research output further and to have more social engagements to help the country benefit in socially relevant problems.

The Research and development activity at IIT Bombay has continued its rapid momentum. During the year 2019-20, 345 R&D sponsored projects and 705 consultancy projects with a financial outlay of Rs. 331.24 Crores have been carried out in diverse areas of science,



engineering, management and social sciences. Some of the major projects include as diverse topics as (a) Quantum Computing Architecture with Silicon-based Spin Qubits, (b) Establishment of a Technology Incubation Hub for IoT & IoE with a financial outlay of Rs. 170 crores, (C) IBM-IITB AI Horizon Network Umbrella Project (d) Hybrid Layered Manufacturing Using Electron Beam Cladding (EB-HLM), (e) Development of Compressed Hydrogen-Fuel Cell Integrated System Suitable for Light Duty Vehicles. In view of the growing importance of the area, IIT Bombay has also set up an interdisciplinary Centre on Machine Intelligence and Data Science (CMInDS).

The Institute's research was recognised by peers and society in the form of several awards and fellowships conferred on faculty and students. Some of the major awards and distinctions received by our faculty members include: Prof. Devang Khakhar, Department of Chemical Engineering, former Director of IIT Bombay, has been conferred with D. Litt (h. c.) by Monash University, Australia. Prof. Subimal Ghosh, Department of Civil Engineering and Prof. Raghavan Sunoj, Department of Chemistry have been awarded the prestigious S.S. Bhatnagar award, J.C. Bose Fellowships have been awarded to Prof. Soumen Chakrabarti, Department of Computer Science and Engineering and Prof. Dulal Panda, Department of Biosciences and Bioengineering. The prestigious Swarnajayanti Fellowships have been awarded to Prof. G. Rajaraman of Department of Chemistry, and Prof. Subimal Ghosh, Department of Civil Engineering. The Infosys Prize 2019 for Engineering and Computer Science was

awarded to Prof. Sunita Sarawagi, Department of Computer Science and Engineering. Also, Prof. Shubhananda Chakrabarti, Department of Electrical Engineering and Prof. Rohit Srivastava of Department of Biosciences and Bioengineering were awarded 'Abdul Kalam Technology Innovation National Fellowship'.

Despite no student being in the campus during the nation-wide lockdown, our faculty members quickly engaged themselves into Covid-19 related research through internal funding. Some of the developed technologies include: in-situ gel for capture and inactivation of 2019-nCoV; incinerator for safe disposal of masks/gloves, portable/ wheeled UVC based germicidal units for disinfection, and a wash resistant antiviral coating for textiles. An App specially developed for quarantine adherence (CORONTINE) has been adopted in Odisha and Meghalaya. Other IT based solutions include providing user-friendly and customized information access with human-in-the-loop system 'World Wide Help' which is operational at both KEM and IIT Bombay Hospital.

The progress of IIT Bombay on all fronts has been extremely creditable in the past year despite the unforeseen difficulties faced due to the current pandemic. I would like to acknowledge the devoted efforts of the faculty, staff, students and administration of the Institute towards these goals.

KEY FOCUS

- ▶ To instill among all the theme of excellence
- ▶ To improving its research output further and to have more social engagements to help the country benefit in socially relevant problems.

ACADEMIC PROGRAMMES



IIT Bombay continues to make forays into newer territories pertinent to undergraduate and postgraduate education. At postgraduate level, three master's programmes have been introduced: Dual Degree MA + PhD programme in Humanities and Social Sciences, MS by research programme in Computer Science and Engineering, and Inter-Disciplinary Dual Degree (IDDD) programme towards a Masters (without honours) in 'Artificial Intelligence and Data Science' in the Centre for Machine Intelligence and Data Science (C-MInDS).

IIT Bombay continues to be a sought-after destination for UG and PG studies and attracts the top performers in national examinations such as GATE, CEED, UCEED, NET, JAM and JEE (ADV). Out of 37 available seats for Undergraduate Common Entrance Exam for Design (UCEED) at IIT Bombay, 16 out of top 30 rankers have joined IIT Bombay for BDes programme.

(Due to COVID-19 outbreak, JEE(Advanced) 2020, which was scheduled to be held on May 17, 2020 has been rescheduled and was held on September 27, 2020).

At the 57th Convocation, a total of 2407* degrees were awarded. These include 181 PhDs, 32 Dual Degree (MTech/MPhil+PhD) and 38 Dual Degree (MSc+PhD), 12 MS (by Research), 6 Dual Degree (MSc+MTech), 576 MTech, 56 MDes, 27 MPhil, 110 MMgt, 226 two-year MSc, 10 five-year integrated MSc, 368 Dual Degree (BTech+MTech), 683 BTech Degrees, 4 Interdisciplinary Dual Degrees (BTech/BS+MTech/ MSc), 6 Dual Degrees (BS+MSc), 21 BS, 15 BDes, and 14 PGDIIT. (*excluding degrees awarded during 57th interim convocation)

With an increase in undergraduate (UG) and postgraduate (PG) intake, the student population has undergone significant changes in the last 10 years. In 2008-09, the number of on-roll UG students was 2583 (44.04%) while the number of PG students was 3282 (55.95%) (Masters – 1774,

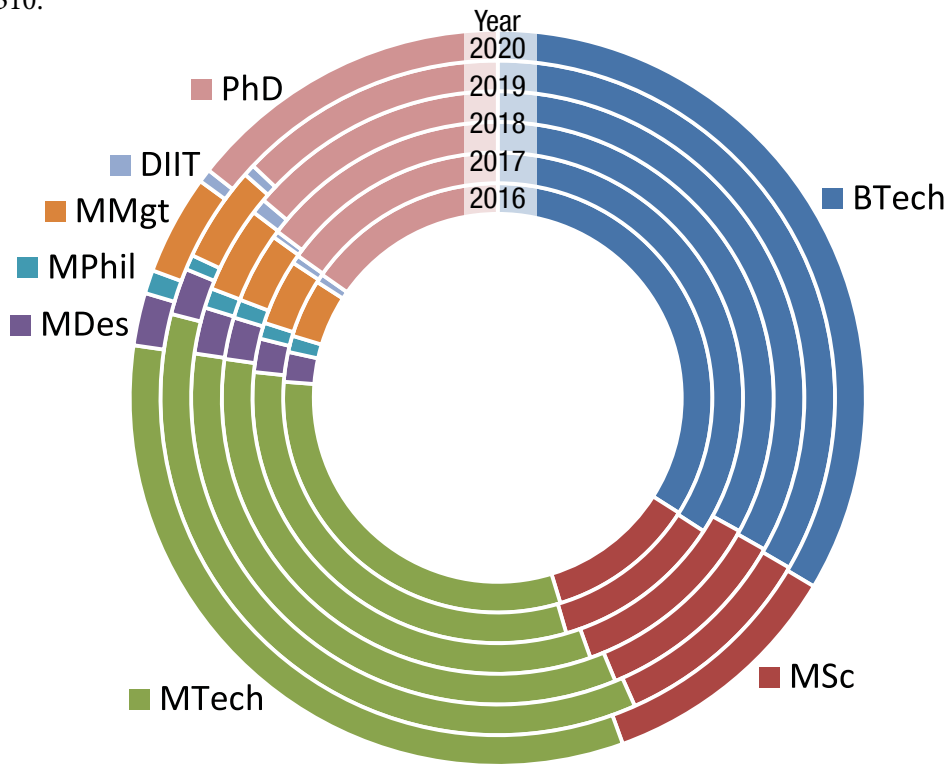


PhD – 1508). This has changed to 3900 (42.35%) and 5307 (57.64%) for UG and PG students, respectively, in 2013-14. Presently, the Institute has about 10949 students of which 4558 (41.6%) are UG and 6391 (58.37%) are PG.

In order to continue imparting high-quality and holistic education to the much larger student population, the Institute continues to modify and evolve processes which can effectively address the changing situations.

The PhD student strength has increased in leaps and bounds in the last 15 years. From 1028 PhD students in 2003-04, the number has gone up to 2518 in 2013-14 and currently stands at about 3310.

The number of students graduating with a PhD has also been steadily increasing. In the last 10 years, the number of PhD degrees awarded has gone up from about 180 to 385. A significant fraction of these are in the engineering discipline. All students involved in research at the Institute are given an opportunity to interact with research community at the national and international level by providing funds to attend international conferences. During the academic year 2019-20, 315 students were granted financial assistance for attending international conferences and an amount of Rs.4.4 Crores (Rs. 4,47,48,447/-) was utilised for this purpose.



Year	BTech	MSc	MTech	MDes	MPhil	MMgt	DIIT	PhD
2020	880	292	800	58	32	114	17	395
2019	867	288	792	56	27	110	14	385
2018	851	297	843	63	28	106	10	379
2017	857	271	866	63	27	117	21	357
2016	840	250	897	56	18	115	14	325
Total	4295	1398	4198	296	132	562	76	1841

RESEARCH AND DEVELOPMENT ACTIVITIES

Research and development activity at IIT Bombay has continued its rapid momentum. The receipt for R&D projects during FY 2019-20 is Rs. 331.24 crores.

1. R&D Activities

During the year 2019-20, new R&D projects were initiated in all areas of science, engineering, management and social sciences, typically ranging from two to five years duration. These included short-term consulting projects and long-term sponsored research projects (Table 1).

Fin. Year	Sponsored Projects		Consultancy Projects	
	Number	Sanctioned outlay (Rs. In crores)	Number	Project outlay (Rs. in crores)
2019-20	345	251	705	79.8*
2018-19	388	214.6	745	104.16
2017-18	303	186.1	703	64.70

*: includes GST for Indian party/ clients

Sponsored projects sanctioned outlay ranges during FY 2019-20 from few lakhs (in Rs.) to 9.56 crores and the distribution of outlay ranges is shown in Figure 1.

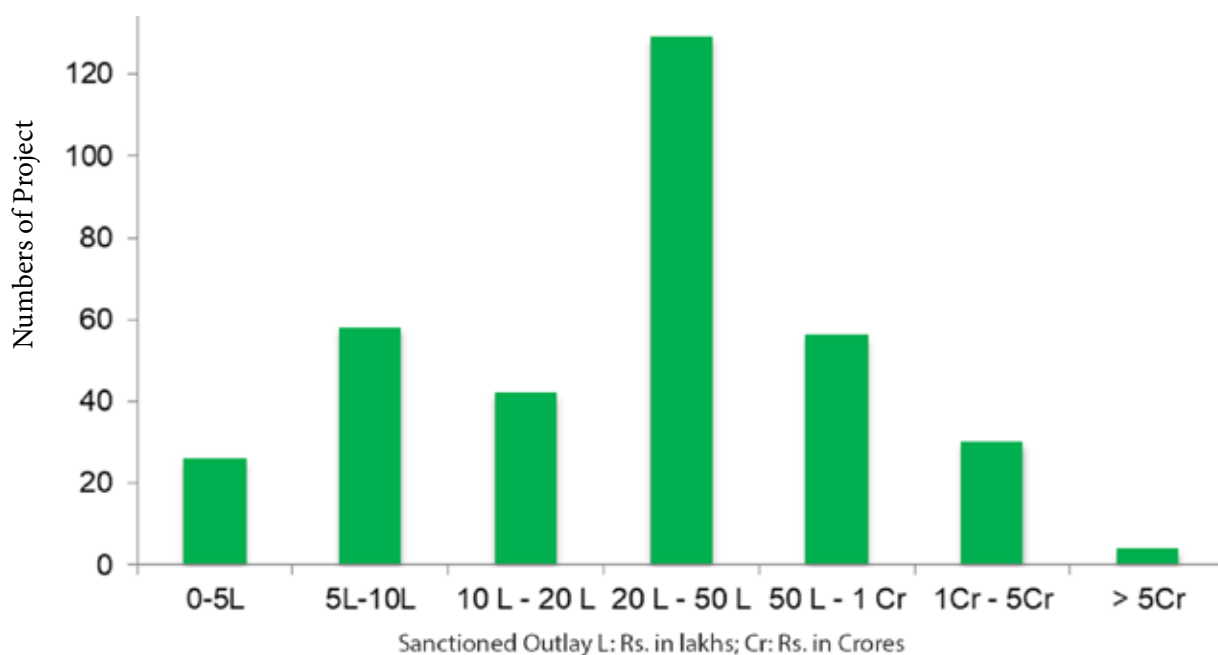


Figure 1: Distribution of Sponsored projects-sanctioned outlay ranges

a) External grants for R&D

The total money received for R&D activity in FY 2019-20 was Rs. 331.24 crores (Table 2). This includes grants received in the year for new projects, sanctioned and ongoing projects.

Table 2: Money received for R&D activities in 2019-20

Project Type	Funds received (Rs. in crores)
Sponsored Projects	263.40
Consultancy Projects	62.60
Royalty	1.44
Equipment usage	3.80
Total	331.24

Some major sponsored projects initiated:

- ▶ **Quantum Computing Architecture with Silicon-based Spin Qubits**
Sanctioned Outlay: Rs. 9.56 crores over five years
Funding Agency: Defence Research and Development Organization
- ▶ **Technology Incubation Hub for Technologies for IoT & IoE**
Currently, the sanctioned outlay is Rs. 7.25 crores, with a proposed outlay of 170 crores over 5 years
Funding Agency: Department of Science and Technology
- ▶ **IBM_IITB_AIHN (AI Horizon Network) Umbrella Project**
Sanctioned Outlay: Rs. 6.84 crores over three years
Funding Agency: International Business Machines Corporations
- ▶ **Hybrid Layered Manufacturing Using Electron Beam Cladding (EB-HLM)**
Sanctioned Outlay: Rs. 4.15 crores over three years
Funding Agency: Department of Science and Technology

- ▶ **Diamond-based Quantum Technologies**
Sanctioned Outlay: Rs. 3.90 crores over three years
Funding Agency: Department of Science and Technology
- ▶ **National Supercomputing Mission Building Capacity and Capability**
Sanctioned Outlay: Rs. 3.02 crores over three years
Funding Agency: Ministry of Electronics and Information Technology (Nanotechnology Division)
- ▶ **Creating Livelihood in Jawar & Mokhada**
Sanctioned Outlay: Rs. 3.00 crores over three years
Funding Agency: Ministry of Tribal Affairs (STWG Division)
- ▶ **A Microscopic Traffic Simulator Integrated 3D Driving Simulator for Cond Behavioural Studies and Testing ITS Applications in Disordered and Heterogeneous Traffic Systems**
Sanctioned Outlay: Rs. 2.66 crores over two and a half years
Funding Agency: Department of Electronics and Information Technology
- ▶ **Development of Compressed Hydrogen-Fuel Cell Integrated System Suitable for Light Duty Vehicles**
Sanctioned Outlay: Rs. 2.42 crores over three years
Funding Agency: Department of Science and Technology
- ▶ **E-Kalpa III**
Sanctioned Outlay: Rs. 2.24 crores over one year
Funding Agency: Ministry of Human Resource Development
- ▶ In addition, Government of India has continued to sanction more projects under the schemes called IMPacting Research INnovation and Technology

(IMPRINT) and Uchhatar Avishkar Yojana (UAY) focussing research to solve major engineering and technology challenges in selective domains including manufacturing industry needed by the country. Thus, it aims to enable, empower and embolden the nation for inclusive growth and self-reliance. Nine new projects have been initiated under IMPRINT – II scheme this year along with 3 ongoing projects. 29 projects are already nearing completion under IMPRINT – I scheme. Under UAY – I scheme, four projects are ongoing. Two projects have been initiated under UAY-II and one more is ongoing.

Scheme for Promotion of Academic and Research Collaboration (SPARC) Projects:

The Ministry of Human Resource Development (MHRD) initiated new scheme called 'Scheme for Promotion of Academic and Research Collaboration (SPARC)' that aims at improving the research ecosystem of India's higher educational Institutions by facilitating academic and research collaborations between Indian institutions and the best institutions in the world to jointly solve problems of national and/ or international relevance. The scheme proposes to enable productive academic cooperation by supporting the following critical components that can catalyze impact making research, namely:

- ▶ Visits and long-term stay of top international faculty/ researchers in Indian institutions to pursue teaching and research
- ▶ Visits by Indian students for training and experimentation in premier laboratories worldwide
- ▶ Joint development of niche courses, world-class books and monographs, translatable patents, demonstrable technologies or action research outcomes and products
- ▶ Consolidation of bilateral cooperation through academic and research partnerships through workshops in India

- ▶ Publication, dissemination and visibility through a high-profile annual international conference in India

The expected outcomes include tangible results in terms of large quantity of high-quality research publications, solution to key national and international problems, development of niche courses, high-quality text books and research monographs, imbibing of best practices from top international academicians and researchers, strong bilateral cooperation and improved world reputation and ranking of Indian institutions. During these interactions, IIT Bombay researchers (faculty, students) will collaborate with their counterpart from universities located at United Kingdom, USA, Canada, Australia and Germany.

IIT Bombay initiated 4 new projects this year along with 8 others that are ongoing.

Consultancy activities were taken up for different government, public sector and industry, both Indian and international. The types of consultancy provided included expert advice, retainership, product/ process/ software development, analysis, evaluation, product design and limited testing.

a) Some typical/ representative consultancy projects initiated during the year:

- ▶ Development of applicators for deep seated tumours
- ▶ Streamlining GIS-based copper prospectivity modeling
- ▶ AI-ML for Chest X-ray Image Analysis
- ▶ Pelletization modeling and analysis
- ▶ Geotechnical study on erosion and instability caused due to rain water seepage
- ▶ CFD modeling of air delivery and noise in fans
- ▶ Smoke Detection Using Machine Learning
- ▶ CFD of Biofluids in Arteries
- ▶ Traffic Impact Assessment and Traffic Management Plan during Construction of Metro Line
- ▶ An innovative cooling fan

- ▶ Development of C-Band 25W GaN RF Device and requisite GaN manufacturing technology
- ▶ Science-of-scale tool and mathematical model to predict rupture in Osmotic Tablet Coatings

b) Internal grants for R&D

The Institute provided internal funding for supporting faculty research and student activities. Around Rs. 22 crores were sanctioned for these activities which included the following:

- ▶ seed grant for initiation of research for new faculty
- ▶ augmenting research facilities and maintenance of central and national research facilities
- ▶ augmenting research resources of faculty recipients of Research Publication Award, Impactful Research Award, Research Dissemination Award and Early Research Achiever Award
- ▶ leverage grants and bridge grants
- ▶ research internships and fellowships for PhD student
- ▶ student research/ competition/ event: projects such as ADVITIY-2nd Student Satellite project, Autonomous Underwater Vehicle (Matsya) - IIT Bombay, IIT Bombay Racing, Barcelona Smart Drone Challenge, Mahindra Rise Driverless Car Challenge, Mars Rover, Exoskeleton for Flight (Exofly), Rakshak, International Aerial Robotics Competition, Robocon, Student Design Competition - 2019 (American Society of Mechanical Engineers)

c) R&D Awards grants from External Agencies

The Institute's research was recognised by peers and society in the form of award grants conferred on faculty and students. Some of the awards/ fellowships received during the year are:



Indian Institute of Technology Bombay has secured second position in the Atal Rankings of Institutions on Innovation Achievements, (ARIIA 2020) under the category of Institute of National Importance, Central Universities and CFTIs.

Council of Scientific & Industrial Research awarded

- ▶ Shanti Swarup Bhatnagar Prize for Science and Technology, 2019 (Prof. R. B. Sunoj for Chemical Sciences and Prof. Subimal Ghosh for Earth, Atmosphere, Ocean and Planetary Sciences)

Infosys Prize

- ▶ Infosys Prize 2019 in the area of Computer Science was awarded to Prof. Sunita Sarawagi

Department of Science & Technology awarded

- ▶ J.C. Bose Fellowship for 2019
Prof. Soumen Chakrabarti (Computer Sciences)
Prof. Dulal Panda (Biosciences and Bioengineering)
- ▶ SwarnaJayanti Fellowship 2020
Prof. G. Rajaraman (Chemistry)
Prof. Subimal Ghosh (Climatology)
- ▶ Women Scientist Fellowship in Chemistry, Physics and Engineering

Department of Biotechnology awarded

- ▶ Innovative Young Biotechnologist Award for Biosciences

Indian National Academy of Engineering

- ▶ Abdul Kalam Technology Innovation National Fellowship 2020
Prof. Shubhananda Chakrabarti (Electrical Engineering)
Prof. Rohit Srivastava (Biosciences and Bioengineering)

National Academy of Sciences, India

- ▶ Reliance Platinum Jubilee Award for Application Oriented Innovation in Biosciences
- ▶ Young Scientist Platinum Jubilee Award in Engineering
- ▶ Scopus Young Scientist Award in Chemistry

2. Licensing Activities

a) Entrepreneurship: (3)

Rights to technology/ Intellectual Property (3 Nos.) created in the Institute were given to researchers for incubation/ entrepreneurship activity in SINE/

elsewhere during this year are as follows:

- ▶ Ayati Devices Pvt. Ltd.
- ▶ Clarity Bio
- ▶ Haystack Analytics Pvt. Ltd

b) Technology transfers: (18)

Royalties for different IP licensed in the past continued to be received and some technologies were licensed in this year. Some of them are:

- ▶ Arsenic removal filter
- ▶ Book- Cycle ka Sapna
- ▶ Curcumin formulations
- ▶ Device to detect tracheostomy tube blockage
- ▶ Digital Stethoscope
- ▶ Multi use biopsy device
- ▶ Software for forecasting load (Web STLF)
- ▶ Tube-Tube Heat Exchangers (TTHE)
- ▶ Waste water vapourizer technology
- ▶ Web based software for transmission usage cost and loss allocation (WebNetUse)



Research and Technology Licensing Agreement between IIT Bombay and Murata

3. Dissemination/ Outreach Activities

a) TechConnect 2019-20

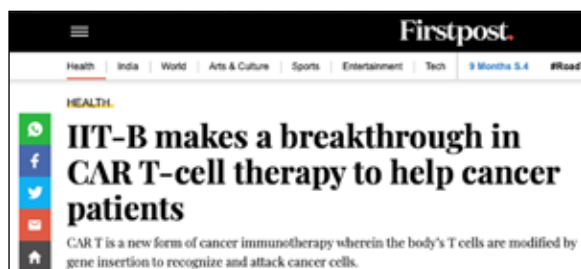
TechConnect 2019-20, an R&D exhibition which showcases IIT Bombay's R&D activities was organised by the Office of Dean (R&D) during January 3-5, 2020 as part of TechFest 2019-20 in the academic area of the campus. It showcased R&D exhibits (250 exhibits - working models, demonstrations, products & posters) from 22 academic units/ research centres. The event was inaugurated by Dr. V. R. Lalithambika, distinguished scientist and Director, Directorate of Human Space Programme, Indian Space Research Organisation (ISRO), Bengaluru and Prof. Subhasis Chaudhuri, Director, IIT Bombay. In addition, Centre for Distance Engineering Education Programme, Centre for Research

in Nanotechnology and Science, Industrial Research and Consultancy Centre (IRCC) and the Academic Office had set up stalls to disseminate information about the online activities, research facilities available, R&D activities of the Institute and academic programs offered by IIT Bombay respectively. Also, a few incubated companies in Society for Innovation and Entrepreneurship (SINE) and student technical teams showcased their exhibits. Apart from the exhibits, lecture-demo sessions were successfully introduced for the first time in TechConnect this year by a group of faculty members in Department of Computer Science and Engineering. The event attracted very large footfall of students and general public.

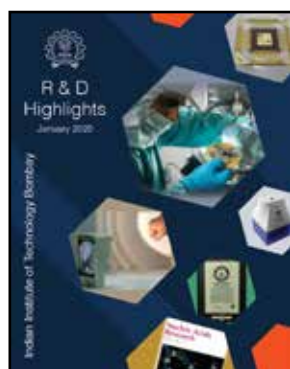


b) Media outreach :

IRCC realizes the need to communicate its R&D efforts with wider society. Towards this, IRCC has collaborated with Gubbi Labs to bring out 27 easily accessible stories conveying IIT Bombay's achievements. These articles have been released in English, Hindi and Marathi languages. Many of these articles have been picked up by mainstream and online media and disseminated further.



Brochures titled '*R&D Highlights*', '*Partner with us*' highlighting the possible modes of interactions between IIT Bombay and Industry and '*Innovations licensed to industry*' highlighting some technologies and products developed and deployed were updated.



These brochures were distributed in various industrial forums like India International Science Festival - 2019 Expo, International Engineering Sourcing Show - IX, TechConnect 2019-20 and various other events and engagements as well as to visitors of the Institute to disseminate information on R&D activities and industry interactions of the Institute.

c) Intellectual Property (IP) Protection Activities

During 2019-20, 153 intellectual property (patent, trademark) applications were filed. List of all Indian and international IPR filings and granted are given in Table 3.

Table 3: Patents and other IPR applications filed & granted during 2019-20

IP type	Applications filed (No.)	Granted (No.)
Indian Patent	97	42
PCT	13	-
US Patent	6	6
Other foreign patent	5	-
Trademark	9	30
Design	23	8

Areas of IP filings:

Battery storage system, Biochemistry for therapeutic treatment, Biomedical devices, Blockchain, Chemical process, Chemistry and chemical, Construction, Cryogenics, Drug delivery systems, Membranes, Microfluidics, Network provider, Photovoltaics, Point of care devices, Polymer technology, Proteomics, Recombinant proteins, Sealant, Semiconductors, Sensors, Waste control, Water technology, Wireless network, etc

As in the previous year, pro-active efforts were taken to assess the possibility of intellectual property in the work of MTech/ Dual degree student to file for possible protection. 745 abstracts were reviewed. Out of these, 64 were shortlisted for a possible filing of patent applications and the filing process is ongoing.

Proactive efforts continued for licensing of these technologies, products and designs.

Nearly 100 agreements were finalized and signed during the year including those for research collaboration, licensing, non-disclosure agreements, IP transfer, student sponsorships, endowment, material transfers, etc. with industries, organisations, universities and government, both national and international.

d) Awards for IP and R&D Activity**National Intellectual Property Award 2019**

IIT Bombay won the National Intellectual Property Award 2019 under the category of 'Top Academic Institution for Patents and Commercialisation' given by the Government of India (Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, and Intellectual Property office, India). The award carries a memento, citation and cash incentive of Rs. One Lakh.

The award was received by Dean (R&D) on behalf of the Institute at a function held in New Delhi on April 26, 2019. During the function, R&D Expo was also organised exhibiting some of the Institute's technology development. The brochure 'R&D Highlights' was distributed to visitors. IP professionals, government officials, jurists, students and media persons who attended the award function and visited the expo.



IIT Bombay wins National Intellectual Property Award 2019

Guinness World Records in 2019

Solar Urja Lamp (SoUL) project of IIT Bombay achieved two Guinness World Records on October 2, 2019 in the following categories: (i) Most people assembling solar powered lamps simultaneously; and (ii) Largest environmental sustainability lesson. The records were achieved by IIT Bombay along with the Ministry of New and Renewable Energy, GoI, involving 6,841 and 4,780 participants respectively. The record attempt was done to pay homage to Mahatma Gandhi on the occasion of his 150th birthday anniversary.



DBT - Biotechnology Product, Process Development and Commercialization Award

This award is conferred to scientists/ innovators/ entrepreneurs/ institutions/ companies both in public as well as private sector towards development and commercialization of biotech process/ technology/ product in the different sectors of biotechnology and biological sciences.

IIT Bombay developed and scaled up a process for synthesis of ephedrine and pseudoephedrine, drugs commonly used as stimulants and decongestants. R&D interventions significantly improved reaction yield. Embio Limited was awarded for optimizing this GMO process all the way to a 36 kL scale, making this the largest GMO process in the country.

At this time, the primary export markets are the US, Europe, and Japan.



DBT-Biotechnology Product, Process Development and Commercialization Award 2019

Focussed Initiatives

Initiatives were taken to promote and facilitate research and development work and encourage students to focus on R&D. Some highlights are given below:

a. Enhancing Industry Partnership

Institute continued its efforts to enhance its interaction with industry. More than 50 industries visited IIT Bombay to explore cooperation and collaboration in R&D activities. These visits by industries were managed in a seamless manner by facilitating meetings with faculty having specific areas of expertise of interest and continued follow up for initiating projects/ collaboration. Agreements were entered into to establish a formal association.

In addition, brochures titled 'R&D Highlights', disseminating some of the outcomes of R&D efforts undertaken at the Institute and 'Partner with Us', highlighting the interactions with industry and disseminating the possible modes of collaboration, were updated twice.

New projects were initiated with industry partners under the *Uchhatar Avishkar Yojana* (UAY) and IMPacting Research INnovation and Technology (IMPRINT) schemes launched by the Government of India. Around 300 Indian and international industries approached the Institute for partnering with the Institute through collaborative R&D projects.

Some of the industries and PSUs which visited and/ or approached the Institute to explore research collaborations include:

Siemens, Pfizer, Hilti, Honeywell Technology Solutions, Delhivery, Larsen & Toubro Limited, Consumer Electricals Limited (Crompton Greaves), LG Soft, Birlasoft, Bajaj Electricals, Reserve Bank of India, Hindalco Industries, Cognizant Technology Solutions, Viacom18 Media, IBM, CEAT Tyres, Reliance, Ion Exchange, Bharat Electronics Limited (BEL), Puretronics, Hindustan Aeronautics Limited (HAL), CII, Airbus, Mangalam Organics, Indian Oil Corporation Limited (IOCL), IDBI Bank, Nutanix Inc., Vedanta Limited, TCSiON, TCS, Army Technology Board, Union Bank of India, Hindustan Petroleum Corporation Limited (HPCL), Micron Technology, Adani Group, Kirloskar Pneumatic Company, Weatherford, TATA Motors, Autoliv, Canthus, Hindustan Zinc Limited, Philips, Minda Corporation, Sony Tokyo, JDA Software, Achal Jewels, ITC Limited, UL, Puri Crawford, UPL Limited, SanDisk, Tristar Intermediates, Honeywell Automation, Transasia Bio-Medicals, Alhoty Analytical Services Bahrain, Alpha Equipments, Bharat Petroleum Corporation Limited (BPCL), Bureau of Indian Standards, Infosys Technologies, Machinery Trials Unit – Indian Navy, ACG Pharmacy, AGD Biomedical, Rites Limited, Ecoman Enviro Solutions, Prism Johnson, Modison Metals, Patanjali Peya, Aarti Industries, ISGEC Hitachi Zosen, Dow Chemicals, DavosPharma, Alibaba, Huawei Technologies, etc.



MoU signing with LGSI



Meeting with Siemens



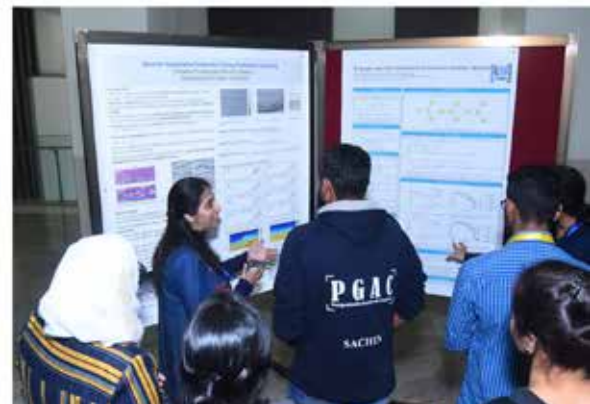
MoU signing with ExxonMobil

b. MInDS workshop

A full-day workshop on Machine Intelligence and Data Science ‘IIT Bombay MInDS Workshop’ was held in IIT Bombay on January 18, 2020 to foster interdisciplinary collaboration between faculty, researchers, students across departments who work in related areas, along with Industry partners. Dr. Mayur Datar, Chief Data Scientist, Flipkart delivered the keynote address on *Data Science Applications in E-commerce*.

The event also included short talks that covered the breadth of areas that faculty in IIT Bombay are already working on; poster presentation by students and panel discussion with industry personnel on ‘*How can Academia and Industry collaborate to increase the pace of AI/ML innovation in India*’. The panelists were Dr. Mayur Datar (Flipkart), Mr. Abhishek Shekhar (Executive Director, J P Morgan Services), Dr. Sanjay Bhat (Principal Scientist, TCS), and Mr. Jayesh Pillai (Head - Product Management, L&T-NxT).

The workshop was a success and provided a platform for cross-fertilization of ideas, collaboration across departments and outreach to the industry. Subsequently, a new Center for Machine Intelligence and Data Science (C-MInDS) has been established at IIT Bombay.



COVID-19 mitigation

c) Projects initiated towards the mitigation of COVID-19:

Projects with an R&D component were given internal seed funding by IRCC for developing proof of concept and further, they were linked to relevant industry partners (wherever possible) for development/ deployment actions. For example, In-situ gel for capture and inactivation of 2019-nCoV; Identification of metabolite biomarkers for targeted therapy; Plasma proteomic analysis towards therapeutic targets; Incinerator for safe disposal of masks/ gloves; and technology and design for portable / wheeled UVC based germicidal units for disinfection.

Projects with immediate deployment for societal use were planned/ funded/ supported. For example, low-cost masks are being sold through Institute pharmacy and masks and PPEs are being distributed to government hospitals.

IT solutions have been developed and fine-tuned to specific requests. For example, App for quarantine adherence (CORONTINE) has been adopted in Odisha and Meghalaya; tracking and tracing of asymptomatic carriers (SAFE); Privacy preserving contact tracing software released in open source domain; IT solution for user-friendly, customized information access with humans-in-the-loop (World Wide Help) to be made operational at KEM Hospital and IIT Bombay Hospital; Methods to reduce waiting period for purchase of essential items to manage physical distancing being planned.

d) Institute Ethics Committee (IEC)

IIT Bombay Institute Ethics Committee was reconstituted in September 2019 with Dr. Renuka Munshi, Department of Clinical Pharmacology, TN Medical College & BYL Nair Hospital as the Chairperson. During the year, the committee has reviewed 65 proposals. 57 proposals were approved in expedited, full board or exempt mode depending on nature of proposals.



Due to increasing number of proposals and varied nature of research, Institute has decided to set up Institutional Review Board (IRB) which will review proposals having social/ behavioural/ design research in human participants and are non-interventional in nature. Institute Ethics Committee will continue to review proposals involving biomedical / health related studies in human participants as per ICMR guidelines

e) Institutional Review Board (IRB)

IRB will review research proposals involving social and behavioural studies that are non-interventional and are not related to health and bio-medical arenas for e.g., language studies and application-designing that does not involve direct interventions. Process is ongoing to set up the committee. The committee is expected to be functional in the coming year.

7. Incentives for R&D

IIT Bombay Research and Consultancy awards were instituted at the Institute in the year 2004 by the Institute to encourage and recognise the outstanding research and consultancy works carried out by faculty members. These awards are now called as

- a) IIT Bombay Research Publication Award
- b) IIT Bombay Impactful Research Award
- c) IIT Bombay Research Dissemination Award
- d) IIT Bombay Early Research Achiever Award

The winners of these awards during the year are as follows:

Award Name	Award Recipient Name
Research Publication Award	Prof. Ranjith Padinhateeri, Department of Biosciences and Bioengineering Prof. Pradeep Kumar P I, Department of Chemistry Prof. S Banerjee, Department of Earth Sciences Prof. S S Pande, Department of Mechanical Engineering Prof. Indrajit Mukherjee, SJM School of Management
Impactful Research Award	Prof. A Kumar, Department of Chemistry Prof. Om P. Damani, Department of Computer Science and Engineering
Research Dissemination Award	Prof. N S Punekar, Department of Biosciences and Bioengineering Prof. Amartya Mukhopadhyay, Department of Metallurgical Engineering & Materials Science
Early Research Achiever Award	Prof. Kamendra P. Sharma,, Department of Chemistry Prof. Vikram Vishal, Department of Earth Sciences Prof. Aswani Yella, Department of Metallurgical Engineering & Materials Science

- **Prof. Krithi Ramamritham Award for creative research**

The Prof. Krithi Ramamritham Award for creative research was instituted in 2016 at IIT Bombay by Prof. Jayant Ramaswamy Haritsa, Indian Institute of Science, Bengaluru. This is awarded for highly creative and original research contribution made primarily at IIT Bombay by a faculty member in any engineering discipline. The award is intended to be given for a specific accomplishment and not for cumulative career performance. The award carries a citation and a cash incentive of INR 1,00,000 (Rupees One Lakh). Prof. Krithi Ramamritham Award for creative research for the year 2018 was awarded to **Prof. Sujit S. Jogwar**, Department of Chemical Engineering in recognition of his significant research contributions in the area of 'Predictive modeling of Perovskite solar cells'.



Prof. Sujit Jogwar receiving Prof. Krithi Ramamritham Award for creative research

Also, rewards for research excellence, technology development and transfer efforts, were given in the year and the winners are as follows:

Award Name	Award Recipient Name
S.C. Bhattacharya Award for Excellence in Pure Sciences	Prof. Kanchan Pande Department of Earth Sciences
H.H. Mathur Award for Excellence in Applied Sciences	Prof. Sunita Sarawagi Department of Computer Science and Engineering
Dr. P. K. Patwardhan Technology Development Award	Prof. Shreevardhan A. Soman, Prof. Anil M. Kulkarni, Dr. Rajeev Gajbhiye, Dr. Gopal Gajjar, Dr. Prashant Navalkar, Dr. Kalyan Dasgupta, Dr. Swati Lavand, Dr. Kedar Khandepurkar, Mr. Akhil Raj, Mr. Hemantkumar Goklani, Dr. Papiya Dutta, Dr. Somesekar Rao, Mr. Aditya Nadkarni, Ms. Priyanka Murli, Ms Minal Chougule, and Ms. Pragati Gupta Department of Electrical Engineering



Prof. Kanchan Pande receiving S.C. Bhattacharya Award for Excellence in Pure Sciences



Prof. Sunita Sarawagi receiving H.H. Mathur Award for Excellence in Applied Sciences

Awards recognition included cash awards, research grants and arranging Institute wide dissemination through lectures and electronic media.

Research Internship awards	<p>Given to bright students across the country to undertake research at IIT Bombay for upto six months, based on national advertisement and selection process. Each selected intern gets monthly stipend of Rs. 10,000 for the internship period subject to not getting any support from parent organization/Government (MHRD).</p> <ul style="list-style-type: none"> • No. of applications received: 428 • No. of Intern selected: 85 • No. of Intern joined: 80 • No. of interns who completed internship: 79 • Other contingency expenditure per intern: Rs. 50,000
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8. Dissemination/ Outreach for IIT Bombay Academic Community

a) Lectures on Winners of the Nobel Prize 2019:

Lectures by domain experts (list given below) on the work of **Winners of the Nobel Prize 2019** were organised at the Institute on October 28, 2019.

Category	Laureate(s) Prof. & Awarded work	Speaker Prof.
Chemistry	John B. Goodenough, M. Stanley Whittingham & Akira Yoshino <i>“Development of lithium-ion batteries”</i>	Prof. C. Subramaniam, Department of Chemistry
Economics (Sveriges Riksbank Prize)	Abhijit Banerjee, Esther Duflo & Michael Kremer <i>“Experimental approach to alleviating global poverty”</i>	Prof. G. Haripriya, Department of Humanities & Social Sciences
Literature	Peter Handke <i>“Influential work that with linguistic ingenuity has explored the periphery and the specificity of human experience”</i>	Prof. Sudha Shastri, Department of Humanities & Social Sciences
Physics	James Peebles <i>“Theoretical discoveries in physical cosmology”</i> & Michel Mayor & Didier Queloz <i>“Discovery of an exoplanet orbiting a solar-type star”</i>	Prof. Vikram Rentala, Department of Physics
Physiology/ Medicine	William G. Kaelin Jr, Sir Peter J. Ratcliffe & Gregg L. Semenza <i>“Discoveries of how cells sense and adapt to oxygen availability”</i>	Prof. Rahul Purwar, Department of Biosciences & Bioengineering

A large number of faculty members and students attended the lectures.



(Right) Prof. Milind Atrey, Dean (R&D) with the speakers

b) National Education Day Programme – Talk by the recipients of Shanti Swarup Bhatnagar Prize for Science and Technology for 2019:

National Education Day Programme was organised on November 11, 2019. As part of the programme, the recipients of the Shanti Swarup Bhatnagar Prize for Science and Technology for 2019 in the Institute gave talk (details given below) on their research works that enabled them to get this prestigious award to the IIT Bombay academic community.

Bhatnagar Award category, Speaker & Talk Title:

- Award category: Earth, Atmosphere, Ocean and Planetary sciences
Prof. Subimal Ghosh, Department of Civil Engineering
Talk Title: ‘Land-Atmosphere Feedback in Indian Summer Monsoon’
- Award category: Chemical sciences
Prof. Raghavan B. Sunoj, Department of Chemistry
Talk Title: ‘Chemical Catalysis using Computers’

A good number of students, faculty members and staff members attended the function.



9. Safety activities at the Institute

A workshop on pressure system safety was held on February 1, 2020 to create awareness regarding pressure system hazards and safety precautions for research work. The first session was on pressure system safety which was conducted by Mr. Anil Hiwarkar, General Manager- Environment, Health and Safety (EHS), Blue Star Ltd. Mr. Hiwarkar also talked about laboratory hazards, unsafe behaviours and unsafe conditions, and hazard control measures. Few accident cases related to pressure systems were discussed. Short videos were also shown during the session. The second session was conducted by Mr. Shashikant Juvekar, Godrej and Boyce Ltd. (Retd.) on air conditioning system - refrigerant types and precautions for working with air conditioners. Mr. Juvekar and the Blue Star team conducted a practical session on safety measures while working with air conditioners. A display of personal protective equipment was also arranged in the laboratory. The workshop was jointly organised by Safety Officer, IIT Bombay and Mr. Anil Hiwarkar, Blue Star Ltd. Around 30 students and staff attended the workshop.

10. Online processes (R&D activities)

Online interface of R&D activities (in drona & IRCC website) continued to make it more user-friendly and few of the activities automated in this year are as follows:

- Updated consultancy projects module:
 - To capture details of closure remarks and uploading of outcome of the project while closing of the project (even without disbursement).
 - For sending an automated email to party consultancy project letter, SOW, invoice and Standard Terms and Conditions.

- Project staff Administration portal modified/ updated:
 - In case of superannuation of staff, new facility is provided to end tenure in Drona, and updated status is shown in project staff details page.
 - To capture HRA amount instead of standard 30% HRA.
 - Extension request approval
 - Provided more additional leave approval process.
 - Sending automated extension reminder email and also possibility of exemption to certain category of staff (07IR001).
 - Medclaim administration module was upgraded with additional features.
- Students fellowship attendance module is modified for data porting to SAP interface towards fellowship payments
- Additional features are added in Advance and Honorarium requests.
- Online DBT scholarship submission facility to M.Sc. students & access to Head, Biosciences & Bioengineering Department
- DST approved projects positions (21 designations) and other relevant details like qualification and experience are created and made available to PIs for facilitating recruitment of project staff and Adhoc appointment.
- Development of new webpage for displaying COVID -19 related R&D activity.

11. Project Manpower

Number of Project staff/ fellow working in various projects as on 31.3.2020 is 1295. Among them, 514 joined during the FY 2019-20.



OUTREACH PROGRAMMES

The Continuing Education and Quality Improvement Programme (CE &QIP) office at IIT Bombay has been actively reaching out to working professionals from both academia and industry to serve the competency development and training requirements. A large number of working professionals from industry as well as faculty and students from academia have participated and acquired knowledge from short and long-term certificate courses during 2019-20.

A number of short-term training programs (STTP), which are funded by the All India Council for Technical Education (AICTE) as QIP courses, for faculty members of engineering colleges and GIAN training programmes funded by the Ministry of HRD, Government of India were conducted. Eminent faculty from foreign institutions were invited to deliver lectures and tutorials for GIAN courses. In order to provide college teachers an opportunity to interact with the industry professionals, special efforts have been made to permit a few industry participants as part of the QIP courses, in the normal CEP mode. This model has been appreciated by the teachers as well as the industry personnel, and has also helped to improve the overall effectiveness of various QIP courses.

Many of Institute's CEP courses for the industry are well established worldwide and continue to attract large participation, both from within as well as from abroad. The courses on "3D

Printing", "Human Computer Interaction", "Energy Management", "Elements of Chemical Engineering", "Executive Programme in Management", "Leadership Development Program", "Expo CD and Expo PDI", "Strategies for Organization's Growth", "Finite Element Method and Application", "Data Analytics", and "Python Programming", have all been appreciated by the industry. The Institute is actively promoting the use of online mode for conducting CEP courses and has already started in-house courses to companies such as Michelin India, L&T and BEL Academy. The CE&QIP office are also promoting two open courses in Machine Learning/ AI scheduled online with weekly slots over a span of 6 weeks, specially designed for working professionals.

In terms of the overall performance of CE&QIP during 2019-20, a total of 201 CEP courses were conducted with about 2932 participants from across disciplines as well as industries, organizations and institutions, with a revenue of around Rs. 9.50 crore. Under the QIP category, 8 PhD students from AICTE-approved engineering colleges were admitted. In addition, 7 teachers were inducted into PhD programme under the advance admission scheme who would be joining the Institute for the regular programme from July 2020. Further, 20 short-term courses (STC) were conducted for college teachers under the sponsorship from AICTE and a total of 621 participants from various engineering institutions/ colleges attended these courses.

FACULTY ACHIEVEMENTS AND RECOGNITIONS

During the year, 25 faculty members (9 Assistant Professor (Grade- I) three Associate Professor and two Professor) on regular basis and 11 on Assistant Professor (Grade -II) joined the Institute. The number of full-time faculty members on the roll of the Institute has risen to 681 comprising 335 Professors, 01 Professor (Contract), 176 Associate Professors, 147 Assistant Professors (Grade-I), and 22 Assistant Professors (Grade-II). In addition, there are 56 adjunct faculty members and 118 post doctoral fellows on the roll. Around ten faculty members retired – nine of whom were re-employed and one resigned during the year.

The Institute provided financial assistance to 259 faculty members for participating in international conferences. In addition, 16 faculty members travelled abroad for attending international conferences using external funding.

Apart from educational and research pursuits, the faculty of the Institute meet national and global obligations in diverse ways. Many of them have accepted membership of various national committees and editorship of journals. They also review manuscripts for publications. We are proud that their efforts have received recognition in the form of many awards and distinctions, some of which are listed below:

Prof. Amit Agrawal, Department of Mechanical Engineering has been elected as a Fellow of the International Society for Energy, Environment and Sustainability. The fellowship was conferred during the annual conference of the society held at NEERI, Nagpur on November 27, 2019

Prof. Anindya Datta, Department of Chemistry has been nominated to join the Editorial Advisory Board of 2020 Journal of Physical Chemistry for a period of 3 years, from January 2020

Prof. Anirudha Joshi, IDC School of Design has received the 2019 IFIP TC13 award by the International Federation for Information Processing Technical Committee on Human Computer Interaction (IFIP TC13) for his outstanding contributions in human computer interaction (HCI)

Prof. Atanu Ghosh, Shailesh J. Mehta School of Management was invited to join the Board of Governors (BoG) of the two management institutes of Institute of Management Technology (IMT) group of institutions – IMT Hyderabad and IMT Nagpur and accepted these invitations to be on the BoG of the two institutes

Prof. B K Das, Department of Mathematics has been selected as Indian Academy of Science Associates for three years from 2019

Prof. Bhaskaran Muralidharan, Department of Electrical Engineering has been awarded the Science and Technology Award for Research (STAR) instituted by Science and Engineering Research Board (SERB) to recognize and reward outstanding performance of Principal Investigators of SERB projects

Prof. Bijan Bandyopadhyay, IDP in Systems and Control Engineering has been elected for the Fellowship of National Academy of Sciences (FNASc) for the year 2019



Prof. Chetan Singh Solanki, Department of Energy Science and Engineering has been awarded “Outstanding Green Activist-Jury Choice Award” by the Indian Federation of Green Energy

Prof. D. Manjunath, Department of Electrical Engineering has been elected as Fellow of the Indian Academy of Engineering (FNAE)

Prof. Debabrata Maiti, Department of Chemistry has been admitted to the Fellowship of Royal Society of Chemistry (FRSC), London

Prof. Debabrata Maiti, Department of Chemistry has been invited to join the Editorial Board of ‘Chemistry A European Journal’ for a period four years, starting from January 2020

Prof. Debabrata Maiti, Department of Chemistry has been selected to receive the NASI Scopus Young Scientist Award for the year 2019 under Innovation in Engineering and Physical Sciences category

Prof. Deepankar Choudhury, Department of Civil Engineering has been elected as Fellow of American Society of Civil Engineers (FASCE). He has also been invited to join the Editorial Board of “Soils and Foundations” published by Elsevier

Prof. Devang V. Khakhar, Department of Chemical Engineering has been selected to receive “Shri Om Prakash Bhasin Award 2019” in the field of engineering, energy and aerospace

Prof. G. Rajaraman, Department of Chemistry received Dr. A. P. J. Abdul Kalam HPC Award - 2019 from Dr. Shekhar Mande, DGCSIR and Dr. Madhavan Nair Rajeevan, Secretary, Ministry of Earth Sciences, GoI

Prof. Haripriya G, Department of Humanities and Social Sciences has been invited to join as an Associate Editor of the Journal of “Indian Society for Ecological Economics” for a period of three years

Prof. Hetu Sheth, Department of Earth Sciences has been selected to receive the PRL (Physical Research Laboratory, Ahmadabad) Award for the year 2017

Prof. Irishi N.N. Namboothiri, Department of Chemistry has been elected as Fellow of Indian Academy of Sciences (FASc), Bangalore

Prof. Jayendran Venkateshwaran, Industrial Engineering and Operations Research and **Prof. Chetan Singh Solanki**, Department of Energy Science and Engineering, and Principal Investigator of SoULS for their SoULS Initiative at IIT Bombay has won the 1st Grand Prize in the IEEE’s Empower a Billion Lives (EBL) competition, the Finals of which was held during September 28th - October 1st at Baltimore, USA. The award includes a citation and grand prize of \$100,000

Prof. K. G. Suresh, Department of Physics has been selected to receive the Materials Research Society of India (MRSI) Medal for the year 2020

Prof. Kannan Moudgalya, Department of Chemical Engineering has been acknowledged with “Pt. Deen Dayal Upadhyaya Recognition for Re-Engineering India 2020” in the Farmer Welfare/ Industry/ Institutional Category for having paved the path for multi lingualism by envisaging and curating spoken tutorials in various Indian languages for Education, Employment and Empowerment. It was conferred on him by the Vice President of India on February 14, 2020

Prof. N. N. Viswanathan, Department of Metallurgical Engineering and Materials Science (MEMS) has been selected to receive 'Metallurgist of the year award – Ferrous category 2019'. The award was instituted by the Ministry of Steel, Government of India

Prof. Neela Nataraj, Department of Mathematics has been awarded the prestigious INSA Teachers Award (2019). The award has been instituted to recognize and honour teachers who have inspired students to take up careers in Science and Technology

Prof. Neela Nataraj, Department of Mathematics has been elected for the National Academy of Sciences (FNASc) Fellowship for the year 2019

Prof. Phani Tetali, IDC School of Design has been awarded Akhil Bhartiya Kala Gaurav Samman for his outstanding contributions to Animation Film Design Education' by the Maharashtra Cosmopolitan Education Society, Pune on March 2, 2020

Prof. Pushpak Bhattacharyya, Department of Computer Science and Engineering has received the prestigious Abdul Kalam Technology Innovation Fellowship for a period of three years from February 1, 2020

Prof. R. B. Sunoj, Department of Chemistry has been invited to join the Editorial Advisory Board of "Chemical Sciences" the flagship journal of Royal Society of Chemistry (London) for a period of two years

Prof. Rinti Banerjee, Department of Biosciences and Bioengineering has been elected as Fellow of Indian Academy of Sciences (FASc), Bangalore

Prof. Rohit Manchanda, Department of Biosciences and Bioengineering has been awarded the prestigious INSA Teachers Award (2019)

Prof. Rohit Srivastava, Department of Biosciences and Bioengineering has been admitted as a Fellow of the Royal Society of Chemistry (FRSC), London.

Prof. Rohit Srivastava, Department of Bioscience and Bioengineering have been elected for the Fellowship of National Academy of Sciences (FNASc) for the year 2019

Prof. Rohit Srivastava, Department of Biosciences and Bioengineering has been elected as a Fellow of the National Academy of Sciences, India (NASI)

Prof. Rohit Srivastava, Department of Biosciences and Bioengineering has received the prestigious Abdul Kalam Technology Innovation Fellowship for a period of three years from February 1, 2020

Prof. Ruchi Anand, Department of Chemistry has been elected for the Fellowship of National Academy of Sciences (FNASc) for the year 2019

Prof. S. A. Khaparde, Department of Electrical Engineering has been elected as a Fellow of the Indian Academy of Engineering (FNAE)

Prof. S. Pal, Department of Mathematics has been selected as Indian Academy of Science Associates for three years from 2019.

Prof. Sachin Patwardhan, Department of Chemical Engineering has been elected as a Fellow of the Indian Academy of Engineering (FNAE)



Prof. Sahana Murthy, Interdisciplinary Programme in Education Technology has received the AECT Robert deKieffer International Fellowship Award for 2019, in recognition of her professional leadership in the field of educational communication and technology

Prof. Samir K. Maji, Department of Biosciences and Bioengineering has been selected to receive the NASI-Reliance Platinum Jubilee Award for Application Oriented Innovation for the year 2019 in Biological Sciences

Prof. Samir K. Maji, Department of Biosciences and Bioengineering has been selected as a fellow for the Tata Innovation Fellowship of the Department of Biotechnology (DBT)

Prof. Santosh Gharpure, Department of Chemistry has been invited to join the Editorial Advisory Board of European Journal of Organic Chemistry (Wiley-VCH)

Prof. Shyamprasad Karagadde, Department of Mechanical Engineering has been selected by the National Academy of Sciences to receive the prestigious 'NASI Young Scientist Platinum Jubilee Award'

Prof. Subimal Ghosh, Department of Civil Engineering has been selected to receive the PRL (Physical Research Laboratory, Ahmadabad) Award for the year 2017

Prof. Subhananda Chakrabarti, Department of Biosciences and Bioengineering has received the prestigious Abdul Kalam Technology Innovation Fellowship for a period of three years from February 1, 2020

A team comprising of **Prof. Sugandh Malhotra and his PhD student Ms. Deepshikha Dash**, IDC School of Design has won the prestigious "Joseph Jaworski's Next-Gen Foresight Award" in the Group Special Award category for their project on "Future Design Possibilities for Mobility"

Prof. Supratik Chakraborty, Department of Computer Sciences and Engineering has been elected as Fellow of the Indian Academy of Engineering (FNAE)

Prof. Tarun Kant, Department of Civil Engineering has been selected to receive "INSA Professor Brahma Prakash Memorial Medal 2019"

Prof. Udayan Ganguly, Department of Electrical Engineering has been selected to serve on the Editorial Board of IEEE Electron Device Letters for a period of three years

Prof. Vivek Agarwal, Department of Electrical Engineering has been elected as Fellow of Indian Academy of Sciences (FASc), Bangalore

Mr. Durgesh Tamhane and Ms. Indrani Mukherjee, students from the Department of Electrical Engineering have won first prize at the IEEE International Sensors and Measurement Student Contest at the 2019 IEEE Sensors Conference at Montreal, Canada. Their project is titled '*Detection of defects in steel sheets*'

Mr. Divakar Kuppan, a student of IDC School of Design has won the Best Animation Student Film at the 8th Mumbai Short International Film Festival for his graduation animation film titled, "*Panangaatu Nari/ The Fox of the Palmgrove*"

STUDENT ACTIVITIES

Sports Council

Inter IIT Sports meet

The 54th Inter-IIT Main Meet, co-hosted by IIT Kharagpur and IIT Bhubaneswar from December 14, 2019 to December 22, 2019 saw a participation of 23 IITs across 14 sports. The Aquatics meet had already concluded earlier in October, with IIT Bombay obtaining 4 points. The highlights of the main meet included Gold for the TT Men's and Squash Women's team, Bronze for Chess, Volleyball Men's, Badminton Women's and Table Tennis Women's, and fourth place for Lawn Tennis Women's team. Notable individual performances came from Kaushik Konwar who clinched a bronze medal in the under 69 kgs weight category, providing the first medal to IIT Bombay, and fourth place positions to Tushar Uike in 100m, RomshaJaipriya in 1500m, and 4x400m Men's relay.

Overall, IIT Bombay scored a total of 37 points, which placed IIT Bombay on the 7th position in the overall standings. Almost all teams made the quarterfinals and narrowly missed out on proceeding to the semifinals.



Aavhan

The fourth edition of IIT Bombay's Annual Sports Fest Aavhan was all set to return from March 27-29, 2020 but due to the COVID-19 situation, it was postponed and held in October 2020. Aavhan 2020 raise the bar and redefined college sports for 4000+ participants from all over India who battled it out in 17 different sports.

Providing IIT Bombay's state-of-the-art sports facilities, Aavhan strives to create the best possible platform for the hardworking players from different parts of the country to prove their mettle amongst some of the finest sportsmen. This edition witnessed Carrom for the first time, along with the newly-added Kabbadi and Powerlifting. This sports fiesta will also sufficed as an opportunity to the Institute teams to play against the best talents and gain substantial experience.

IIT Bombay Half Marathon

The third IIT Bombay Half Marathon was held on October 13, 2019. In spite of an incessant monsoon season, the Half Marathon drew 3000+ participants from across the entire city, with a vast multitude of runners looking forward to the event eagerly.

Organized in association with Fitizen India, the mega-event carried the tagline “Every drop counts”, contributing to Prime Minister’s ‘Jal Shakti Abhiyan’. In a bid to reduce waste generation, IIT Bombay Sports collaborated with Team Zero Waste and used reusable and biodegradable kulhads for water distribution.

UG + PG Orientation

Sport is an integral part of one’s life, and IIT Bombay provides the best of facilities for students to hone their skills. Following a slew of orientations for freshers regarding campus life, IIT Bombay Sports aced the UG and PG Sports Orientation. Freshmen were given an insight into the events and camps conducted by the sports council, a glimpse of the sports culture and a glance at the opportunities at hand for glory. SAC in charge, Dr. K.K. Sengupta introduced them to the highly-acclaimed Inter-IIT Sports Meet, the biggest sporting event for IITians.

The introduction of the sports council drew a round of applause from the audience, and a barrage of questions was launched at them post the orientation. Delighted to see the zeal from their juniors, the council members promptly assisted all the students.

MAC (Mountaineering Adventure Course) + BMC (Basic Mountaineering Course)

A mountaineer must not only learn climbing but should also understand the language of mountains. With this being the major objective, IIT Bombay Sports organised Mountaineering Adventure Course, MAC during May 9 – 23, 2019 at Sanasar, Jammu. Further, with a power-packed itinerary of mapping down the distances of Mcleodganj, Bharmour and Manimahesh, Basic Mountaineering Course, BMC was kicked off on June 11, 2019.



The packages proved to be a perfect conjunction of training activities like rappelling, rock climbing, river crossing, camping, ascender climbing and recreation. There was an everyday schedule to be followed which taught various aspects of punctuality and discipline to the trainees as they started the ascent.

Base camp at 9000 feet, lake at around 14500 ft. and everyone filled with gushing enthusiasm - BMC was a perfect experience to hold on. "A frozen lake surrounded by a Vista of mountains covered in fresh snow; definitely a sight to behold" - said a trainee. They termed it as an unparalleled experience which helped them to overcome their fears. It also helped them in improving their physical fitness and the difficulties faced helped them better their mental strength. The course turned out to be more of a memory and something to get people out of their semester blues.

Swimathon

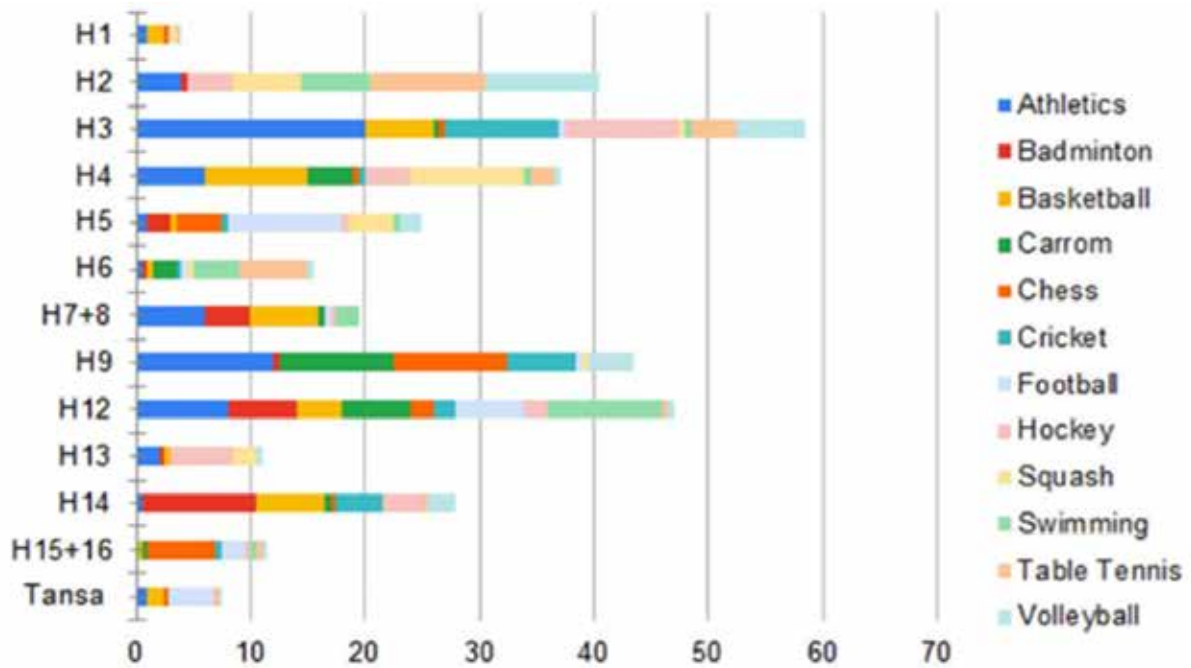
An event which demanded everything from its participants - skills, patience, and endurance. A 12-hour swimming marathon which exhausted the contestants physically, mentally, and emotionally.



To complete this event, the participants were disbarred from exiting the swimming pool for the entire duration of the event. Covering 12 km is also considered as having completed the event. An astounding total of 26 participants completed the event. Overall champion Ayush Thakur completed a staggering 27.5 km in 12 hours while Girls Champion Mridula Bagul covered an impressive distance of 20.1 km.

General Championship

The General Championship (GC) dates back to the time hostels were built. Many legacies and rivalries have been created by this tournament, which has grown over time. Each hostel bands together in support of their best sportsmen, where players gruel it out and where players win titles not just for themselves but for their hostels as well.



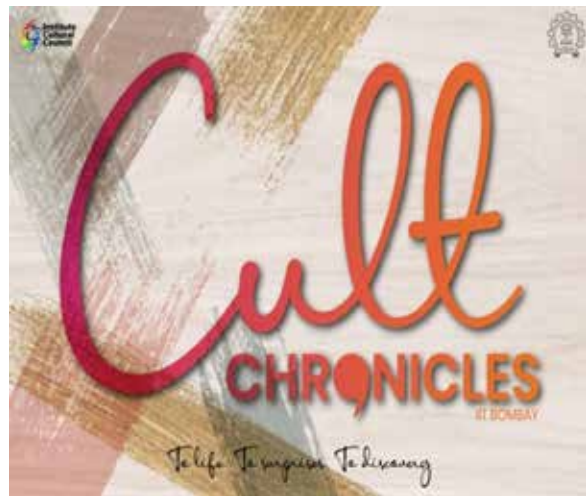
The GC's are inter-hostel tournaments, spread widely throughout the entire year, with each sport adding prized points to a hostel's total tally. These tournaments provide a platform to showcase talent, win hearts and possibly find a way into the reputed Inter-IIT contingent. The hostels are segregated into groups, to ensure equitable distribution of strength. This splitting of the hostels into groups promises tight and competitive matches, with plenty of cheering and motivating from audiences. The current standings of various hostels in different GC's is shown pictorially here in this graph.

Cultural Council

- **Culturals Website and App:**
 - ◆ Improved existing admin portals and the app UI interface
 - ◆ Revamped the resume verification portal and updated blogs, P2P portal
- **Cultural Meet 4.0:**
 - ◆ IIT Bombay successfully conducted the 4th Cultural Meet (December 20 – 22, 2019)
 - ◆ 24 IITs took part in the Cultural Meet 4.0 with more than 54 competitions
 - ◆ IIT Bombay bagged the runner's up trophy at the same



- **Enigma (ICSP):**
 - ♦ Ideated and executed the first ever cultural lookback magazine during the summers, under ICSP (Institute Cultural Summer Project)
- **Movie-Madness:**
 - ♦ Movie Screenings were conducted under the Banner of IIT Bombay Filmfest
 - ♦ Chhichhore, Noblemen, The Tashkent Files, Unreserved have been screened till now and all of them were followed by a talk session
- **Cult Chronicles & Click Beetles:**
 - ♦ The respective seniors have been contacted to submit their write-ups, contents and pictures as per the requirements for the Instagram post

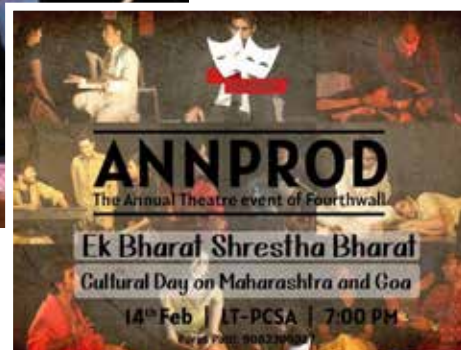


- **Prom Night:**

- ◆ Organised “Prom Night 2019” for the passing out seniors of the Institute
- ◆ Collaborated with the location-based social search mobile app and web application “Tinder” for photo booth and informal activities

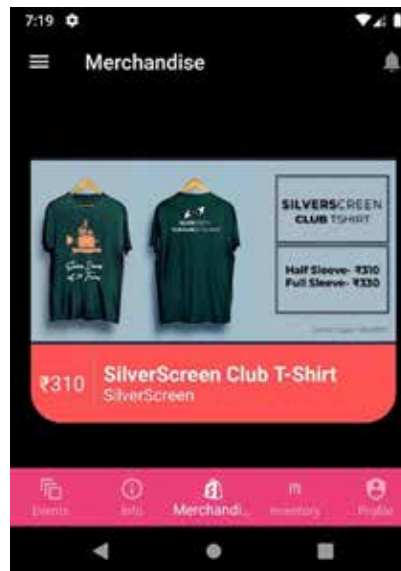


- **Ek Bharat Shreshtha Bharat (EBSB):** Various events were conducted under the banner of EBSB (as requested by the MHRD). Every month witnessed 1 major and 7 minor events featuring the culture of various states in India



- **Culturals App**

- ♦ Created a Culturals App compatible with Android & iOS devices



- **Performing Arts Festival**

- ♦ Conducted PAFs on three days, in the month of April 2019
- ♦ Saw participation from 15+ hostels and 250+ students from all the genres



- **Showstopper**

- ♦ Introduced a fashion show-case in Convocation Hall
- ♦ The event was performed in January, including pre-event photoshoots



- **Annual InSync Dance Show (AIDS):**

- ♦ AIDS was organised in February 2020. The event witnessed dance performances across various genres and also highlighted social issues like rape and suicide among the youth



- **Comedy Cons Flagship**

- ◆ Introduced a stand-up show featuring performances by our students and two of the very famous stand-up artists in the Mumbai circuit



- **Theatrefest**

- ◆ Conducted the well known, dramatics flagship - Theatrefest
- ◆ The event was graced by bollywood cast of Ujda Chaman



- **Salsa Night**
 - ◆ Conducted an open Salsa night workshop for college students
- **Dandiya Night**
 - ◆ Conducted Dandiya night as a festive celebration for college students



- **Surbahaar**
 - ◆ Conducted the musical flagship (Surbahaar) for students and faculty
 - ◆ The event was graced by the very famous Mithoon (music composer)



- **Virasat**

- ♦ Organized the classical night packed with various music and dance performances in the LT-PCSA
- ♦ All the artists were national award winners in their respective fields

Abhyuday

Following year-long activities were conducted by **Abhyuday** 2019 -20 with the focus on creating social awareness and impact.

Campaigns:

- **Career Counselling Campaigns (CCC)** were conducted for 8000+ students from 80 BMC schools in one day with the help of 250+ volunteers from IIT Bombay. The students were told about the myriad career opportunities and were also made aware of the various harmful effects of Climate Change.



- Achieved milestone of reaching out to 18,000+ students of BMC schools in one session of through video-teleconferencing telling them about career opportunities and answering their queries regarding subjects and various prospects.
- **2 Powai Lake Mega Clean-Up Campaigns** were held on June 5, 2019 for World Environment Day and on November 3, 2019. The campaign was done in collaboration with BMC. Together, the two campaigns saw a total turnout of more than 600 enthusiastic volunteers from the Institute and garbage collection of over 3 metric tonnes.
- **Volunteer Visits** - Organised volunteer visits on weekends through the year consisting of **Masti Ki Paathshala** - 10, slum & old age home visits - 10, **Food Distribution** with Robin Hood Army- 16, Versova Beach Cleanup - 2, Mithi River Cleanup campaign - 4



- **Slum Adoption Campaign** started with the collaboration with Pranays NGO. Volunteers took a survey of about **180+** students in a slum in Ghatkopar. Two interactive sessions of Masti ki Pathshala followed by 2 Awareness sessions of Drugs and Alcohol use were conducted in the slum.
- Abhyuday conducted various communal beneficiary activities including 1 blood donation camp with 400+ participation, free health checkup camp catering 200+ people, CPR Workshop, self-defense workshop for IIT Bombay women and a fire-safety workshop for residents.



Events:

- **Youth Empowerment** - Organized lectures on topics covering Power of Thinking, Leadership, Smartwork, Emotional Intelligence by renowned speakers Mr. Ashish Vidyarthi, Dr. Radhakrishnan Pillai, Dr. Ujjwal Patni, Mr. Anand Munshi and more empowering the youth towards the difficulties faced in everyday life.
- **Socio-X Series** - Series of Lectures part of Annual Fest focusing on key areas of concern of society including Health, Environment, and Technology for rural development. Dr. Sheetal Amte, Padmabhushan Dr. KK Talwar, Tahira Kashyap Khurrana are some of the renowned speakers delivered the lectures.
- Abhyuday's **Annual Social Fest** encompassed a wide spectrum of events dealing with burning social issues, along with which self-awareness and solutions were presented. Several renowned personalities including Mr Sonam Wangchuk, Actress Dia Mirza, IAS officer Tukaram Mundhe, Mr. Mayank Gandhi, Atul Khatri, BMC Commissioner Mr. Praveen Pardeshi, Former ISRO Chairman Dr. AS Kiran Kumar and many more talked on pressing issues including Climate Change, Youth in Governance, Girl Safety, Cyberbullying, Nation Building, Space Entrepreneurship, etc. An exhibition on Agrotech was also held.

Competitions:

Action Plan - Challenges the youngsters across the country to come up with feasible and optimistic solutions to tackle social issues present in Indian society. This year 500+ teams from all over India participated in the competition and 20 teams were invited to present their solutions in front of a panel of 16 Incubators and investors.

PIL competition on Road Safety - Introduced a new competition to promote student involvement in laws and policies related to social issues by providing a fair and competitive environment for an exchange of thought and to strive and develop participant's knowledge related to them. The competition saw participation from 250+ students in 85+ teams.

- **Technical Affairs**

TINKERERS' LAB (TL)

To tackle the problem of redundant electronics being disposed of, TL Donation Drive was initiated to recycle gadgets. Training sessions were held for some machines in TL every weekend to give students basic training on how to use them. TL had been a part of the organizing Team of the Smart India Hackathon 2019 in collaboration with MHRD. TL Talks on new technology, innovation & entrepreneurship were conducted by Prof. Moriwaka, CEO Silicon Valley Ventures and Rahul Prajapat, STAB OC (2014-15) & Co-founder, Tvarit AI. A semiautomatic vertical milling machine was bought by TL.



CLUBS

24 workshops, 11 competitions and hackathons and 35 talks were organised by all the clubs together reaching an audience of over 2000 students. To establish an online presence, weekly problems and updates on technology were delivered via newsletters and social media. Some clubs also participated in national competitions like *Skyrush*, *Boeing Competition*, *Techfest Drone Challenge* and *International Meshmerise Challenge*.

Placement talks were conducted followed by some technical workshops in collaboration with industries. Student Reading Groups were formed to share knowledge. Industry Visits were planned to gain insights on the operations and increase awareness regarding the utility as well as safety. Documentary and movie screenings proved to be an effective medium of learning. Group discussions were held as a continuing tradition to promote knowledge sharing. The clubs launched various projects to engage the students productively during the holidays.

PROJECTS

In **Institute Technical Summer Projects (ITSP)**, first-year students are mentored to engineer their dream projects or use technology to solve real-world problems. Rural and agriculture-based projects were introduced with the help of the CTARA department. More than 40 projects were selected. Under Technovation, project proposals were invited under the following categories - campus sustainability, rural technology, autonomy and robotics and open domain, with support from the Tinkerer's Lab.

Summer of Science, (SoS) by MnP, matches enthusiasts with diverse interests to student mentors. SoS took off with 435+ mentees and 120 mentors. Seasons of Code (SoC) by WnCC had 16 projects, with 63 students and 21 mentors, and spanned topics like Machine Learning, Augmented Reality and Network security. Sustainability Cell collaborated with the Institute Technical Council and floated funded technical projects, guided by professors, aimed at solving issues related to sustainability in our Institute.

8th INTER IIT TECH MEET

This year, **IIT Roorkee** hosted the 8th Edition of the Inter IIT Tech Meet from December 20-22, 2019. This vision was carried further by the problem statements that were released in various fields like robotics, automation, social innovation etc. Overall, we achieved an overall 8th Position this year with 1 gold, 2 silver and 2 bronze medals. The results reflected some lack of preparation. However, the team displayed a good amount of teamwork and zeal. They are continuing working on the projects even after the Inter IIT Tech Meet.



GENERAL CHAMPIONSHIPS

9 intra-hostel general championships were conducted over the year. These GC's saw participation from 10 hostels and involved around 1000 students to represent their hostels.

- Jhatka GC
- Astrophotography GC
- Eye in the sky++ GC
- Coding GC
- PhysX GC
- Think inside the box GC
- Logic GC
- Glider GC
- Documentation GC

TECH R&D EXPO

Tech & RnD Expo was organised during October 12-13, 2019. The exhibition consisted of **30+ exhibition stalls** with presenting students ranging from undergraduates to postgraduates. The exhibition was complemented by talks and events which ran parallel with the expo. The exhibition was conducted from 10:00 am to 5:00 pm on both days. Both professors and students participated.



Miscellaneous

INTER IIT Bootcamps: 7 workshops designed to provide a broad understanding of various domains in engineering and technology were conducted to prepare the contingent for the meet. Chemistry Club was introduced on a pilot basis where enthusiasts conducted two events and received decent participation. Controls and Dynamical Systems-Student Reading Group was held with the primary aim of exposing students to the exciting world of control systems. Developers' Community (DevCom) released InstiApp for iOS as well as Cerium, which uses SSO login and emulates Google Forms.

Mood Indigo - A Ballad of Ecstasy

Mood Indigo 2019, IIT Bombay's annual cultural festival and Asia's largest college cultural festival, took place from December 26-29, 2019. Attracting a footfall of over 1,45,000 people from around 1700+ colleges pan India, Mood Indigo entertained the visitors with an incredible array of artists, both national and international. The four-day fiesta centred around the theme of "A Ballad of Ecstasy" served the visitors with best festive feelings.

The 49th edition of Mood Indigo was the grandest ever and laid a strong base for the upcoming Golden Jubilee of the festival. Mood Indigo even conducted various Pre-MI events for the students of IIT Bombay. As a part of the Institute Night in OAT, Mood Indigo invited Guru Randhawa, a national pop-sensation. A special screening of the film *Chhichhore* was organised at the Convocation Hall exclusively for the residents of the campus.

Mood Indigo 2019 saw a conglomerate of over 230 events spanning across multiple genres. With the presence of over 250 national and international artists, we continued our legacy of providing the most assorted and entertaining experience to the crowd.

Proshows:

Eloquence featured interactive sessions with eminent personalities like **Deepika Padukone** on a campaign against acid attacks against women. It also featured panel discussions by **Yami Gautam** and **Rajeev Masand, Siddhant Chaturvedi, Adah Sharma** on breaking out in bollywood. Adding to the star-studded lineup, we had famous Bollywood singers **Akasa, Tony Kakker** and **Leslie Lewis**. With a purpose to celebrate and cherish good cinema we had, IIT Bombay alumni **Nitish Tiwari** with **Fatima Sana Sheikh** relived the famous Dangal movie. Adding to the Slam Poetry touch to our Eloquence, we invited **Jidnya Sujata, Kopal Khanna Simar Singh** to which the youth went crazy.



Subramanian Swamy gave an inspirational talk on relevance of management education in technical institutes. **Prithviraj Chavan**, the former chief minister of Maharashtra and **Devdutt Pattanaik** also graced this year's Eloquence. Stand-up sensations, the much renowned **Zakir Khan** and **Rahul Subramaniam**, were the major highlights of our Humorfest treating the crowd with their insane performance along with the evergreen **Jitendra Kumar, Biswapati Sarkar, Gajrao Rao, Nidhi Bisht** and **Arunabh Kumar**. Youtube sensations and a part of the renowned YouTube channel Timeliners **Barkha Singh, Ritvik Sahore, Ayush Mehra, Gagan Arora, Shreya**

Mehta and Rashmi Agdekar also graced the HumorFest. For the first time ever at Mood Indigo, we had a comedian poet Rajat Sood perform at the festival. The International Music Festival had crowd relishing the performances from international artists and bands like Celtica, Morrissey and Marshall, James Robinson, HI-5. Increasing the magnificence of IMF by adding an Indian touch to it, we had Indian youth sensations like **Rekha Bhardwaj**, **Taba Chake** and **The Revisit Project** and Alif amaze the crowd with their brilliant performances. In addition to this, Mood Indigo saw performances from artists belonging to various cultures from Taiwan, Japan, Belgium, Malta, Spain, Slovenia etc. Increasing the takeback value for the crowd, we included 50+ Interactive and DIY workshops ranging from Book writing, Parkouring to Mural Arts, Tango etc to make the festival more memorable.

Pronites:

The concerts at Mood Indigo have always been known for the perfect blend of unique, up and coming talent and the most renowned names in the industry. Living upto the legacy of International acts, MAGIC! The Canadian reggae band with their famous single 'Rude' with over a billion views, attracted huge crowds from all parts of India to watch the band live. Fusion Nite has always been known to feature rare and exclusive talent and 2019 was no different. Ace drummer Darshan Doshi and his collective with Indian sensations Mame Khan and Vijay Prakash headlined the night with a great set. EDM Nite featured the famed dutch American DJ Bl3nd and India's electronic sensation Lost Stories featuring Jonita Gandhi and Zaeden. Popular Nite saw a full house crowd to witness the contemporary singer of our times, a man who has defined the 90s and 2000s of Bollywood and etched his songs to our hearts forever - KK along with the stars of today's indie pop music - Yellow Diary to add charm to the night. For the first time at Mood Indigo, a heavy stage production was used along with 3D Interactive visuals which made the concerts more engaging and interactive for the crowd.



Competitions:

Known to attract the best student talent from across the country, Mood Indigo saw competitions in the field of dramatics, dance, film and photography, music, debating and creative writing, and informal events with a quirky twist. The competitions were judged by industry stalwarts like **Kavita Seth, Pawni Pandey, Nidhi Bisht and Biswapati Sarkar** and also received online appreciation from **Shakti Mohan** and **Navin Polishetty**. The grandest dance competition ‘**Choreonite**’ saw thousands of people lining up to get entry into the Convocation Hall to watch some of the best dancing groups of the country. The event was also embraced by dancing greats of DID - **Shantanu** and **Kunwar Amarjit Singh**. The relentless energy at the jam-packed convocation hall radiated throughout the venue. This year saw the introduction of a winners’ showcase at the end of all finals through ‘**Best of Competitions**’ at the famed convocation hall in the presence of celebrities like **Mamta Sharma, Dalip Tahil, Sunny Singh, Sonnali Seygall**. To put a perfect end to the battle between contingents that lasts for months, the college with most winning points was crowned the ‘**Mood Indigo Champion**’. Entry of competitions in niche fields like improvisational theatre, rap, photography and folk dance increased participation by 15%.

Under the “**Live Your Passion**” campaign, the participants received various incentives like a casting opportunity from **TVF**- the leading online content creator, a music distribution opportunity by **Hungama Artist Aloud**, professional dance training by **NrityaShakti** dance academy, display of artwork at **Jaipur Intl Film Festival**, video streaming by **Humaramovie** and various recording and showcase opportunities. The

competitions saw participation from over a thousand colleges panning across various cities like Mumbai, Delhi, Jaipur, Hyderabad, Ahmedabad, Kolkata and Bangalore. The multicity campaign, our on-ground eliminations, expanded its reach to 15 major cities including associations with some of the top regional festivals in India.

Media and Publicity:

A great deal of media houses and online and offline partners helped in carrying out the publicity of the festival. We had an extensive coverage deal from our partners for the publicity of the festival on all platforms including TV, Facebook, Twitter and Instagram. Amazon Prime Video was associated as the Title sponsor of the festival and as a result, a great deal of publicity was carried out on it. This year also saw the launch of a **Competitions.Moodi** page on Instagram to showcase the performances and works of our participants, which was highly appreciated by the audience. Our associations with local newspapers and magazines helped us in penetrating into regions where Mood Indigo wasn’t present before. In order to reach out to colleges in Mumbai, a College Publicity Drive along with a Contingent Leader Meet was conducted to engage with the crowd first-hand and achieve better information flow.

Techfest

Techfest is IIT Bombay’s annual college festival and is widely recognised as Asia’s largest science and technology festival. The 23rd edition of Techfest was a grand success with website hits of 4.7 Million+ and a footfall of more than 1,75,000 among other highlights.

BOLT: Strengthen Your Bones:

On the occasion of World Osteoporosis Day, Techfest, IIT Bombay organized Bone Health Awareness and Free check-up camps across India as a part of our Initiative: BOLT - strengthen your bones. With camps across cross 8 states that conducted over 3,000 Bone Health Checkups and over 10,000 affected, Techfest 2019-20's Social Initiative: BOLT generated massive awareness on the pressing issue of Osteoporosis and Bone Health



Dasho Tshering Tobgay at Techfest:

Techfest is known for its mind-boggling lineup of Lecture series every edition, which attracts children and adults alike. The 23rd edition was no different. Former Prime Minister of Bhutan, Dasho Tshering Tobgay enlightened an audience of **2500+** with his words on how Bhutan's environmental consciousness sets an example to the world. Other highlights from the Lectures series were Zaheer Khan, Vidya Balan, BS Dhanoa, Suresh Prabhu, NR Narayana Murthy and Nobel laureates including Dr John C. Mather, Prof. Sir Richard J. Roberts



TechConnect (IIT Bombay R&D Expo):

Promoting the enormous amount of research work happening in IIT Bombay has always been one of the prime motives of Techfest. TechConnect was executed on a larger scale attracting huge crowds of more than **1,35,000** people across the three days. It showcased exhibited various flagship **281 exhibits** of IIT Bombay with around 110 stalls including IIT Bombay Racing (more than 50% increase compared to last year)



Exhibitions:

The 23rd edition saw various unique first-of-its-kind exhibitions like **RoboThespian**, **Einstein Robot**, **AeroHans** and **NHK Enterprise**. For the first time in India, Techfest brought Hanson Robotics' humanoid emulating Albert Einstein: the Einstein Robot! The latest human sized Einstein Robot from Hanson Robotics, the android was made using cutting edge mechatronics and AI

International Full Throttle:

The third edition of International Full Throttle was held with an international arena setup, in which drivers with world **rank 13**, 9 time Australian National Champion and 4 time World Championship Finalist: Kyle McBride took part. A total of 20+ Indian teams participated in this third edition.



International Robowars:

Robowars witnessed participation of 9 international teams from 8 countries including USA, South Korea, Austria, Brazil, Malaysia, Nepal, Bangladesh and UK. Techfest has one of the largest battle arenas in Asia and the best robots from all over the world converging to battle it out to decide who takes the glory. In this third edition, 8 kg category was introduced along with 15 kg and 60 kg.



Technoholix:

Technoholix Gymkhana Concert Night, the grand finale of Techfest was witnessed with magnificent lineup of artists, Nina Suerte for the opening act and Julius Nox - supporting the phenomenal AFISHAL on the TREMOR in bringing the 23rd Edition of Techfest, IIT Bombay to its grand conclusion. A new series of events was introduced at day time known as day Techx featuring Sri Lankas' Got Talent Semi-Finalist: Ramod Malaka.



Ozone:

With incredible artists performance, Maria Margiyeva: the hoop artist, Krzysztof Riewold: Circus artist, Juggler, Juan Pablo: the illusionist and Gaia Ma: the hats juggler and futuristic gaming setups with latest technology of AR and VR, ozone features a fun element of Techfest 2019-20.



E-Cell

- 1) Three startups received on-spot funding in this year's edition of 'The Ten Minute Million' with total funding of INR 48 Lakhs



- 2) Eureka Offline mentor's meetup took place for 3 whole days, wherein the 80+ participating teams got to interact with some of the leading investors and startup mentors.



- 3) Established a closed community of IIT Bombay startups for the development of the entrepreneurial ecosystem of the Institute.
- 4) This year, we had the maximum number of foreign speakers (25+) at the E-Summit'20 from various corporates like Mastercard, Pinterest, etc.
- 5) E-Summit 2020 hosted Mr. Rishad Premji, Mr. T.V Mohandas Pai, Mr. Bharat Desai, Mr. Ashish Chanchlani as the highlight speakers along with India Heads of leading global firms like Twitter, Bain & Company, etc.
- 6) Conducted a social initiative with the aim of spreading awareness regarding Autism to over 800 people across Mumbai.

To promote entrepreneurship among the school students, initiated the b-plan competition Eureka! Junior conducting training workshops in more than 30 schools for classes of 6-10.
- 7) Reached out to 700+ colleges around India to establish E-Cells in their institutes under the National Entrepreneurship Challenge.
- 8) Ideated and executed "Seed Stars", a one-of-a-kind pitching cum networking event to aid the development of seed-funded startups and help them increase their network with some of the top venture capitalists in town.
- 9) For the first time, ideated and executed "Content Creation Conclave" by inviting the best content creators in the country catering to a huge audience.

PLACEMENT

The presence of world-class research facilities, vigorous institute-industry collaborations, international exchange programs, interdisciplinary research collaborations and industrial training opportunities help the students of IIT Bombay to excel and be ahead in the competitive professional environment. The placement drive at IIT Bombay was a year-long event, which started in the month of July 2019 and ended on June 30, 2020. The placements were successfully completed in two phases and clearly demonstrated the demand of our graduates among the top recruiters in various segments and sectors of the economy. In the backdrop of general uncertainty due to global pandemic, economic slowdown and recessionary trends in job creation, IIT Bombay students confidently participated in the placement season 2019-20 with necessary preparatory activities such as assessments, career fair and PCAT test series during the intervening months.

Interview procedure of phase 1, the main event of on-campus placements, was conducted during December 1-16, 2019, which witnessed participation of over 300 companies including firms that gave Pre-Placement Offers (PPO). A total of 1784 students registered for final placements and 2028 students registered for internship opportunities. The registered students belonged to engineering, science, humanities and design departments of IIT Bombay in Bachelor's, Master's and PhD programs. The phase 2 was conducted from January 15 to June 30, 2020.

The first event was the "orientation" held in July, during which the Professor-in-Charge of Placement Cell Prof. Viren Menezes and staff along with the placement managers addressed the students giving information of the complete placement procedure. Next, there were preparatory activities conducted by the placement cell, in collaboration with assessment agency. Company officials started approaching the office during July and August months to commence discussions of their job offerings. Companies started filling the "Job Announcement Forms" (JAF) in August.

Completed JAFs were released to the students to start applying in late September. Pre-Placement Talks (PPT) and Career Fair event were organized to facilitate interactions between the registered students and the companies. A few companies conducted extra screening levels prior to the interviews. For the students of IDC School of Design, the interviews were conducted during December 9-15, 2019 in phase 1.

December 1, 2019, the first day of campus placements, witnessed some of the giant corporates offering coveted jobs across sectors and recruiting in large numbers, which was pivotal for the success of the placement season 2019-20. Placement of 291 students took place on day one including the pre-placement offers and PSU jobs, re-affirming the faith of top recruiters in IIT Bombay graduates. The highest number of offers was rolled out by the Engineering and Technology sector, ascertaining the technical proficiency of IIT Bombay students. In a record for the number of students being placed during phase 1 of placements at IIT Bombay, the Institute secured 1,176 selections (including Pre-Placement Offers or PPOs).

Student Preparations

The key focus of the placement office is to prepare students for their placement and internships. Keeping the students well prepared for what they are likely to face in the corporate world is the responsibility of every academic Institute, and the team at IIT Bombay takes every necessary step to train and guide the students. Students are exposed to challenging and research-based academics, and host of sports along with cultural and organizational activities on this vibrant campus. The first event conducted in this endeavour was "Boot Camps", in collaboration with Career Cell, for profiles of coding, consultancy, finance, analytics etc. In addition, preparatory programmes were arranged to enhance the communication skills, group dynamics and interview skills. Overall, these programs provided an insight into the job domains and prepared the job aspirants to face the challenges of the future. The students



were assigned mentors for guidance and a series of aptitude tests were conducted to improve the problem-solving skills. The preparatory activities sourced information from various alumni, where the alumni background was mapped according to student preference. Various department level activities were conducted to cater to individual domain requirements.

Placement Common Aptitude Test (PCAT)

The placement office strived to facilitate the recruitment process in the most convenient and optimal manner possible. This year, IIT Bombay's Placement Common Aptitude Test (IIT Bombay-PCAT) was conceptualized to step-up the quality and provide objectivity in assessments during the placement process. Every year, hundreds of students at IIT Bombay write about 80 company-aptitude tests during their placements. These aptitude tests are quite exhaustive and stressful when conducted in parallel with the regular curricular activities of the Institute. On an average, a student gets a break of 2-3 hours before each day of placement, where the increased stress levels can affect the performance in the interview, adversely. IIT Bombay-PCAT is a standardized test, designed to minimize the number of aptitude tests conducted by the recruiting companies. Placement Common Aptitude Test (i.e. PCAT) was introduced in the previous season as a substitute for the company recruitment tests to reduce student stress and save time. PCAT witnessed an improved credibility as nearly 50 organizations accepted PCAT scores for initial shortlisting of candidates. Increase in acceptance of PCAT scores suggests the confidence of recruiters in the test as an effective metric for evaluation.

Standardization of IIT Bombay-PCAT:

The IIT Bombay-PCAT is on par with the aptitude tests conducted by third parties for recruitment across campuses. Professor-in-Charge of IIT Bombay Placements oversees the conduct of the test. The test had operating procedures and standards similar to those of JEE and GATE, conducted by IITs in the country. The recruiting companies were invited to subscribe to PCAT,

and the test scores are shared with the interested companies through the Job Announcement Forms (JAF).

- The test assessed a student's ability in three domains namely Quantitative aptitude, Logical Reasoning/ Data Interpretation and Verbal aptitude.
- Each of these sections (domains) are timed separately to assess the relative performance.
- The students are given an opportunity to attempt three PCATs during a placement season. The best performance (best of three tests) in each of the sections is disclosed as the final score to the subscribing recruiter. This gives a more reliable index of a student's performance as against a single score normally obtained from a company test.
- Each subscribed recruiter was asked to submit a preferred weightage for the three sections (Quantitative, Verbal and Logical) based on their shortlisting criterion. The final weighted score is calculated and the student-shortlist were prepared for each firm, offering flexibility as that of the third-party test.

Career Fair

Career Fair is a useful resource for candidates to find information about potential employers. One of the main reasons to attend a career fair is to increase student awareness. The Placement cell organized career fair in the foyer of Victor Menazes Convention Center (VMCC) at IIT Bombay where potential employers set up booths with members from their human resources (HR) team along with new employees and senior management and provide information to students about their company, and their application process.. Those attending a career fair were free to ask any questions to prospective employers and take notes on their answers, as well as being able to take any promotional material or freebies that are offered by the firm. If that's not enough of a reason, there was a chance for students to network and capitalize on the vast experience of the team to have interesting and productive conversations. Structure of career fair was simple, companies had 20 minutes to brief

about their company in the VMCC auditorium followed by a much detailed interaction in their information booth. For the employers, career fair was a much better opportunity to interact with students on a one-to-one basis ensuring exchange of quality content with maximum student attention as compared to the conventional Pre - Placement Talks. The event witnessed a footfall of above 1100 students with every student spending at least 30 minutes at the event. Replacing PPTs with career fair would help in increasing student awareness by demanding a higher quality of interaction. This could be a win-win situation for everyone as students would avail much more information compared to PPTs and companies would be better-off creating a much better brand impact.

Diverse Recruiters

While the placement season has seen recruiters from the entire spectrum of the industry, the initial part of the season was dominated by a variety of firms from sectors like engineering and technology, oil and gas, IT/ Software, electronic hardware, data analytics, consulting, finance/ banking and Fast Moving Consumer Goods (FMCG). There were opportunities provided by the firms with vast learning, travelling experience and varied work culture. Most of these firms are world leaders in their respective domains. We also had some of the major start-ups as recruiters, which were screened based on the financial and technical status. The informal work culture, opportunity to make immediate and visible contributions, chance to own equity etc. seemed to be the attractions offered by such start-ups.

Engineering and Technology

All 428 engineering students selected from IIT Bombay have expressed a strong commitment to core companies in the choice of employment. This is primarily attributed to the highly challenging work profile and remuneration package offered to IIT Bombay graduates by the recruiters.

IT/ Software

IIT Bombay students known for programming skills have continued to attract recruiters through

campus placement over the past several years. This trend was strong this year. Around 212 students have been offered IT/ Software jobs by over 58 companies through the campus placement.

Consulting

Over 85 consulting offers were made by several global leaders, who visited IIT Bombay for campus placement this year. These organizations work with large corporations across the world, helping them resolve complex business problems. With high quality of recruits these companies took last year, their return to the campus was marked by a renewed vigor.

Research & Development

With an increased demand for high-end products and services, a large number of companies strive to develop cutting-edge products. The placement season witnessed an increase in the number of organizations hiring fresh graduates for research and development sector. This sector has observed a steady growth where 103 positions were offered by 18 organizations in 2019-20.

Data Analytics

The outstanding analytical and reasoning skills of IIT Bombay graduates continued to draw recruiters from the rapidly growing field of data analytics. There were 133 job offers from 35 organisations, making the sector one of the biggest recruiters after engineering and information technology. This trend, observed over the last few years, seems to have taken strong roots in the Institute.

Financial Services

The financial, banking and fintech companies were prominent recruiters. With many of the top global companies of this sector preferring IIT Bombay, the sector saw participation of prestigious companies to recruit the brightest and the best from the campus. A variety of profiles were opened up in the sector as these companies admire the analytical and computational skills of the IIT Bombay graduates. Over 98 offers were made by 24 financial service firms this year.

IIT Bombay received a total of 159 international offers from different countries like USA, Japan, UAE, Singapore, Netherlands, Hong Kong, Taiwan and South Korea. The Placement Office has taken additional efforts to expand the global outreach and invite more foreign organizations.

Conclusion: The overall placement percentage is around 84 % this year. The graduating students of IIT Bombay have taken the next step in their lives. They have joined the top recruiters in various segments of the economy. The firms participating in the placement season appreciated the efforts put in by the students to deliver their best. Efforts shall be required to foster long-term relationship with all these organizations in the near future and we look forward to strengthening our relations with them over the years to come. The months of training that students endured were fruitful with the efforts of the placement office including the student placement team, combined with excellent academic system and the opportunity for all-round development. The Placement Office has taken additional efforts to expand the global outreach and invite more foreign organizations. The importance of the efforts, which were put are reflected well in the QS World Ranking and NIRF Ranking of IIT Bombay as well, since placement is an important contributing factor.

Analysing the increased corporate competitiveness, heightened student aspirations, a rapidly changing job market and an increasingly insecure global economy, it is clear that campus placements will be more intensely sought by both students and companies. In conclusion, the recruiters have shown that they want to capture and nurture the fresh minds of students, which is also why the number of job offers were very encouraging this year. Placement team has achieved higher milestones and overall selections has remained excellent with our constant endeavours to facilitate a good placement season. Despite the challenging situation presented due to COVID-19, the participating companies have honoured the maximum job offers. This clearly shows the confidence, the corporates have in the Institute.

Overall Statistics

A comparison of offers received and accepted over the last three years is given below:

Table 1. Placement Statistics for last three years:

Year	Pre-Placement Offers		Campus Placement Offers		Total Offers in Phase I	
	Received	Accepted	Received	Accepted	Received	Accepted
2017-18	142	100	1014	923	1156	1023
2018-19	168	125	1102	997	1270	1122
2019-20	164	116	1155	1056	1319	1176

Table 2: Distribution of offers made in different sectors of economy:

Sr. No.	Sector	Number of Offers
1	Engineering & Technology	428
2	IT/ Software	212
3	Finance	98
4	Analytics	133
5	Consulting	85
6	Research & Development	103
7	Services	75
8	Education	32
9	FMCG	31
10	Public Sector Undertaking	10
Total		1207

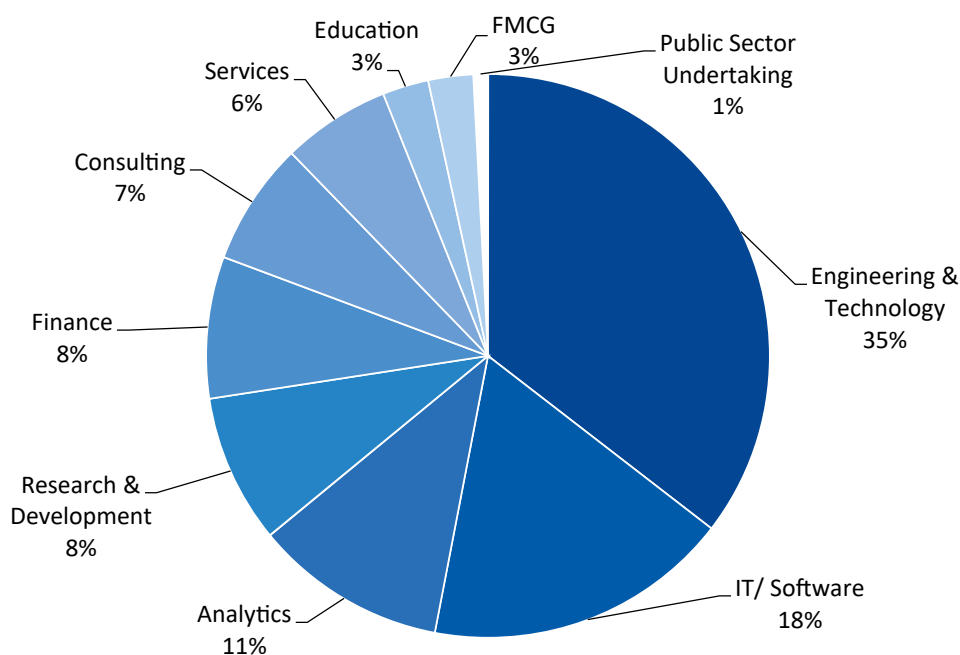


Figure 1 Distribution of offers made in different sectors:

Program-wise statistics:

Some students in pursuit of their career might initially register for campus placement and then decide to convert their academic program to PhD or Dual Degree. All the registered students do not necessarily participate actively in campus placements, opting for higher studies abroad or in different streams. It is important to note that students also get placed through channels other than campus placements. The program-wise placement data is provided in Table-3 and Figure-2.

Note: Participated count excludes students, who opted for higher studies or had other career options, and hence de-registered from the placement process.

Table 3: Programme-wise Placement data 2019-20

Programme	Registered	Participated	Placed	Percent placed
BTech	601	534	492	92.13
Dual Degree (BTech+MTech)	166	141	133	94.33
MTech	575	507	423	83.43
2-yr MSc	144	96	52	54.17
BDes	28	15	11	73.33
MDes	60	48	42	87.50
4-yr BS	11	6	5	83.33
Other Programmes*	199	97	49	50.51
Total	1784	1444	1207	83.58

*Includes 5-yr. Integrated MSc, BS+MSc, MTech+PhD, PhD, MSc+PhD, MPhil, IDDD, MS by Research (Exit) degree

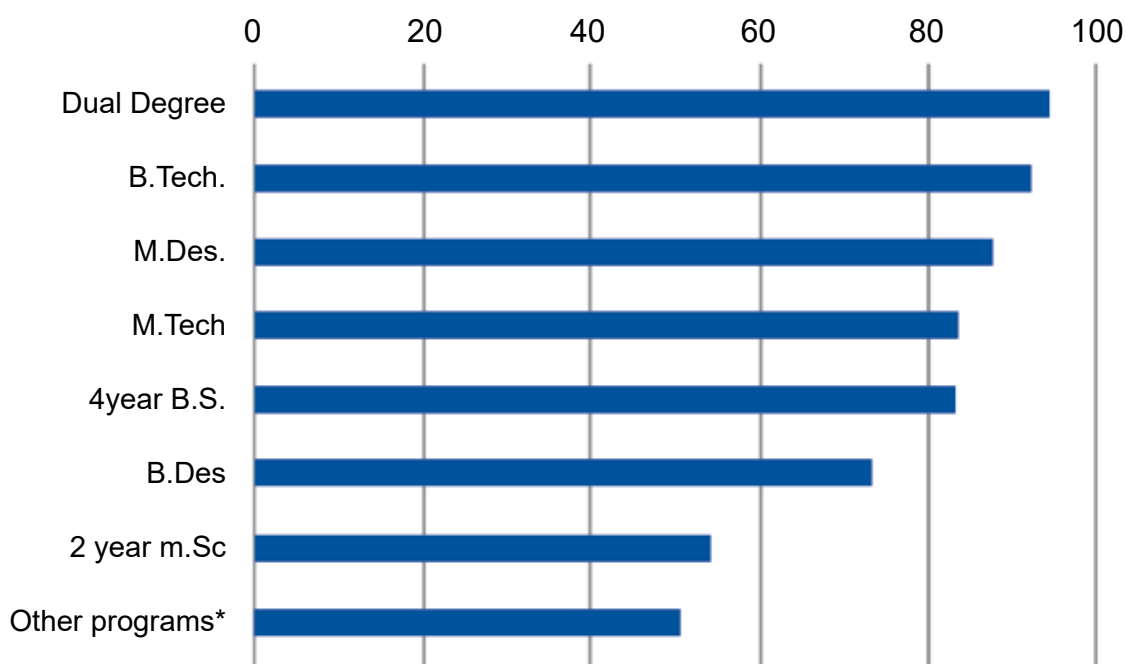


Figure 2. Program-wise Placement percentage.

Department-wise statistics

IIT Bombay provides engineering education across 23 different departments, spanning students from under-graduation to PhD. The placement team endeavors to get companies from core as well as non-core sectors for students. The placement statistics of students across departments including all domains of jobs offered during the placement season 2019-20 are shown in Table-4.

Table 4. Department-wise classification of offers

Departments	2017-18	2018-19	2019-20
Aerospace Engineering	53	50	71
Chemical Engineering	92	122	122
Chemistry	17	27	18
Civil Engineering	111	102	100
Computer Science & Engineering	174	207	186
Electrical Engineering	185	196	202
Mechanical Engineering	179	148	173
Metallurgical Engineering & Material Science	104	97	97
Energy Science & Engineering	33	34	30
Physics	15	10	4
Mathematics (Applied Statistics and Informatics)	24	19	22
IDC School of Design	35	59	59
Bioscience & Bioengineering	13	15	21
Other Programmes	82	100	102
Total	1117	1186	1207

Salary-wise statistics:

The jobs offered by recruiting organizations are divided into various categories based on the gross compensation packages. Factors other than compensation package like job profile, past association etc. may sometimes influence the classification of a company. Salary-wise classification of total offers made in the year 2019 - 20 is shown in Table 5 and Figure 3.

Table 5: Placement details based on compensation

Range of Gross Salary (in lakh rupees per annum)	Number of Companies	Number of Offers
Above 16	61	246
Between 13.5 to 16	42	204
Between 11.5 to 13.5	60	315
Between 9.5 to 11.5	58	184
Between 7.75 to 9.5	48	158
Between 6.25 to 7.75	26	72
Between 5 to 6.25	15	25
Between 4 to 5	3	3
Total	313*	1207

*Some organisations may have offered jobs in multiple salary categories.

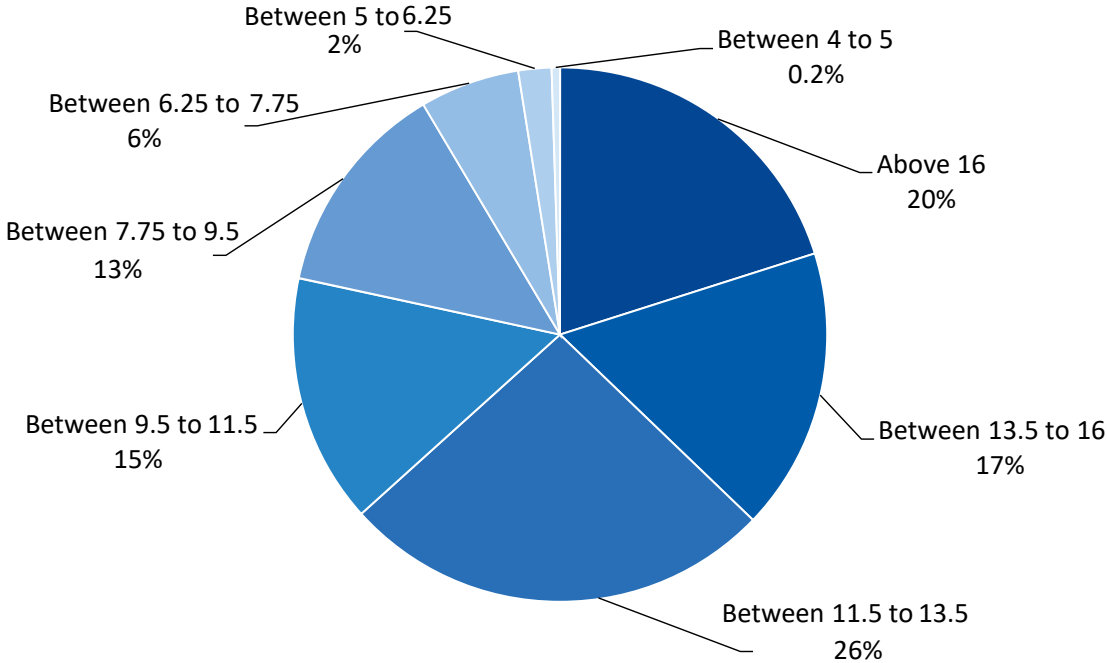


Figure 3. Compensation-wise distribution of offers. (in Lakhs P.A.)

Comparison of average salary, international and pre-placement Offers:

The Average Gross Salary offered was Rs.16.06 lakhs and the average CTC was Rs.20.08 lakhs. Total number of Pre-Placement Offers (PPO) was 113. The number of international offers was 159, including PPOs. This suggests an increasing and a positive trend in the pay package offered by various organizations (Refer to Table 6).

Table 6: Average salary, international and Pre-Placement offers details:

Description	2018-19	2019-20
Average Gross Salary (in LPA*)	14.11	16.06
Average CTC (in LPA*)	17.49	20.08
Total number of International Offers	108	159
Total number of Pre-Placement Offers	131	113

* LPA – Lakhs per annum (in rupees)

Year-wise Placement Comparison

Despite the challenging market situations over the years, IITB managed to attract good recruiting firms in the job market. Table 7 and Figure 4 present the comparison of students placed over the last three years.

Table 7: Comparison of students placed in last three years

Program	2017-18	2018-19	2019-20
BTech	438	475	492
Dual Degree (BTech+MTech)	157	151	133
MTech	403	402	423
Others	119	158	159
Total	1117	1186	1207

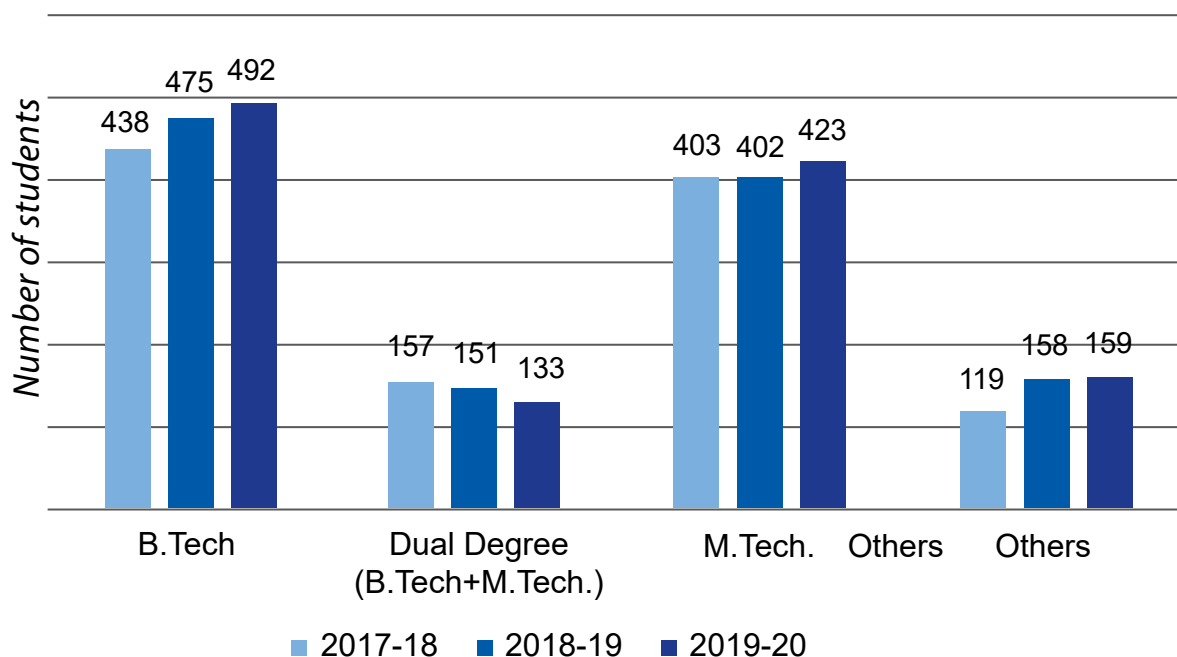


Figure 4. Comparison of student placement over the years.

Sector-wise statistics for different programs

BTech and MTech students maintained almost the same demand amongst companies of various sectors. Sectors like Education, and Engineering and Technology expressed greater interest in students of IIT Bombay than the previous year. Sector-wise statistics for different programs are shown in Table-8 and Figures 5, 6 and 7.

Table-8: Sector wise statistics for different degree courses

Sector	BTech	Dual Degree	MTech
Analytics	57	10	46
Consulting	60	18	4
Education	2	3	9
Engineering & Technology	149	39	205
Finance	53	23	7
FMCG	23	4	4
IT/Software	99	9	81
Public Sector Undertaking	4	5	1
Research & Development	23	12	56
Services	25	10	10

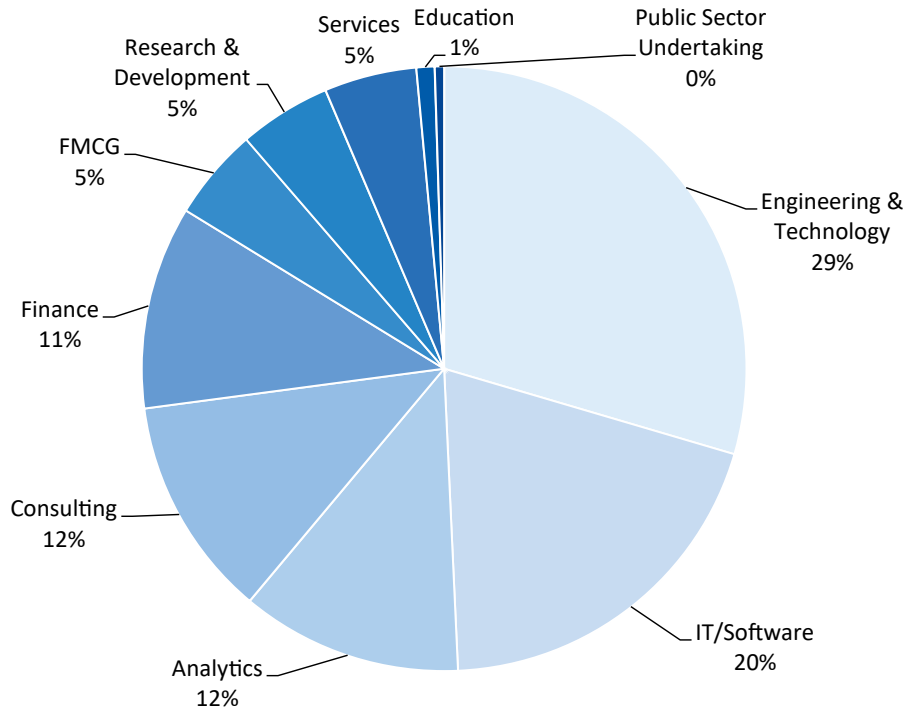


Figure 5. Sector-wise demand for BTech

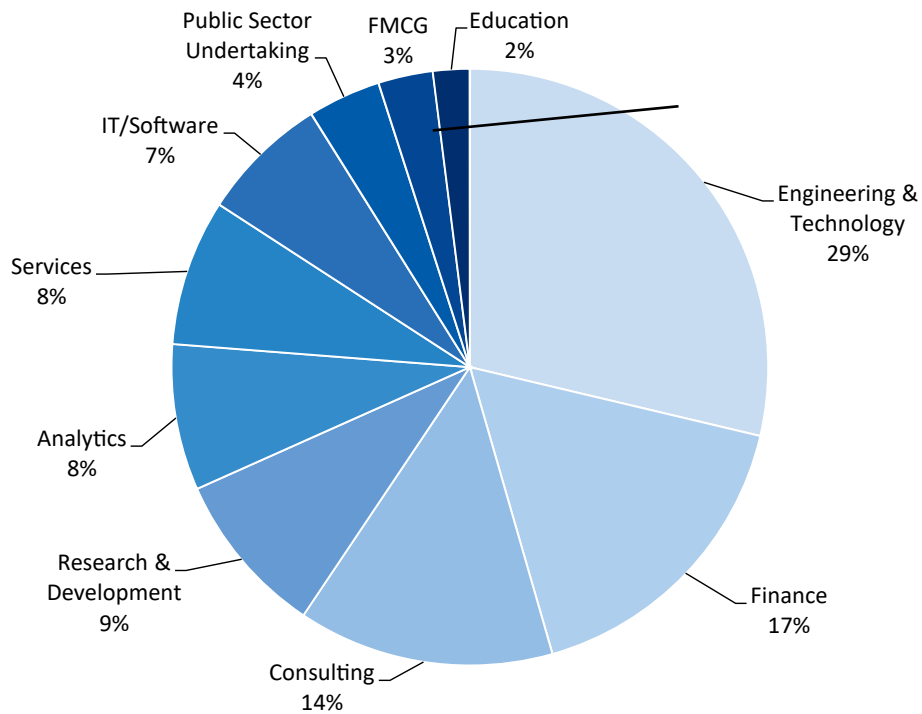


Figure 6. Sector-wise demand for Dual Degree (BTech + MTech)

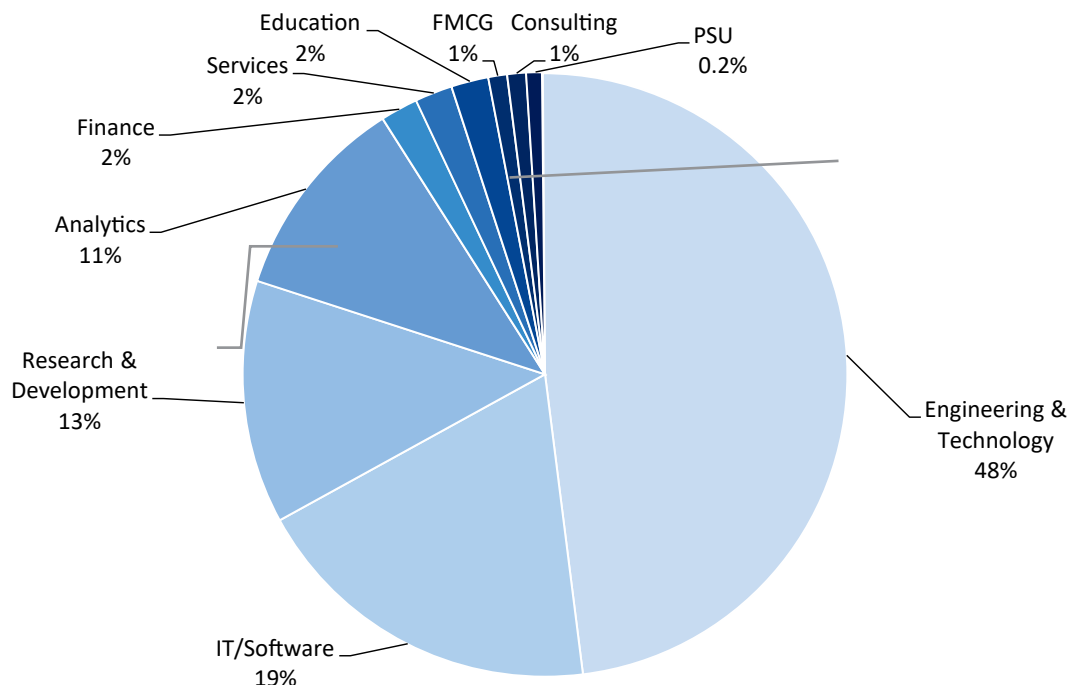


Figure 7. Sector-wise demand for MTech

Internship Report 2019-20

Industrial exposure and practical experience play a significant role while attempting to enter the corporate world. Internships have thus become really important as they not only provide this exposure and experience but also help in one's personal growth and development.

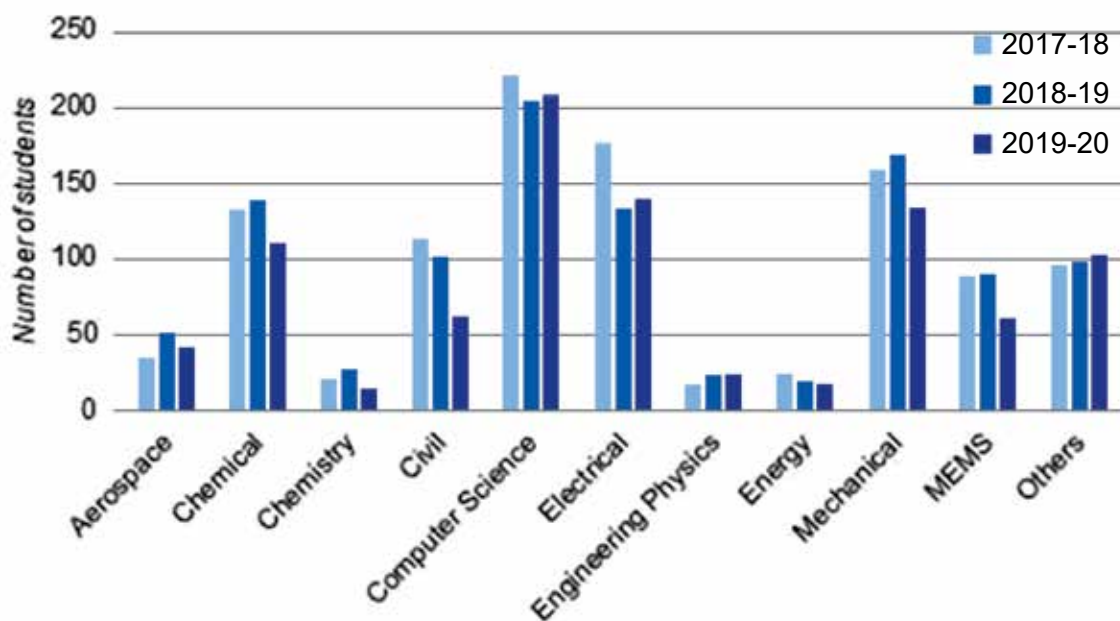
Students from their second and third year of Bachelor's, and first year of Master's programmes appear for the internship recruitment. Keeping the diversity of students in mind and the importance of internships in context, the Placement Office strives hard to provide students with the best of the opportunities in their field of interest. Placement Office also encourages research by providing students the research internship opportunities at esteemed universities.

Department-wise Internship offers:

Students from all departments were in demand by firms and universities alike for internship positions. A lot of trends, which were seen in the previous years, continued this year as well. The demand for students from departments such as Computer Science, Mechanical and Electrical Engineering was high. A slight increase in the number of MSc and Design internships was also observed in comparison with the previous year. Figure-9 presents the department-wise distribution of internship offers made over the past 3 years.

Table 9: Department-wise internship offers over past three years :

Department	2017-18	2018-19	2019-20
Aerospace	34	49	41
Chemical	131	137	109
Chemistry	21	25	14
Civil	111	100	60
Computer Science	220	203	207
Electrical	176	133	139
Engineering Physics	17	23	22
Energy	23	18	17
Mechanical	158	166	132
MEMS	88	89	59
Others	96	98	101
Total	1075	1041	901


Figure 8. Department-wise internship offers over years

Summer vs. Winter Internship offers:

Summer internships usually begins in May and end in mid-July, whereas winter internships are pursued in December. The number of summer internship offers exceeds the number of winter internship offers, which is attributed mainly to the longer duration available in summer.

Table 10 Summer vs. Winter internship offers:

Total Number of Internships	Summer Internships	Winter Internships
901	703	198

Companies vs. Universities internship offers

Companies of various business sectors offer internship positions to the students. This option presents an opportunity to gain industrial exposure and broaden one's skill-set in the domain of interest. This year, the Institute started the much-awaited credit-based internship programme, by means of which the students could leverage the performance in their internship towards the academic credit requirement.

Table 11: Companies Vs. Universities Internship Offers

Total Number of Internships	Company	University
901	791	110

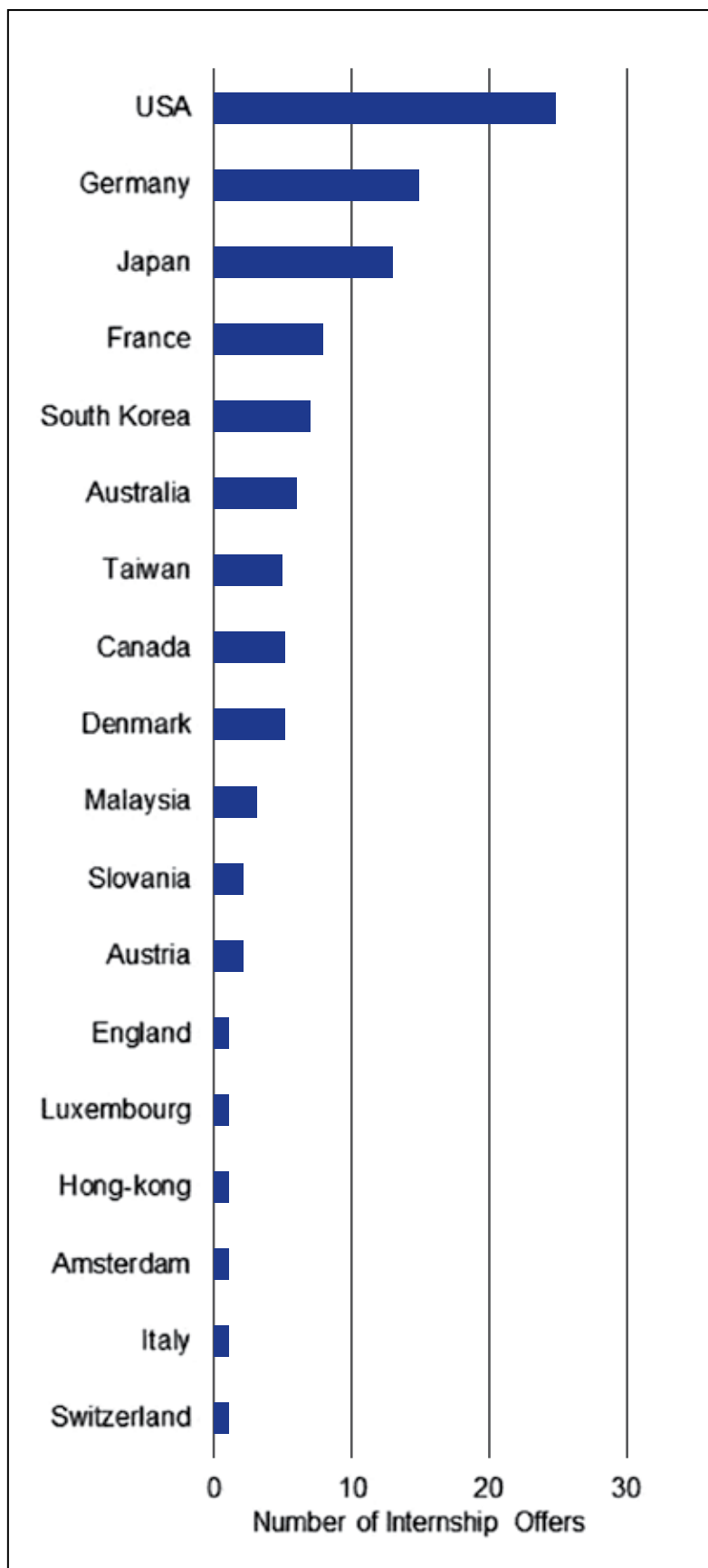
Country-wise internship offers

Reputed foreign universities and firms have an affinity towards IIT Bombay-students. The Table 12 and Figure 9 show the country-wise internship offers from different foreign firms and universities. Students have received the greatest number of internship offers from the USA followed by Germany, Japan and other countries in the world. This indicates the preference of IIT Bombay-students in other countries.

Table 12: Country-wise international internship offers from Universities and firms:

Country	Number of Internship Offers
USA	25
Germany	15
Japan	13
France	8
South Korea	7
Australia	6
Denmark	5
Canada	5
Taiwan	5
Malaysia	3
Austria	2
Slovenia	2
Switzerland	1
Italy	1
Amsterdam	1
Hong Kong	1
Luxembourg	1
England	1

Figure 9. Country-wise distribution of International internship offers from universities and firms



SOCIETY FOR INNOVATION AND ENTREPRENEURSHIP

The Society for Innovation and Entrepreneurship (SINE) has completed 16 successful years as a technology business incubator. Set up in 2004, SINE provides start-to-end support to technology-based entrepreneurs and facilitates the conversion of research activity into entrepreneurial ventures. As an incubator, SINE runs programs which include prototyping grants, entrepreneur fellowships, bootcamps for innovators and early-stage entrepreneurs. In 2019-20, SINE hosted 53 companies, of which, 32 are new companies that got incubated and 16 have graduated. SINE's incubation program incubates technology entrepreneurs from various streams like Cleantech, Agritech, Material, IOT, Fintech, Manufacturing, Retail, Med-tech and healthcare etc., for over 3-5 years in both physical and virtual formats. It also runs accelerator programs with corporate partnerships.

In the last 16 years, SINE has gained a leadership position in business incubation community in India. SINE has been selected as "Centre of Excellence" by the Department of Science and Technology, Government of India (DST-GOI). In addition, DST has also selected SINE as an implementation partner to run its nationwide program for funding innovators for prototyping their ideas. SINE has also been approved by BIRAC and the Department of Biotechnology, Government of India (DBT-GOI) for setting up a BIO-Incubator (BIONEST) to encourage the MedTech entrepreneurs. MeitY-GOI (Ministry of Electronics and Information Technology) also supports SINE. SINE has been identified as the implementing agency of Centre for Augmenting WAR with COVID-19 health

crisis (CAWACH) by NSTDEB for supporting innovations offering comprehensive solutions to address/ mitigate Covid-19. Many SINE start-ups viz. Ayu Device, Haystack Analytics, Endimension Technologies, Combat Robotics, Vytal Healthtech, Ubicare's, EmerTech Innovations, Aubotz Robotics, Patanjali Pharma, Abstract Ideas, Ideaforge, Allincall, and Medprime etc., have come up with unique and effective solutions that can ease many problems faced by frontline workers combating the pandemic. From screening to diagnostics, informative platforms, PPE kits, food supply chain to surveillance, these start-ups offer it all with their new technologies. SINE is one of the five implementing incubator partners for "Innovations for Defence Excellence (iDEX) – a defence start-up initiative of the Ministry of Defence, aimed to create an ecosystem to foster innovation and technology development in Defence and Aerospace and solve some of the most critical technological problems being faced by the Indian Defence Establishment.

SINE in its journey of 16 years has incubated over 168 startups founded by 550+ entrepreneurs who in turn created more than 4000 employment opportunities. It has facilitated more than 350 innovators under various programs. Nearly 26% of its start-ups are based on IPs spun out of IIT Bombay. Majority of its incubated companies have received external funding, and many have expanded the ventures into international markets.

SINE actively collaborates for various initiatives with corporates, government, institutions and International organisations. SINE, while engaging with corporates, not



Participants at 'Dialogue with Stakeholders'

only involves them in various activities like joint accelerator and mentoring programs, but also in product/ service/ idea validation of incubatees. SINE also works with corporates for their CSR initiatives.

SINE, along with Desai Sethi School for Entrepreneurship (DSSE), IIT Bombay, successfully hosted an event called “Dialogue with Stakeholders” to celebrate the spirit of entrepreneurship and as mark of 15th anniversary of SINE and five years of DSSE and their immense contributions to the emergence and growth of a thriving entrepreneurial ecosystem inside IIT Bombay. The event

brought together various stakeholders such as academicians, policy makers, industry leaders, investors, business incubators and aspiring entrepreneurs from across the nation.

SINE, this year, has entered into various collaborations with industry giants at national and international level for the benefit of its start-ups. These are Mahindra & Mahindra, Petroleum Conservation Research Association (PCRA), Shell, Bank of Baroda, Maharashtra State Innovation Society, All India Institute of Medical Sciences, AIIMS and international collaborations with the University of Toronto and Bhutan Government.

IIT BOMBAY RESEARCH PARK FOUNDATION

The IIT Bombay Research Park Foundation (IITB RPF) is a non-profit organization incorporated by IIT Bombay (IITB) in 2016. The primary objective of the Research Park (RP) is to deepen the interaction between industry and IIT Bombay through physical proximity by bringing industry research and development centres on IIT Bombay campus. The IIT Bombay Research Park is a single window through which industry and academia can interact, in an environment where academic research complements technology development and productization, to make an impact on businesses, society and India.

IIT Bombay Research Park started with eight member companies in 2017, and currently, it has 13 member companies onboard that are actively interacting with IIT Bombay faculty. MuRata, NCIIPC, DRDO, and ideaForge have enrolled as member companies of IIT Bombay Research Park during 2019-20, and a few companies have also expressed interest to join IIT Bombay Research Park.

During 2019-20, the focus of IIT Bombay Research Park was mainly to engage strongly with the student community and evolve mechanisms for IIT Bombay Students to interact with Research Park companies closely. IIT Bombay Research Park client Ubisoft had organised 'Ubisoft Game Jam' on October 6, 2019 - a competitive event designed to bring together young, entrepreneurial game enthusiasts to try their hand at Game Development through a rigorous two-day workshop. The event was designed to be a crash course on Game Development – packed with sessions with Ubisoft experts, and handheld guidance and mentor training sessions. This edition of the Game Jam was organised solely

for IIT Bombay students. To display the best work by the participants, Ubisoft hosted a small exhibition along with an award ceremony.

The first edition of RESEARCHx was held on October 20, 2019. This was a day-long event organised by IIT Bombay Research Park in collaboration with the Undergraduate Academic Council. The event comprised student exhibitors from IIT Bombay showcasing their research and technical projects carried out under professors and a few industry internships. The exhibition also had industry representation. The IIT Bombay Research Park companies Applied Materials and Tata Power SED had stalls displaying their products and research work.

Apart from the exhibition, two competitions were also held for students aiming to solve real world societal problems in IIT Bombay viz. the water shortage and the disorganised traffic in front of IIT Bombay campus.

Two keynote lectures were delivered by IIT Bombay Research Park clients Mr Vishal Bhasin, Senior Vice President, Viacom18 on "Digital Transformation" and by Dr. Nitin Kale, Co-Founder, Nanosniff Technologies on "Microsensors and Instrumentation for detecting chemicals and biochemicals".

Another exciting activity during ResearchX event was a very engaging panel discussion on the topic "Industry and Academia" with IIT Bombay professors Prof. B. Ravi, Department of Mechanical Engineering and Prof. Rajesh Zele, Professor-in-Charge, IIT Bombay Research Park, representing academia and two industrialists Dr. Raghavan Muralidharan, Chief Technology Officer, Tata Power SED and Mr Rahul Singh, Co-Founder & VP Engineering, ideaForge



representing the industry perspective. Another talk on “Transforming Technology to Business” was delivered by Sust Labs incubated at SINE, IIT Bombay. The overall aim of the event was to bring the student community and the member companies of IIT Bombay Research Park on one platform to showcase the pioneering research carried out by them.

On December 11, 2019, IIT Bombay Research Park organised “Research Park - Clients Day”. The purpose of this event was to facilitate interactions between member companies of Research Park as well as to familiarise them with other modes of engagements with the IIT Bombay ecosystem. The Dean of Research & Development of IIT Bombay Prof. Milind Atrey gave an overview of the research activities carried out at IIT Bombay in different areas. He had an informative discussion with the member companies on Intellectual Property Rights and Technology Transfer at length. The incubation

activities at IIT Bombay were presented by Ms Ganga, Head, Operations, SINE.

Besides these, IIT Bombay Research Park hosted the first meeting of “Association of Indian Universities Research Parks” on January 11, 2020. The event witnessed participation from Research Parks of IIT Kanpur, IIT Kharagpur, IIT Guwahati, IIT Delhi, IIT Hyderabad and IISc Bangalore. The purpose of the meeting was to bring together the academic research parks and share the best practices and learn from one another. During 2019-20, IIT Bombay Research Park has been able to attract an overall additional funding of INR 250+ lakhs for industry-sponsored research at IIT Bombay. About 30 students were hired for internships/full-time employment at Research Park companies. IIT Bombay Research Park has been striving to grow exponentially while the building construction is still underway. The building construction has also made a significant progress in the past year.



INTERNATIONAL RELATIONS

IIT Bombay assigns significant value to its relationships with various international partners. Over the years, IIT Bombay has steadily built up a reputation for research and education both in India and abroad. This has helped in attracting bright and young researchers from all over the world, as faculty of the Institute.

A good number of international students have also come to the Institute either as full-time or as exchange students. During the year, IIT Bombay has signed 50 MoUs with various foreign universities and received governmental and ministerial delegations from countries across the globe for exploring areas of collaboration and cooperation.

Some of the MoUs signed with Foreign Universities include:

- Loughborough University, UK
- Curtin University of Technology, Australia – Dual Doctoral Degree Program
- National Chiao Tung University, Taiwan - Dual Doctoral Degree Program
- The Royal University of Bhutan, Bhutan
- The Korea Advanced Institute of Science & Technology, Republic of Korea
- Politecnico di Milano, Italy
- Institut National des Sciences Appliquées Lyon, France
- University of Houston, USA
- Washington University in St. Louis, USA – Co-supervised Ph.D
- Distance State University, Costa Rica
- Myanmar Institute of Information Technology, Myanmar
- Sciences Po, France
- University of Twente, Netherlands
- Institut Supérieur d'Electronique de Paris, France
- University of Wisconsin-Milwaukee, USA
- University of Wollongong, Australia
- United Arab Emirates University, Dubai
- Concordia University, Canada
- Toulouse INP, France
- University of Alberta, Canada – Co-supervised/Joint Doctoral Degree Program
- The University of Newcastle, Australia – Dual Doctoral Degree Program
- University of New Brunswick, Canada

Visits of International Delegations:

IIT Bombay also received a large number of international delegations for exploring areas of collaboration and cooperation. The major ones are as follows:

- Prof. Cillian Ryan, Pro Vice-Chancellor International of Nottingham Trent University, UK visited on July 31, 2019
- Prof. Jennifer Dixon, Deputy Vice-Chancellor (Strategic Engagement), Dr. Caroline Daley, Dean Graduate Studies, Mr. Brett Berquist, Director International Office and Mr. Vinayak Rao, India Recruitment Advisor from University of Auckland visited on August 1, 2019.
- Prof. Dr. Mohammed Abdullah Al Baeli, Vice-Chancellor, Dr. Atiq Jekka Al Mansouri, Deputy Vice Chancellor Student Affairs, Prof. Dr. Ali Hamid Al Marzooqi, Dean of the Post Graduate Faculty from United Arab Emirates University visited on August 5, 2019.
- Ms. Sandra Kalidien, Liaison for Innovation, Technology, and Science from Consulate General of The Kingdom of the Netherlands and Mr. Freek Jan Frerichs, Embassy of Netherlands, New Delhi visited on August 19, 2019.
- Prof. Adèle Martial - Gros, Deputy Director of the French Institute in India and Mr. Philippe Guillien, Attache for Cooperation in French Language visited on August 21, 2019.



- Prof. Derrick Bolton, Dean of Knight-Hennessy Scholars Admission and Dr. Rati Godrej, MD Godrej Industries visited on August 21, 2019.
- Dr. Issa Al-Ansari, Rector, Dr. Ali Chamkha, Dean Research & Graduate Studies, Mr. Abdullah Boughannoom, Manager Human Resources, Ms. Rania Sinno, Director Global Engagement and Ms. Shazia Syed, International Faculty Recruitment/ Coordinator Global Engagement from Prince Mohammad Bin Fahd University (PMU), Saudi Arabia visited on August 29, 2019.
- Delegation from Shenzhen comprising of Mr. Yang Hong, Member of the Standing Committee, CPC Shenzhen Municipal Committee and Vice Mayor of Shenzhen People's Republic of China, Mr. Zhang Xuefang, Director General, Housing and Construction Bureau of Shenzhen Municipality, Mr. Wang Youpeng, Director General, Urban Planning, Natural Resources Bureau of Shenzhen Municipality, Mr. Yao Liang, Party Secretary, Bureau of Public Works of Shenzhen Municipality, Mr. He Xiaofeng, Principal Staff Member, General Office of Shenzhen Municipal People's Government, Ms. Liu Huiqin, Principal Staff Member, Foreign Affairs Office of Shenzhen Municipal People's Government, Ms. Gloria Gong, Secretary General, China India Exchange Center (CIEC), Mr. Liu Peng, Vice President, China India Exchange Center (CIEC) and Mr. Salil Narang, Chairman, China India Exchange Center (CIEC) visited on September 11, 2019.
- Japanese delegation comprising of Mr. Hiromichi Uchino, Director of Koo International, Ms. Akiko Kato, Miss World Japan Special Jury Prize in 2015, Ms. Rumiko Ishida, anchorwoman from Japanese TV company, Ms. Yumiko Kiminami, a teacher for Japanese Flower arrangement & Japanese traditional paper craft visited on September 18, 2019.
- Dr. Subhas Chandra Mukhopadhyay, Director of International Engagement from School of Engineering, Macquarie University visited on September 19, 2019.
- Delegation from Welsh Government comprising of Mr. Alun Cairns Secretary of State for Wales, Mr. Crispin Simon, Deputy High Commissioner, Mr. Geraint Islwyn Evans (Special Adviser to the Secretary of State for Wales), Ms. Charlotte Louise Cantle (Principle Private Secretary to the Secretary of State for Wales) and Ms. Asiya Ashraff, Country Manager India visited on September 24, 2019.
- Prof. Katsunori Nagano, STSI Program Director and Professor Human Environmental Systems and Associate Prof. Masatoshi Sakairi, Materials Science and Engineering from Hokkaido University, Japan visited on September 27, 2019
- Ms. Sarah Fallon, Head of UK Science and Innovation Network for India, Middle East and Africa visited on October 1, 2019.
- Representatives from Diku - Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education, which is a Directorate under our Ministry of Education, Ms. Unni Mjelde Birkeland, adviser and programme manager for UTFORSK Programme and Ms. Camilla Krebs Tetler, adviser and coordinator for Indo-Norwegian cooperation in education along with Ms. Merethe Sandberg Moe, senior adviser from the Research Council of Norway visited on November 4, 2019.
- Prof. Tom Finholt, Dean of School of Information and Ms. Rebecca Pagels, Director of Development and Alumni Relations from University of Michigan visited on November 6, 2019.
- Prof. Jeongyun Heo from Graduate School of Design, Kookmin University visited on November 6, 2019.
- Prof. Robert Allison, Vice Chancellor & President, Prof. Steve Rothberg, Pro Vice Chancellor, Prof. Andy Dainty, Dean School Architecture, Building & Civil Engineering, Mr. Charlie Carter, Director International Office, Mr. Rob Reeves, Regional Manager International Office and Mr. Musa Yusuff, Graduate Management Trainee from Loughborough University visited on November 8, 2019.

- Mr. Yukihiko Kazao, Director General & Ms. Kaori Watanabe, Administrative Officer from STS Forum, Japan visited on November 25, 2019.
- Prof. Yves H. Berthelot Vice-Provost for International Initiatives, Dr. Sivakumar Raghupathy, Executive Director of CREATE-X from Georgia Institute of Technology along with Mr. Ani Agnihotri, Co-Founder and CEO, Marshall Automation America, Inc. (MAAI) & Managing Partner, USA International Business and Research Center (USIBRC) LLC visited on December 16, 2019.
- Dr. Bruce McPheron, Executive Vice-President & Provost, Dr. Gil Latz, Vice Provost - Global Strategies and International Affairs, Mr. Gates Garrity-Rokous, Chief Compliance Officer, Ms. Padmini Roy-Dixon, Executive Director Global Gateways from Ohio State University visited on January 6, 2020.
- Dr. Katja Lasch, Regional Director, Ms. Marja Einig, Deputy Consul, German Consulate Mumbai, Ms. Shubhada Choudhury, Information and Office Manager, Mumbai, Ms. Pooja Midha, Programme Officer, Delhi from DAAD visited on January 13, 2020.
- Prof. Vasu Reddy, Dean and Prof. Schoeman, Professor of International Relations and Deputy Dean of the Faculty of Humanities from University of Pretoria visited on January 20, 2020.
- Prof. Yoshii Masahiko, Executive Vice-President in Charge of International Exchange and Evaluation, Kobe University, Japan visited on January 22, 2020.
- French Minister of Culture Mr. Frank Reister and his associates visited on January 27, 2020. Mr. Frank Riester gave a talk on business opportunities while promoting culture titled "How the economy of culture is reshaping the world".
- A delegation from University of Illinois delegation led by Prof. Timothy Killeen, President accompanied by Prof. Edward Seidel, Vice-President for Economic Development and Innovation, Prof. Pradeep Khanna, Associate Vice-President for Corporate and International Engagement, Prof. Narendra Ahuja, Research Professor and Donald Biggar Willet Professor Emeritus, Dept. of Electrical and Computer Engineering, Prof. T. Kesavadas, Professor, Dept. of Industrial and Enterprise Systems Engineering, Prof. Rohit Bhargava, Professor, Dept. of Bioengineering and Director, Cancer Center at Illinois, Prof. Bellur Prabhakar, Associate Dean for Technological Innovation and Training, College of Medicine and Prof. Ken Mullikan, Associate Vice-Chancellor for Undergraduate Education visited on January 28, 2020.
- Prof. Paul Pettersson, Vice-Chancellor, Dr. Helena Jerregard, Deputy Vice-Chancellor, Dr. Thomas Wahl, Dean of the School of Business, Society and Engineering and Mr. Christer Nygren, Lecture at the School of Innovation, Design and Engineering from Malardalen University visited on January 30, 2020.
- Mr. Stephen Williams, Director Global, Dr. Clare Newstead, College International Manager, Science and Technology, Prof. Phil Breedon, Professor of Smart Technologies and Ms. Vidhi Sahae, Senior Global Partnerships Manager from Nottingham Trent University visited on February 5, 2020
- Prof. Eilis Ferran, Pro Vice-Chancellor for International Relations and Prof. Howard Griffiths, Professor of Plant Ecology, Dept. of Plant Sciences from Cambridge University visited on February 17, 2020
- Prof. David Gray, Head of School, Professor Peter Doerner, Director of Internationalisation, Ms. Anne Payne, Director of Professional Services - all School of Biological Sciences, Prof. Pankaj, Dean South Asia, Ms. Amrita Sadarangani, Regional Director, India and South Asia Liaison Office from University of Edinburgh visited on March 6, 2020.
- Mr. Agus P. Saptono, Consul General of the Republic of Indonesia, Mumbai, Mrs. Tennike Erman, Consul - Socio-cultural, Mr. Yadi Suriahadi, Consul - Economics, Ms. Yustinus Budi Hartarto, Official Socio-cultural visited on March 6, 2020.



Delegation from Shenzhen Municipal



Delegation from United Arab Emirates University



Prof. Subhasis Chaudhuri with French Minister of Culture



Delegation from Indonesian Consulate

Contingent visits during 2019-20:

- **From Netherlands:** A group of 15 students studying the Transport Engineering and Logistic track of the Mechanical Engineering, Master's program at Delft University visited IIT Bombay on July 22, 2019. As a part of their program, they were in India visiting institutes and companies and doing study-related activities. At IIT Bombay, Prof. Bhalchandra Puranik, Head of Mechanical Engineering department, briefed them on the various activities and research taking place in the Department. They also visited Refrigeration and Cryogenics Lab, Machine Tools Lab and BeTiC.
- **From Tajikistan:** As part of International Youth Exchange Programme between India and Tajikistan, a 10-member youth delegation visited IIT Bombay on October 23, 2019. This delegation comprised of young university students, entrepreneurs and officials from Ministry and Federations from Tajikistan.

There was a vibrant interactive session between this delegation and IIT Bombay students, besides a visit to Central Library and entrepreneurship display by Society for Innovation and Entrepreneurship (SINE).

In addition, several individuals visited IIT Bombay as representatives of their respective universities.

Asian Universities Alliance (AUA) Consortia

The Asian Universities Alliance (AUA) is a consortia of Asian universities. AUA is a regional organization established to jointly address regional and global challenges, specifically related to higher education, economic, scientific and technological development by strengthening collaboration among member institutions. The alliance was established by a core of 15 founding members with the intention of gradual expansion, with IIT Bombay being a founding member university of AUA.

Following activities were organised under AUA consortium:

- **Overseas Study Program - Innovation, Incubation and Entrepreneurship (I2E):** The AUA Overseas Study Program "Innovation, Incubation and Entrepreneurship" (I2E) was organised at IIT Bombay during July 1-7, 2019. The week-long program was designed not only to provide firsthand exposure of the Indian business context but also to introduce the students to the concepts of innovation, incubation and entrepreneurship through a series of interactive sessions, activities and field trips. A diverse set of 18 student participants from nine universities across Asia took part in the program.



Innovation, Incubation and Entrepreneurship (I2E)

- **Online Education Conference in China:** The AUA (2019) Online Education Conference was held at Tsinghua University, China during July 5-6, 2019. More than 20 delegates from AUA member universities participated. Prof. Sridhar Iyer, Department of Computer Science and Engineering and Prof. Sahana Murthy, IDP in Education Technology represented IIT Bombay. The conference had keynote speeches and roundtable discussions on current situations of online education platforms in their respective countries. During the conference, the delegates had the opportunity to visit xuetangX and aixuetang online education platforms as well as attend talks from experts of enterprises related to online education. The conference also held discussion on the latest developments in Chinese online education and education innovation.



Executives' meeting in Sri Lanka

- **Executives' Meeting in Sri Lanka:** The third Asian Universities Alliance Executives' Meeting (AUAEM) was hosted by AUA Executive Presidency 2019-20 at the University of Colombo, in

Colombo, Sri Lanka during November 20-21, 2019. The annual event was attended by over 40 delegates from AUA member institutions. Prof. Prasanna Mujumdar, Deputy Director (Finance and External Affairs) and Prof. Swati Patankar, Dean (International Relations) represented IIT Bombay. The two-day event had sessions to take a review of all AUA activities and programs held during the year. AUA Executives and senior representatives discussing the proposed revisions to the AUA Framework and AUA representatives presenting proposals for AUA activities to take place in 2020-21, including student mobility programs and academic conferences.

- **Overseas Study Program - Sun, Society and Sustainability (S3):** The AUA Overseas Study Program "Sun, Society and Sustainability" (S3) was organised at IIT Bombay during December 9-15, 2019 in Mumbai and Madhya Pradesh, India. The 7-day action packed program drew 14 students from seven AUA member institutions. The program was organized by Solar Urja through Localization for Sustainability (SoULS), a flagship program of IIT Bombay, which has developed interventions, built on the foundation of localization for providing clean, efficient, affordable and reliable energy access to the most rural households across India. The visit to Betul village in Madhya Pradesh was covered in the local television news and the project was much appreciated by the participants.



Sun, Society and Sustainability (S3)



Program at University of Malaya

Program at the University of Malaya (UM), Malaysia: The University of Malaya, a member of AUA, hosted the Asian Universities Alliance program for students of the AUA member institutions during January 15-21, 2020. The theme of the program was "UM Appreciating Diversity through Art, Malaysia". A student from IIT Bombay Mr. Raghav Goyal, Department of Chemical Engineering, participated in this program. He was the General Secretary for Cultural Affairs 2019-20. The program gave participants a unique insight into the different facets of arts and culture in Malaysia.

National/ International visits by IIT Bombay community:

- **Knowledge Summit in France:** A two-day Knowledge Summit was organised by the Embassy of France in India in association with the Union Ministry of Science and Technology and the Ministry of Human Resource Development (HRD) during October 17-18, 2019 at Lyon, France. Around 300 participants from Indian and French academia, competitive clusters and start-ups, corporate houses, research organisations and public authorities attended the summit. The summit comprised of a series of interactive sessions designed to launch concrete initiatives and allow participants to deepen academic and scientific cooperation between two countries. The two-day summit is an essential step to develop and structure India-France collaborations in the fields of education and research, stimulate connection between research and industry and encourage the mobility of students and scholars. Prof. Chandra Sekhar Yerramalli, Department of Aerospace Engineering and Prof. Akshay S, Department of Computer Science and Engineering attended and represented IIT Bombay at the summit.

- **Shastri Indo-Canadian Institute (SICI) Summit, New Delhi:** The SICI Summit on ‘Dynamics of Higher Education in India and Canada: Envisaging Greater Collaborations and Opportunities to Network’ was held during November 25-26, 2019 in New Delhi. The summit was attended by 150 participants from SICI’s member network from Canada and India. About 15 Canadian and 69 Indian institutions participated in the summit. The summit aimed to promote and foster bilateral partnership in the higher education and research sector between India and Canada. Prof. Pushpa Trivedi, Department of Humanities and Social Sciences attended and represented IIT Bombay at the summit.

IIT’s International Relations Conclave 2019:



IIT’s IR Conclave

The All IIT International Relations Conclave organised by the Office of Dean (International Relations) was held at IIT Bombay campus on December 2, 2019. The objective of the conclave was to share experiences on various topics such as scholarships for international students including ICCR and Study in India, common admission portals, membership of international alliances, and other issues on internationalization. The meet was a follow-up of the conclave held at IIT Kharagpur in 2019. Recently, the Ministry of Human Resource Development (MHRD) released a common application portal to IITs and IISc for international applicants and 1000 PhD fellowships for the ASEAN countries. All representatives of international relations in the IITs conclave discussed the operational process of the portals and also had an interactive session on umbrella agreements with consortia of universities in France, Finland and BRICS countries.

Visits under Faculty and Staff Exchange Programme:

- The University of Edinburgh (UoE) funded visit of their staff members Ms. Caroline Kier, Publicity and Recruitment Officer, Mr. Alistair Hudson, Global Operations Support Officer and Dr. Conor Snowden, International Development Research Manager to IIT Bombay under the Erasmus+ International Credit Mobility (Erasmus+ ICM) programme in early 2020.



- Asian Universities Alliance (AUA) promotes faculty and staff mobility by providing financial support. Ms. Saori Mukaimachi from University of Tokyo visited IIT Bombay under AUA Staff Exchange program in September 2019. The purpose of these exchanges is to shadow our administrative staff and get an idea about processes, functioning, etc. The Office of International Relations facilitated interactions with their respective counter parts for the staff who visited under exchange.
- Prof. Nikhat Jamal Siddiqui from King Saud University, Dr. Nuruol Syuhadaa Mohd. from the University of Malaya and Dr. Eric Nelson from The Hong Kong University of Science and Technology visited IIT Bombay under AUA faculty exchange 2019-20.
- IIT Bombay faculty too visited other member universities of AUA under the faculty-exchange programme. Prof. Parinda Vasa (Physics) visited The University of Tokyo, Prof. Sanjeeva Srivastava (BSBE) visited United Arab Emirates University, Prof. Azizuddin Khan (HSS) visited Nazarbayev University and Prof. Raaj Ramasankaran (Civil) visited Tsinghua University during 2019-20.
- IIT Bombay staff too visited other member universities of AUA under the staff-exchange programme. Mr. Hrushikesh Nagwekar (Technical Superintendent, BSBE) visited University of Malaya, Mr. Prabhakara Ramasamy (Senior Sports Officer) visited Nazarbayev University and Mr. Sanjay Shah (Assistant Registrar, Main Administration) visited Peking University during 2019-20.

IIT Bombay Students participated in Student Exchange Programs

(under the Memorandum of Understanding) during Academic Year 2019 – 20

Sr. No.	Name of the University	No. of students/ Programmes
1	Aalto University, Finland	Three dual degree students from Electrical Engineering and one dual degree student from Energy Science and Engineering
2	Augsburg University of Applied Sciences, Germany	Three BDes students from IDC
3	City University of Hong Kong, Hong Kong	One BS student from Chemistry department
4	Technical University of Denmark, Denmark	Two dual degree students from Electrical Engineering department, two BTech students from Chemical Engineering department, one dual degree student from Metallurgical Engineering and Material Science department and one student from Mechanical Engineering department
5	Ecole Centrale de Nantes, France	One dual degree student from Energy Science and Engineering department
6	Ecole Nationale Supérieure Des Arts Decoratifs, France	One BDes student from IDC
7	EPFL Lausanne, Switzerland	Four dual degree students from Energy Science and Engineering department

Sr. No.	Name of the University	No. of students/ Programmes
8	ETH Zurich, Switzerland	One dual degree student from Mechanical Engineering department and one dual degree student from Electrical Engineering department
9	Hochschule Fur Gestaltung Schwabisch Gmund, Germany	Two BDes students from IDC
10	Holon Institute of Technology, Israel	One BDes student from IDC
11	INSA Lyon, France	Two BTech students from Civil Engineering department
12	KAIST, Korea	Two BDes students from IDC
13	Koc University, Turkey	One dual degree student from Mechanical Engineering department and one BTech student from Chemical Engineering department
14	KTH Royal Institute of Technology, Sweden	One BTech student from Electrical Engineering department and one BTech student from Civil Engineering department
15	Katholieke Universiteit Leuven, Belgium	One BDes student from IDC
16	Kyoto Seika University, Japan	One BDes student from IDC
17	Loughborough University, UK	One BTech student from Civil Engineering department
18	Malardalen University, Sweden	Two BDes students from IDC
19	Nanyang Technological University, Singapore	Two dual degree students from Electrical Engineering department, one dual degree student from Metallurgical and Material Science and three BDes students from IDC
20	National University of Singapore, Singapore	Three dual degree students from Electrical Engineering department and three BTech students from Computer Science and Engineering department
21	Ontario Universities International, Canada	One dual degree student from Energy Science and Engineering department
22	Swansea University, UK	Two BDes students from IDC
23	Technische Universitat Braunschweig, Germany	One BDes student from IDC
24	Technical University of Munich, Germany	One MSc+ PhD student from Energy Science and Engineering department
25	Universidad Carlos III de Madrid, Spain	One dual degree student from Energy Science and Engineering department
26	University of Agder, Norway	Six Master students from SJMSOM



Sr. No.	Name of the University	No. of students/ Programmes
27	University of Geneva, Switzerland	One dual degree student from Energy Science and Engineering department, one dual degree student from Electrical Engineering department and one BS Economics degree student from Humanities and Social Sciences department
28	University of Toronto, Canada	One dual degree student from Metallurgical and Material Science department and one dual degree student from Electrical Engineering department

Foreign Language courses:

Following language courses for the students and staff of IIT Bombay were organised in the Autumn and Spring semester:

- French (in association with the Embassy of France, New Delhi)
- Japanese (in association with Koo International Co. Ltd., Japan)
- German (in association with DAAD, New Delhi)
- Mandarin (in association with Embassy of Taiwan, New Delhi)

The courses were conducted by the native speakers of these languages.

Joint Research Workshops:

The office of Dean (International Relations) at IIT Bombay conducts research workshops with various institutes/ universities across the globe. The research workshops are the measures to strengthen the collaboration between the two institutes/ universities. The main objective of these research workshops is to identify collaborators with common research areas and take ahead the collaboration with a joint research student so that it is more sustainable.

IIT Bombay conducted joint research workshops with the following universities during 2019-20:

- Hiroshima University, Japan at IIT Bombay on September 12, 2019
- IIT Bombay – National Chiao Tung University, Taiwan – Delta Electronics, Taiwan – MediaTek Electronics, Taiwan on November 7, 2019
- University of Sydney, Australia during November 18-19, 2019
- IIT Bombay- Sun Pharma – Tel Aviv University, Israel during November 25-26, 2019
- Leibnitz University of Hannover, Germany on December 3, 2019
- Newcastle University, UK on December 9, 2019
- Genomics Research Centre, Taiwan during December 16-17, 2019

Workshops organized at partner universities:

- Newcastle University, UK on March 3, 2020



IIT Bombay-National Chiao Tung University, Taiwan



IIT Bombay-Newcastle University, UK

International Students

A total of 103 International students (from countries like Afghanistan, Australia, Bangladesh, Brazil, Canada, Denmark, Dubai, Ethiopia, France, Gambia, Germany, Hong Kong, Iran, Japan, Kenya, Myanmar, Nepal, Netherlands, Nigeria, Norway, Russia, Sierra Leone, Singapore, Sudan, Switzerland, Syria, Taiwan, Turkey, UK and USA) have registered at IIT Bombay during the financial year 2019-20. They have joined IIT Bombay for course work/ project work/ post graduate studies.



ALUMNI AND CORPORATE RELATIONS

The Dean Alumni and Corporate Relations (ACR) Office integrates two strategic thrusts for IIT Bombay. One is nurturing alumni relations and other is enhancing relations with corporations. The alumni and corporate donations, that have picked up significantly in the last few years, also provide a great support to the Institute. The Office of Dean ACR performs the important task of nurturing relationship for the benefit of the Institute and raising additional resources from the alumni and other well-wishers of IIT Bombay.

During 2019-20, the Institute received a total donation of Rs.57.26 crores. We express our deep gratitude and appreciation for the constant support shown by our alumni and other well-wishers to IIT Bombay. The major donors for the last financial year, among others, were Bank of Baroda, HPCL, Mangalam Organics, British Petroleum, Goldman Sachs India Pvt. Ltd., Narotam Seksaria Foundation, Ansys, Portescap India Pvt. Ltd., and the major alumni donations were from IITB Heritage Foundation, Mr. Abhay Pande, Dr. Mayur Datar, Mr. Raj Nair, Mr. & Mrs. Shamkant Sarkar and Class of 1993 and 1994. The development and alumni activities of the Institute are not just a role model in India, but have also been appreciated by major international universities.

The major activities for which these donations were received are as under:

Institute Development Fund: This fund primarily caters to the critical needs of the Institute such as those related to modernization and the establishment of new academic, research and campus infrastructure.

Young Faculty Awards (YFA): In an endeavour to enable IIT Bombay attract quality faculty, the alumni have instituted the Young Faculty

Awards programme. The YFA ensures that IIT Bombay offers a more attractive package to achieve better results in recruitment. The “Young Faculty Joining Bonus”, initially a Class of ’82 Legacy Project, has been awarded from 2010 onwards. The class of 1978, ’83, ’84, ’85, ’88, ’89, ’90, ’91, ’92, ’93 and ’94 have also joined this project. The project focuses on supporting young faculty in their academic pursuits in order to attract outstanding young faculty to replace retiring faculty and to augment current faculty as a key element for IIT Bombay to maintain its long-term competitiveness. 119 faculty benefited from YFA in 2019-20.

Chair Professorship: The Chair Professorship is a distinguished academic position of the Institute and is conceived as an academic honour to recognize outstanding teaching/research work and achievements of the permanent faculty in the Institute. It is also used to attract outstanding academicians to join the Institute as visiting faculty. Each Named Chair is supported by an endowment created from a donation to the Institute. It is envisaged that Named Chairs will also lead to establish new areas of specialization through the recruitment of accomplished researchers in specific fields of study. The endowment for a Chair is currently Rs. 1.25 crore. Interest from the endowment will be used to meet expenses of the Chair, which include an honorarium of upto Rs.30,000 per month and contingency expenses. The salary of the Chair Professor and all other benefits (housing, medical, etc.) continue to be borne from Institute funds. Donors have the prerogative of naming the Chairs. The broad area of specialization for instituting the Chair may also be specified by the donor. The total number of Chair Professors for the year 2019-20 was 81, out of which 50 were Institute Chairs and 31 were Donor-named Chairs.

Hostel Development: The Hostel Alumni Team Stewardship (HATS) is an important alumni-driven initiative that aims to channel the affinity and affection that many alumni have for their former hostels. This activity is run exclusively through the alumni support and contributions. The key goals of HATS are as follows:

- (a) Improve hostel infrastructure and facilities
- (b) Assist the current and retired mess workers
- (c) Increase interaction between the alumni and students
- (d) Empower students to improve their living conditions under the aegis of Make Hostel My Home (MHMH) and
- (e) Organize hostel-level reunions in each hostel on the Alumni Day.

The alumni from various batches have initiated projects to provide better facilities to the students for their academic progress.

Student Development:

- (a) **Scholarships:** One way to nurture excellence amongst students is by awarding scholarships to deserving candidates. The scholarships may be named after the donor. The Office of Dean (ACR) also works with students and alumni to identify and apply for relevant external fellowships and scholarships. The amount of scholarship is reviewed with the Institute Scholarship Committee from time-to-time to determine the viability of the same given the prevailing economic conditions. During 2019-20, about 600 scholarships of varying amounts were granted. Desai Sethi, IITBHF Named scholarships, Round Memorial, C'1990, C'1992 and Indira Foundation scholarships are some of the prominent scholarships.
- (b) **Awards and Prizes:** As every year, about 45 awards and prizes of varying amounts and forms (certificates, medals, etc.) were

given away during 2019-20. The awards in the name of Prof. K.C. Khillar, Mr. R.G. Manudhane, Dr. P.V Sukhatme and Mr. Rakesh Mathur, Mrs. Rama Mathur are some of the prominent ones given during convocation.

Major Events:

- (a) **FAN India Symposium and DA India Meet 2019:** The Faculty Alumni Network (FAN) India symposium and the Distinguished Alumni (DA) India Meet was held during April 6-7, 2019 at the Taj Exotica Resort in Goa. The Faculty Alumni Network (FAN) is a community of IIT Bombay faculty and alumni with backgrounds as researchers, university faculty, students and administrators. FAN's goals are to assist IIT Bombay in its efforts to become a world-class research and teaching center. The FAN India Symposium 2019 theme "New and Advanced Materials" was held in the morning session and "Sustainable Chemical Sciences" was held in the afternoon session. Prof. Jayesh Bellare, Department of Chemical Engineering and Prof. R Murugavel, Department of Chemistry were selected to lead the Symposium as conveners. The symposium on "New and Advanced Materials" in the morning session was chaired by Prof. Srikant Sastry from the Theoretical Sciences Unit, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) and the symposium on "Sustainable Chemical Sciences" in the afternoon session was chaired by Prof. Alisagar Contractor, who has retired from the Department of Chemistry, IIT Bombay. The symposium was attended by over 45 participants in both sessions from academia and industry including alumni from IIT Bombay and subject matter experts (SMEs).

The Distinguished Alumni India Meet 2019 was held on April 7, 2019. It



is an initiative that brings together IIT Bombay's distinguished alumni who have contributed and have been acknowledged by the Institute for their distinguished services to the society at large. The meet is held annually to plan the strategic growth of the Institution in the future years. This year, IIT Bombay is primarily focussing on four priorities including a) enhancing the students' experience b) strengthening faculty and research c) building a culture of innovation and entrepreneurship d) creating a world-class campus.

- (b) **Institute Valedictory Function:** The Valedictory Function for the graduating students was organised on May 3, 2019 at Prof. B. Nag Auditorium in the Victor Menezes Convention Centre of the Institute. Mr. Abhay Pandey, General Partner, A91 Partners and IIT Bombay alumnus of CSE Department, and Mr. Gagan Bhalla, CEO and COO of Apollo Sugar and Apollo White Dental and an IIT Bombay alumnus of Civil Engineering Department, were the Chief Guests on the occasion. The event was graced by the presence of Institute dignitaries; Prof. Subhasis Chaudhuri, Director, IIT Bombay, Prof. Soumyo Mukherjee, Dean (Student Affairs), and Prof. Suhas Joshi, Dean (Alumni and Corporate Relations). The outstanding contribution awards were also given out to felicitate the members of the Student Alumni Relations Cell who have contributed substantially to the Institute as members of Dean (Alumni and Corporate Relations) Office. The awardees were Mr. Karan Mantri, Mr. Samarth Agrawal, Mr. Taveesh Garg, Ms. Vaishali Agrawal and Ms. Mrinal Dharmik.

- (c) **Japan Visit:** A delegation from IIT Bombay including Prof. Subhasis Chaudhuri, Director, Prof. Suhas Joshi, Dean (ACR), Prof. Milind Atrey, Dean (R&D), Prof. K. Momaya, Shailesh J Mehta School of Management, Mr. Sharad Saraf, Chairman, Technocraft and others visited Tokyo in the first week of September. The visit was aimed to get connected with more and more corporates and reach out to the alumni community. The delegation visited the following companies: Murata Manufacturing, Daikin, NEC, FUSO/Diamler Asia Trucks, Sony Corporation, Yahoo, Honda R&D and few others. The delegation also visited Tokyo University.

IIT Bombay Alumni Connect Program:

The meeting was attended by more than 100 alumni from Japan. It appeared that there is a big influx of alumni in Japan during 2016-2018. The event was a great success.

- (d) **Alumination:** The flagship event of SARC, IIT Bombay 'Alumination' was organised during October 12-13, 2019. It is IIT Bombay's largest platform for bilateral exchange between the IIT Bombay alumni and students on a spectrum spanning career guidance, corporate exposure, life learning and motivational talks. Three IIT Bombay alumni including Mr. Arvind C. Bidaye, Scientific Officer at Bhabha Atomic Research Centre, Mr. Amit Mittal, Senior Manager at Aditya Birla Finance Limited and Mr. Zishaan M. Hayath, Founder and CEO of Toppr.com presented their views on working conditions in their respective sector. Talk on the fundamentals of entrepreneurship was delivered by alumnus Mr. Saurabh Garg, the co-founder and CBO of NoBroker.in on October 12. On the final day, the fest concluded with a motivational talk by Mr. Rizwan Koita, co-founder and

CEO of CitiusTech, as he presented an account of his life after graduation and the invaluable insight he gained along the way.

(e) **US and Canada Roadshow by IIT Bombay:**

The IIT Bombay team conducted its annual roadshow to the United States and Canada (this year) during October 10-22, 2019. The team travelled to 6 cities to meet alumni, corporate and university partners across the USA and Canada. The major highlight of the roadshow was the alumni connect events in San Francisco in Bay Area, Seattle, Houston, Toronto and New York.

(f) **Re-union Events in India:** IIT Bombay organized a “Chennai Alumni Reunion” on November 9, 2019 in Mauve Lilac, The Raintree, 636, Anna Salai, Teynampet. The reunion was attended by more than 100 alumni.

The “Jaipur Alumni Reunion” was held on November 16, 2019 in Kewra Lawns, Hotel Diggi Palace, Diggi House, Shivaji Marg. The event was attended by more than 200 alumni.

(g) **Institute Alumni Day and Presentation of Distinguished Service Awards (DSA):**

The annual Alumni Day was held on December 22, 2019. The Alumni Day, saw two of the alumni, who have contributed in a notable and sustained manner to the progress of the Institute, being honoured with the ‘Distinguished Service Awards.’ The DSA were conferred on Mr. Aaloke Surie (BTech, 1970, Mechanical Engineering) and Ms. Rekha Koita (BTech, 1992, Metallurgical Engineering and Materials Science). The Chapter Service Awards (CSA), instituted during the Diamond Jubilee year celebrations was conferred on Dr. Sushil Bhatia (BTech, 1966, Electrical Engineering), Mr. Madhusudan Reddy M (MSc, 1974, Applied Geology), and

Mr. Sunil Dhall (BTech, 1985, Mechanical Engineering).

During this event, the respective batches of alumni have pledged a total of Rs. 26.26 crores for the Institute. The Class of 1994 presented their ‘Silver Jubilee Class Legacy Project’ and pledged to contribute a record-breaking amount of Rs. 12.14 crores to the Institute. A Legacy Project is a project adopted by the batch celebrating its Silver Jubilee anniversary, for the betterment of the Institute and of the people associated with it, as a way of giving back to the alma mater and to leave behind a lasting legacy and remembrance of their silver jubilee reunion. Mr. Parasvil Patel from the class of 2009-10 announced the Legacy Project Gift. The decennial batch (Class of 2009-10) pledged a sum of Rs. 1.05 crore to the Institute this year.

Major highlight of the event was the launch of the *Regular Giving Programme* by Prof. Subhasis Chaudhuri, Director, IIT Bombay. The objective of the program is to encourage the students and alumni of the Institute to give back to their alma mater on regular basis which will go towards a number of endeavours, grand and small, in the service of the Institute and the current students.

h) **Alumni Reunions:** Reunions of various batches of the Institute were organised in December 2019:

- Silver Jubilee Reunion of Class of 1994 was held during December 20-22, 2019. The batch of 1994 pledged a sum of Rs. 12.14 cr. towards the Legacy project. They would be looking at deploying the funds in a number of projects largely related to student well-being, including scholarship programs for deserving students, upgradation of study facilities across the hostels, supporting the ongoing institute



efforts for student counselling, amongst other things.

- Class of 1969 celebrated its 50th year reunion in January 2019. Around 107 alumni attended the event along with their families. On the Alumni Day, 10 representatives from the class of 1969 presented the batch contribution of Rs. 13.07 crores to the Institute towards their legacy project. These funds add towards a number of endeavours, grand and small, in the service of the Institute and the current students.
- Decennial Reunion of Class of 2009-10 was held on December 20-22, 2019. The reunion was attended by 151 alumni along with their family. The decennial batch contributed Rs. 1.07 crores to the Institute. The batch also took the time pledge to give their valuable time of 3000 hrs to the students and the Institute. This is first-of-its-kind initiative.
- Ruby Reunion of Class of 1979 was held during December 20 – 22, 2019. 32 alumni attended this reunion with their family.
- Reunion of Class of 1982 was conducted from December 30, 2019 - January 2, 2020. About 63 alums attended the event.

i) **Foundation Day and Distinguished Alumnus and Young Alumni Achievers Award:** The 61st Foundation Day of the Institute was celebrated on March 11, 2020. During the function, seven alumni were honoured with the Distinguished Alumnus Awards and four Young Alumnus Achiever Awards by the Chief Guest Prof. Ashutosh Sharma, Secretary, Department of Science and Technology, Government of India. The

Distinguished Alumnus Award is conferred on those alumni who have reached positions of eminence in the areas of business, academics, research, government, public service and entrepreneurship. The Young Alumni Achiever Award is presented to those who have shown outstanding achievements in their chosen field of work and are below 40 years of age.

The recipients of the Distinguished Alumnus Award are as follows:

- Prof. Varadarajan Chari, BTech, 1974, Chemical Engineering
- Prof. Janat Shah, BTech, 1980, Mechanical Engineering
- Mr. Surendra Murlidhar Vaidya, BTech, 1983, Metallurgical Engineering and Materials Science
- Prof. Mayuresh Kothare, BTech, 1991, Chemical Engineering
- Prof. Gaurav Sukhatme, BTech, 1991, Computer Science and Engineering
- Prof. Kavita Ramanan, BTech, 1992, Chemical Engineering
- Mr. Abidali Neemuchwala, MTech, 1992, Industrial Management

The recipients of the Young Alumni Achiever Awards are as follows:

- Mr. Shaikh Shahnawaz Ali, BTech. 2003, Electrical Engineering
- Mr. Ankit Mehta, Dual Degree (BTech+MTech), 2005, Mechanical Engineering
- Mr. Rahul Singh, BTech, 2006, Mechanical Engineering
- Mr. Ashish Bhat, BTech, 2007, Electrical Engineering

j) **Named Lectures:** The following lectures were organised during the year by the Office of Dean ACR:

N. R. Kamath Chair Distinguished Lecture – N. R. Kamath Chair Distinguished Lecture by Prof. Kaushik Basu, Professor of Economics and the C. Marks Professor, International Studies at Cornell University, and former Senior Vice President and Chief Economist of the World Bank (2012-16) titled “The Economics of Digital Platforms: Theory and Policy Options” was organized on August 2, 2019.

Prof. C. N. R. Rao Lecture - Prof. C. N. R. Rao Lecture on Nanoscience and Nanotechnology by Prof. Ajayan Vinu, Global Innovation Chair Professor and Director of Global Innovative Center for Advanced Nanomaterials, University of Newcastle titled “Advanced Nano-materials for clean energy, environment, and health” was organized on September 26, 2019.

C.V. Seshadri Chair Distinguished Lecture - Dr. Ajit Sapre, Group President (R&T), Reliance Industries Ltd. spoke on “Technology initiatives by Reliance Industries to meet global challenges” on November 29, 2019.

Prof. C. N. R. Rao Lecture – Prof. C. N. R. Rao lecture in Nanoscience and Nanotechnology by Nobel Laureate in Chemistry Professor Grubbs, Victor and Elizabeth Atkins Professor of Chemistry at the California Institute of Technology on “Applications of Organic Chemistry to the solutions of Practical Problems” was organized on January 8, 2020.

Shashwat Panda Memorial Lecture by Pureheart Capital – Inaugural Shashwat Panda Memorial Lecture by Pureheart Capital was held on February 13, 2020. The speaker, Mr. Gurcharan Das, renowned author, commentator and public intellectual spoke on “Making a life vs Making a living”.



Prof. Subhasis Chaudhuri welcoming the speaker Mr. Gurcharan Das, during the inaugural Shashwat Panda Memorial Lecture by Pureheart Capital

Institute Distinguished Lecture (in memory of Prof. K. C. Khilar) – The Institute Distinguished lecture in memory of Prof. K. C. Khilar by Dr. Janhavi Raut, Director, R&D at Unilever R&D Center titled “Microbiomics: Role of Microbe – Microbe and Host – Microbe interaction in shaping microbial communities” was organized on March 12, 2020 in Prof. B. Nag auditorium, VMCC.

INSTITUTE EVENTS

57th Convocation: The 57th Convocation of IIT Bombay was held on August 10, 2019. Shri. Ramesh Pokhriyal 'Nishank', Hon'ble Minister of Human Resource Development, was the Chief Guest and delivered the Convocation Address. During the 57th Convocation ceremony, 2407 students were awarded the degrees.



The degree of Doctor of Science (*Honoris Causa*) was conferred on Mr. Nandan Nilekani, Co-founder and Chairman, Infosys Technologies Limited, Bengaluru and former Chairman, UIDAI, Government of India. Hon'ble Minister of Human Resource Development Shri. Ramesh Pokhriyal 'Nishank' inaugurated Hostel No. 18 and planted a tree in the IIT Bombay campus during his visit and also interacted with all the IITs through NKN on "Navbharat Ka Nirman, IITs Ke Saath".

61st Foundation Day: IIT Bombay celebrated its 61st Foundation Day on March 11, 2020. Prof. Ashutosh Sharma, Secretary, Department of Science and Technology, Government of India was the Chief Guest for the function. The Institute celebrated 61st anniversary on the Foundation Day by honoring its select alumni for their achievements in diverse fields. The Institute honored seven outstanding

alumni this year with the Distinguished Alumnus Awards and four with Young Alumnus Achievers Awards. The 'Prof. S.C. Bhattacharya Award for Excellence in Pure Sciences' was conferred on Prof. Kanchan Panda, Department of Earth Sciences. The 'Prof. H.H. Mathur Award for Excellence in Applied Sciences' was conferred on Prof. Sunita Sarawagi, Department of Computer Science and Engineering.

Teacher's Day: The 61st Teacher's Day was celebrated on September 9, 2019. Prof. Varun Sahni, Vice-Chancellor, Goa University was the Chief Guest. The "Prof. S.P. Sukhatme Excellence in Teaching Award" and the "Dr. P. K. Patwardhan Technology Development Award" were presented to select faculty members in recognition of their contributions in the field of teaching and research on the occasion.

International Day of Yoga: IIT Bombay celebrated the International Yoga Day on June 21, 2018 at the Institute's badminton court in the gymkhana ground. Ms. Anu Aggarwal, Founder Director of Anu Aggarwal Foundation and Mr. Tushar Pradhan, CIO, HSBC, were the chief guests of the event. The celebrations included second edition of Yog Pratiyogita on March 23, 2019 and a workshop on "Power and Yin Yoga" on May 3, 2019; "Flexibility & Stretching" on May 15, 2019; "Pranayam" on May 21-24, 2019; "Introduction to Iyengar Yoga with Yog-asana Demonstration" on June 1, 2019; "Heartfulness Meditation" on June 7-9, 2019 and a symposium on "Research on Yoga Based Practices" on June 15, 2019.

Van Mahotsav 2019 was celebrated on July 13, 2019. About 2000 saplings of 15 varieties were planted on the hill slope beyond the pipeline at rear side of Hostel 3 and 4 on the IIT Bombay campus.

58th Interim Convocation: IIT Bombay awarded degrees to 192 students at its 58th Interim Convocation on February 28, 2020. Dr. Lalit S. Kanodia, Chairman, Datamatics Global Services Limited was the chief guest for the interim convocation function. The degrees

were conferred upon those students who have completed all the requirements during the period from August 2019 to January 2020 and had requested for the degree to be awarded earlier than the 58th Convocation.

Matribhasha Diwas: IIT Bombay celebrated Matribhasha Diwas (Mother Language Day) on February 20, 2020 to promote the use of mother tongue in the Institute.

The event was organised under the chairmanship of Prof. Tapanendu Kundu, Dean (Student Affairs). Various linguistic associations of the Institute showcased the importance of different languages spoken across India during the function.

Marathi Rajbhasha Day: IIT Bombay celebrated Marathi Rajbhasha Day on February 28, 2020, as part of "Ek Bharat Shreshtha Bharat" event. The celebrations included a lecture on "Experiencing Marathi culture through its literature" by renowned Marathi writer, Editor-in-chief for the Marathi Encyclopaedia and Padmashree awardee Dr. Vijaya Wad. Padmashree Prof. D.B. Phatak, Chairman, Board of Governors, IIT Indore and former faculty, IIT Bombay was special guest on the occasion.





Institute Lectures/ Colloquia

Prof. T. Pradeep, Deepak Parekh Institute Chair Professor and Professor of Chemistry, DST Unit of Nanoscience and Thematic Unit of Excellence, Department of Chemistry, Indian Institute of Technology Madras, spoke on “From materials to clean water: Science, Technology and Industry”, at an Institute lecture on June 6, 2019

Prof. Peter Molnar, Distinguished Professor, Department of Geological Sciences, University of Colorado, Boulder, Colorado, USA, spoke on “The growth of the Himalaya and Tibet and the evolution of Asian climate”, at an Institute lecture on July 19, 2019

Prof. Kaushik Basu, Professor of Economics and the Carl Marks Professor of International Studies at Cornell University, Ithaca (New York) as well as the former Chief Economist of the World Bank and Chief Economic Adviser to the Indian Government, spoke on “The Economics of Digital Platforms: Theory and Policy Options”, at the N. R. Kamath Chair Distinguished Lecture on August 2, 2019

Dr. Geeta Narlikar, Professor of Biochemistry and Biophysics, Lewis and Ruth Cozen Chair I, University of California, San Francisco, USA, spoke on “Beyond the genetic code: how a shape-shifting genome controls cell fate”, at an Institute lecture on August 19, 2019

Dr. Vinod Nowal, Deputy Managing Director, JSW Steel, spoke on “Role of Indian Steel Industry in US\$ 5 Trillion Economy”, at Steel Colloquium lecture on September 18, 2019.

Prof. Ajayan Vinu, Global Innovative Center for Advanced Nanomaterials, The University of Newcastle, Australia, spoke on “Advanced Nano-materials for clean energy, environment, and health”, at Prof. C. N. Rao Lecture for Nanoscience and Nanotechnology on September 26, 2019

Prof. Michael L. Klein, FRS Laura H Carnell Professor of Science and Dean of Science and Technology, Temple University, Philadelphia, USA, spoke on “Wetting-Dewetting Transitions & Nature’s Exquisite Sensing Machines: Unveiling the Molecular Mechanism of Pain?”, at an Institute lecture on October 3, 2019

Prof. Axel Kleidon, Research Group leader, Biospheric Theory and Modelling Group, Max-Planck- Institute for Biogeochemistry, Jena, Germany, spoke on “Using thermodynamic limits to infer climate and global climate change”, at an Institute lecture on October 9, 2019

Prof. Michael Jordan, University of California, Berkeley, spoke on “Machine Learning: Dynamical, Statistical and Economic”, at the 7th Annual Indira Foundation Lecture on November 4, 2019

Prof. Justin Wark, Department of Physics, Oxford University and Fellow, Trinity College, UK, spoke on “Science with X-Ray Free Electron Lasers”, at an Institute lecture on November 15, 2019

Dr. Ajit Sapre, Group President (R&T), Reliance Industries Ltd., spoke on “Technology initiatives by Reliance Industries to meet global challenges”, at an

Institute Distinguished Lecture in Chemical Engineering (in memory of Professor C.V. Seshadri) on November 29, 2019

Prof. Rukmini Bhaya Nair, Professor Emerita, Department of Humanities and Social Sciences, IIT Delhi, spoke on “Five Ideas of The University The 21st Century: Towards a ‘Stem And Leaf’ Model of Interdisciplinary Research Cooperation”, at an Institute lecture on December 2, 2019

Prof. Slobodan Simonovic, Professor Emeritus, Department of Civil and Environmental Engineering, Director of Engineering Works, Institute for Catastrophic Loss Reduction, The University of Western Ontario, London, spoke on “Resilience – Imperative of the Society Under Global Change”, at an Institute lecture on December 6, 2019

Prof. Richa Nagar, Professor of College of Liberal Arts, Chair of Russel and Elizabeth M. Bennett Chair of Excellence, Beverly and Richard Fink Professor in Liberal Arts, University of Minnesota-Twin Cities, spoke on “Academic Knowledge and People’s Struggles”, at an Institute lecture on December 9, 2019.

Prof. Oliver Hart, recipient of Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2016, spoke on “A New Approach to Contracts”, at an Institute lecture on January 14, 2020

Prof. Joachim Frank, Nobel Laureate in Chemistry (2017), Columbia University, New York, spoke on “Single-particle cryo-EM: Visualization of biological molecules in their native states”, at an Institute lecture on January 17, 2020

Mr. Frank Riester, Minister of Culture, France, gave a talk on business opportunities while promoting culture titled “How the economy of culture is reshaping the world” on January 27, 2020

Prof. Yann LeCun, Director, AI Research at Facebook, Silver Professor of Computer Science, Data Science, Neural Science, and Electrical and Computer Engineering, New York University, spoke on “Self-Supervised Learning: the Next Step in AI”, at an Institute lecture on February 14, 2020

Dr. Janhavi Raut, Director, Research and Development, Unilever R&D Center, Bangalore, spoke on “Microbiomics: Role of Microbe-Microbe and Host-Microbe interaction in Shaping Microbial Communities”, at an Institute lecture (in memory of Professor K. C. Khilar) on March 12, 2020

Conferences

10th ACM/ SPEC International Conference On Performance Engineering

The Department of Computer Science and Engineering, IIT Bombay hosted the 10th ACM/ SPEC International Conference on Performance Engineering (ICPE) on “Performance Engineering in the AI Era”, at the Victor Menezes Convention Centre during April 7-11, 2019. Prof. Varsha Apte, Department of Computer Science and Engineering was the organizing co-chair of the conference (along with Prof. Antinisa Dimarco of University of L’ Aquila, Italy).

Prof. Kishor Trivedi, Hudson Distinguished Professor, Department of Electrical and Computer Engineering, Duke University, USA, Prof. Evgenia Smirni, Sidney P. Chockley



Professor, Department of Computer Science, College of William and Mary, USA, and Dr. N. Muralidaran, Managing Director & CEO of NSEIT Limited, Mumbai were the keynote speakers at conference.

15th World Conference on Transport Research (WCTR)

The Transportation Systems Engineering Group, Department of Civil Engineering, IIT Bombay conducted the prestigious 15th World Conference on Transport Research (WCTR) during May 26-31, 2019. The WCTR is the flagship activity of World Conference on Transport Research Society (WCTRS). The opening ceremony of the conference was held on May 27, 2019. The conference provided a forum for the interchange of ideas among transportation fraternity from all over the world, from a perspective which is multi-modal, multi-disciplinary and multi-sectoral. The conference provided a platform to the academicians, practitioners, managers, and policymakers together from all parts of the world to share cutting-edge research and advanced state-of-practice.

Prof. K. V. Krishna Rao, Department of Civil Engineering was the Conference Director of the WCTR. Over 1000 delegates from over 60 countries attended the conference. More than 1200 presentations on the topic of transportation were made during the conference in several technical and special sessions. As part of the event, WCTRS Young Researchers' conference was held on May 26, 2019.

11th APCTP-IACS-IIT Bombay Joint Conference on Emergent Phenomena in Novel Oxide Materials and Low Dimensional Systems

11th APCTP-IACS-IIT Bombay Joint Conference on Emergent Phenomena in

Novel Oxide Materials and Low Dimensional Systems was jointly organized by the Department of Physics at IIT Bombay, the Indian Association for the Cultivation of Science (IACS), Kolkata, and the Asia-Pacific Center for Theoretical Physics (APCTP) during November 28-30, 2019 at IIT Bombay. The purpose of the conference was to bring together theorists as well as experimentalists working in the area of novel oxide materials and low dimensional systems that includes multiferroic oxides, oxide heterostructures, frustrated magnetism, Graphene, topological insulators etc. The highlighted topics covered during the conference were Topological insulators, Transition metal oxides, Novel superconductors, Two-dimensional materials and Multiferroic materials

SciPy India 2019

The FOSSEE (Free/ Libre and Open Source Software for Education) project at IIT Bombay organised SciPy India 2019 - An annual international conference on "Python for Education and Scientific Computing", during November 29-30, 2019. The conference provided opportunities to spread the use of the Python programming language in the Scientific Computing community in India. It provided a unique opportunity to interact with the "Who's who" of the Python for Scientific Computing fraternity and learn, understand, participate, and contribute to Scientific Computing using Python.

7th International Conference on Advances in Energy Research

The 7th International Conference on Advances in Energy Research was organised by the Department of Energy Science at IIT Bombay during December 10-12, 2019. A panel discussion on "Energy Transitions and Energy Security" with the panellists including

Mr. Anil Kumar Jain, Secretary, Ministry of Coal, Government of India; Mr. Karthik Ganesan, Research Fellow, Council on Energy, Environment and Water; Dr. Anuradda Ganesh, Director, Research & Innovation at Cummins; Dr. Keith Lovegrove, Managing Director of ITP Thermal Pvt. Ltd., Australia; and Mr. Soeren Huittinen, Head of Products R&D, India for Siemens was also held during the conference on December 12, 2019.

INDSTATS 2019 - Innovations in Data and Statistical Sciences

The Department of Mathematics, IIT Bombay organised a 5-day International Conference titled “INDSTATS 2019 - Innovations in Data and Statistical Sciences” at IIT Bombay during December 26-30, 2019. The 2019 IISA Conference at Mumbai was aimed to bring together statisticians worldwide from academia, industry, government, and research institutions to explore the latest developments and challenges in the era of Data Science and Statistical Learning. Recent advancements in the fields of Statistics, Biostatistics, and Probability were also discussed in the conference.

IDC Golden Jubilee – Design Conference and Alumni Meet

The IDC School of Design at IIT Bombay organised “IDC Golden Jubilee – Design Conference and Alumni Meet” during January 6-8, 2020. The keynote speaker during the conference include Dr. Punya Mishra, Associate Dean of Scholarship and Innovation, Arizona State University; Mr. Pankaj Jhunja, Head of Mobility Services, Tata Motors; Ms. Devina Kothari, Indian Industrial Designer, Strategist and an Entrepreneur; Mr. Rajeev Prakash, Art Director, Delhi Press, Uttar Pradesh; Mr. Abhishek Verma, national award winning director and animator; Mr.

Abhimanyu Kulkarni, Studio Director Philips Experience Design, India; Ms. Chandni Rajendran, Chandni is a social entrepreneur and designer; and Prof. Uday Kumar, Associate Professor and Head of Department of Design, IIT Guwahati.

TCTD Symposium 2020

The Tata Centre for Technology and Design at IIT Bombay organised TCTD Symposium titled “Take Idea to Scale” on January 9, 2020. The highlight of the symposium was the posters and prototypes exhibition which displayed almost all of TCTD’s research projects and their readiness for field test or market-connect. The event was aimed to bring together academic researchers, field implementation agencies, social entrepreneurs, NGOs, government policymakers and CSR partners for discussion with expert speakers and panellists on relevant challenges and alternatives to overcome them.

2nd International Conference on Entrepreneurship and Family Business [ICEFB 2020]

The Shailesh J. Mehta School of Management, IIT Bombay and the College of Business, University of North Texas, USA jointly organised the 2nd international conference on “Entrepreneurship and Family Business” [ICEFB 2020] during January 9-11, 2020 in Mumbai. The conference provided an opportunity to explore, expound on, and extend the rich heritage of research on entrepreneurship and family business. We expect to witness vibrant scholarly sessions underscored by a profusion of thought-provoking ideas.

5th International Conference on “Management of Intellectual Property Rights and Strategy”

The Shailesh J. Mehta School of Management



and IPR Cell at IIT Bombay in collaboration with the National Institute of Industrial Engineering (NITIE), Maharashtra National Law University (MNLU) Mumbai and the Society for Innovation and Entrepreneurship (SINE), IIT Bombay organised 5th International Conference on “Management of Intellectual Property Rights and Strategy” on Abstract Booklet MIPS 2020 during January 24-25, 2020

4th Doctoral Consortium – Advances in Management Research: Role in Emerging Economies

The Shailesh J. Mehta School of Management organized 4th Doctoral Consortium 2020 during February 21-22, 2020 at IIT Bombay on the theme “Advances in Management Research: Role in Emerging Economies”.

Workshops

ICPE 2019: 2nd workshop on Education and Practice of Performance Engineering (WEPPE)

The Department of Computer Science and Engineering at IIT Bombay organized ICPE Workshop - the 2nd workshop on Education and Practice of Performance Engineering (WEPPE) and two ICPE tutorials were held on April 8, 2019. The workshop saw three unique co-located events on April 7-8, 2019 viz the TCS-TIFR Quantum Computing Symposium, the First India Performance Workshop and a first Performance Modeling and Simulation Hackathon Training Event.

Workshop On Scilab

The Teaching Learning Centre (ICT) under the ‘Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT) supported by the FOSSEE and the SpokenTutorial projects conducted a one-day ‘Coordinators Workshop on Scilab’ on

April 16, 2019. The workshop was a blended training programme that used A-VIEW for live interactions and Spoken Tutorials to learn Scilab. The workshop was inaugurated by **Prof. A K Suresh**, Deputy Director (AIA), **Prof. Kannan Moudgalya**, Principal Investigator, TLC (ICT), Spoken Tutorial & FOSSEE briefed the participants about the workshop schedule and the Spoken Tutorial methodology. **Prof. Madhu Belur**, Department of Electrical Engineering explained the participants about the capabilities and advantages of using Scilab. More than 160 remote centres participated in the workshop.

Massive Scaled Linux Workshop from Myanmar

The Teaching Learning Center (Information Communication Technology), IIT Bombay organized Linux Workshop from Myanmar on August 23, 2019, funded by the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT), MHRD, Government of India. Prof. Kannan Moudgalya, Principal Investigator, TLC (ICT), Spoken Tutorial & FOSSEE, visited MIIT in Myanmar to explore how effectively the benefits of the education technology can be transferred to Myanmar. He addressed more than 3500 college teachers across 120 remote centres in India from MIIT, Mandalay through A-View software as a technology demonstration.

World’s First Massive Hardware Workshop Using eSim

The Teaching Learning Center (Information Communication Technology), IIT conducted the first-of-its-kind hardware workshop on September 21, 2019 for more than 3500 college teachers through more than 120 remote centers spread across India, including one in Myanmar using a free software named “eSim”, developed by the FOSSEE project, under the aegis of Pandit

Madan Mohan Malaviya National Mission on Teachers and Teaching, MHRD, Government of India.

Prof. Kannan Moudgalya, Principal Investigator, TLC (ICT), Spoken Tutorial & FOSSEE inaugurated the program. Mr. N. K. Mohapatra, CEO, Electronic Skills Sector Council of India (National Skill Development Corporation) was the guest of honour. Prof. Pramod Murali, Department of Electrical Engineering, the eSim course Instructor, gave the introductory remarks.

The topics covered in the workshop includes “Schematic creation and simulation; simulating an astable multivibrator”, “mapping components and footprints; setting parameters for PCB Design” and “Create Gerber files”.

Workshop on Renewable Energy from Ocean: Potential along Indian Subcontinent

The Department of Civil Engineering at IIT Bombay organised a nation workshop on “Renewable Energy from Ocean: Potential along Indian Subcontinent” during September 30 - October 1, 2019. The workshop was a kick-start event for various academic, research and knowledge dissemination activities as part of the project funded under Scheme for Promotion of Academic and Research Collaboration (SPARC) launched by MHRD (Ministry of Human Resource Development, Government of India). The workshop highlighted different aspects of marine renewable energies, including identifying potentials, selection criteria for suitable existing or innovate sustainable technologies adoptable to Indian conditions and to understand the environmental, ecological & socio-economic impacts.

Experts from University of Edinburgh and UK's sustainable energy company spoke about innovative technologies of wave and tidal energy

converters and success case studies during the workshop. Talks from experts from various research & academic institutes and other Indian industry stakeholders, such as MoES, NIOT, NIO, IITs, NITs, ONGC were also organised during the workshop.

Global Student Solar Assembly workshop was held on October 2, 2019

A Global Student Solar Assembly workshop involving over 1 million students from 100 countries across the world was organised at IIT Bombay on the occasion of 150th birth anniversary of **Mahatma Gandhi** on October 2, 2019. IIT Bombay campus hosted around 1400 students from various schools and institutions who assembled with their own lamps and took a pledge to become student solar ambassadors towards protecting the environment.

Lakhs of students simultaneously participated in the event across the country at multiple locations including hospitals, beaches, schools, NGOs, jails, etc. apart from the 1000s of schools across India and in 100s of countries across the world. **Dr Srikumar Banerjee**, Ex-Chairman, BARC was the chief guest for the event at IIT Bombay. The event marked the culmination of Gandhi Global Solar Yatra (GGSY) initiated by Prof. Chetan Singh Solanki, Department of Energy Science and Engineering.

17th NAMIS Workshop Nano and Microsystems for fundamental, medical and industrial applications

The Indian Institute of Technology Bombay and CNRS jointly organized 17th NAMIS International Workshop 2019 during November 25-27, 2019 at IIT Bombay. The workshop covered talks by eminent international researchers in the domain for collaborative discussions and exchange of ideas.

International Workshop on “QCD with Electron-Ion Collider (QEIC)”

The Department of Physics, IIT Bombay organized international workshop on “QCD with Electron-Ion Collider (QEIC)” during January 4-7, 2020 at IIT Bombay

Hindi Cell

Hindi Cell is actively engaged in providing support for implementation of Hindi in the Institute. The Institute’s circulars, office orders, registers, forms, visiting cards, signboards and degree certificates are prepared in bilingual form. Hindi workshops were conducted during the year for staff of the Institute. The cell continues to send Hindi synonyms of the administrative terms through the Institute’s email.

“Hindi Pakhawada” was celebrated during September 1-14, 2019, where competitions in Hindi essay writing and translation were

organised for the student and staff members of the Institute.

Hindi Book exhibition was jointly organized by the Central Library and Hindi Cell during September 3-5, 2019 to encourage reading habit of the Hindi books of all the staff and students of the Institute. Smt. Sunita Sakhare, Head of the Department of Hindi was the Chief Guest of the Hindi Diwas. Prof. A.K. Suresh, Deputy Director (AIA), IIT Bombay felicitated the winners of the competition in Hindi with certificates and cash awards.

Regular meetings of the Official Language Implementation Committee of the Institute were conducted during the year for increasing the use of Hindi in official work. Smt. Suniti Sharma, Director (OL), MHRD inspected the implementation of Official Language Hindi in the Institute on January 21, 2020. A one-day workshop was also organised by the Hindi cell for the senior officers of the Institute to promote the use of Hindi in official work.



FACILITIES

Infrastructure Development

During 2019-20, four major infrastructure projects namely construction of Research Park, Hostel No 17, Type 'B' housing 78 flats (Building No. B-25) and combined building for Society for Innovation and Entrepreneurship (SINE), Industrial Research and Consultancy Centre (IRCC) and IDC School of Design are in good progress. The Institute is making sincere attempts to cover the setback received in executing projects from COVID-19 pandemic. Apart from these projects, construction of Vertical extension to School of Management building is nearing completion.

During this year, the new guest house called Padmavihar Guest House and Department of Energy and Environment building have been certified as '4-STAR' and '3-STAR' by the Green Rating For Integrated Habitat Assessment (GRIHA) - an initiative of Ministry of New and Renewable Energy of Government of India, respectively.

Some of the building projects that would be constructed in the near future include construction of: Centre of Propulsion Technology (COPT) building in Paspoli area,

Centre for Entrepreneurship building (adjacent to Institute's Central Library), a new building behind the Department of Humanities and Social Sciences, Structural retrofitting of Main Building and other miscellaneous works in the Department of Energy and Environment building.

Other buildings in pipeline are Central Animal Facility, Nano Centre building (under IOE), Hostel 19 (towards north side of Hostel 18), 400 married students building (behind QIP building), One Type-II staff quarters tower 78 flats and one more new B-Type tower, etc.

In order to counter spread of COVID-19 pandemic and also to safeguard faculty, staff and students, number of hygiene measures, like foot-operated door openers, foot operated sanitizer stands, thorough virus disinfectant measures, etc. are being implemented on war footing basis.

In keeping the campus surroundings clean and hygienic, spitting is banned in the campus and offenders (will be) penalized promptly.





Central Library

The Central Library, IIT Bombay housed in a huge 3-storey building having central air-conditioned facilities with state-of-the-art amenities provide a vibrant ambiance to the students, faculties, staff, alumni and corporate/ member users for study, research and access to library resources. The services of the library are backed by efficient and courteous staff. It holds a vast collection of books, back volume of journals, monographs, standards, reports, thesis/ dissertation and current journals/ magazines etc., in the varied areas of engineering, sciences, technology, humanities and social sciences both in print and electronic format.

The institutional repository of IIT Bombay publications attracts large number of users from around the world throughout the year which has 25,278 publications.

The library collection was used by 11,000 members during the year. The institutional repository of IIT Bombay has over 22,258 records. During this year, 709 Master's degree dissertations, 26 MPhil dissertations, 416 PhD theses, and 183 Dual Degrees dissertations were submitted online.

The Central Library continues to provide access to more than 20,000 e-journals and e-resources and has added about 3568 volumes including books, theses, reports, standards, pamphlets, e-books and other reading materials during the year. All the library collection can be accessed through online-public access catalogue.

The Central Library also render user-services like reference, consultation, document delivery services, book lending, arranging materials from other libraries through inter-library-loan, providing the book bank facility for IIT Bombay students belonging to economically and socially weaker sections of the society and organizing the user awareness programmes to enhance their awareness about library resources, services and activities. The library allows users to self check-out books as well as renew borrowed books online. It facilitates inter-library-loan facilities of books and other informational documents for its members as and when required. It also provides internship facilities to Library Science graduates. It handled over 79,593 circulation transactions of books and other documents for its members

during the year. Central Library also offers services to industry and corporates, IIT Bombay alumni and engineering (educational) institutions, professional members and has earned over Rs. 14.65 lakh for the services rendered.

The library is open from 0900 to 2300 hrs on all working days and from 1000 to 1700 hrs on holidays (except three national holidays and two festival holidays). The library remains open till 0100 hrs on all days during examinations. Round-the-clock air-conditioned reading hall facility with 150 seating capacity for the bonafide users of the library is also available. Even during the COVID19 global pandemic, access to the entire digital resources has been through remote access and the library staffs are proactively providing online reference services through email, social media, whatsapp and mobile calls.

User Education Programmes: Central Library had organised following workshop for the benefit of Institute researchers during the year:

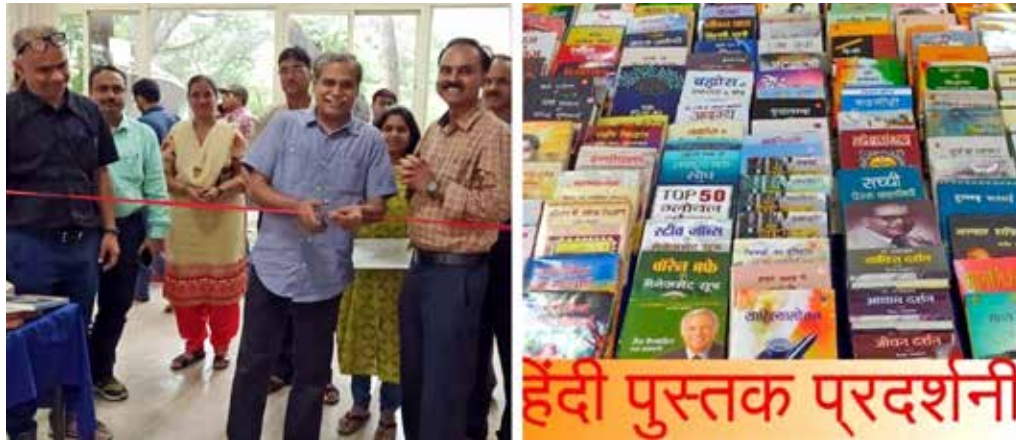


Participants during Author's Workshop Event

- 'IOP Author's Workshops' on September 4, 2019 with speakers Dr. Antigoni Messaritaki and Dr. Jennifer Sanders from IOP Publishing, UK.
- Workshop on Elsevier's Scopus, Engineering Village, Reaxys and Mendeley on September 11, 2019
- 'Research Writing and Science Communication' workshop on September 13, 2019 with speakers Prof. Arnab Bhattacharya, Department of Condensed Matter Physics and Materials Science, Tata Institute of Fundamental Research, Mumbai; Dr. Shivane Shah, Senior Managing Editor, Impact Science, Cactus Communications – Medical Communications; and Ms. Harini Calamur, Content Director, Editage and Impact Science
- 'Springer-Nature Author Workshop' on February 26, 2020 with speaker Ms. Swati Meherishi, Executive Editor, Applied Science and Engineering at Springer

Hindi Pakhwada

Central Library celebrated 'Hindi Pakhwada' by organizing Hindi book exhibition during September 12-13, 2019 to encourage faculty, staff and students to read Hindi books. The exhibition displayed latest Hindi books from three book suppliers and 118 books recommended by users were procured.



Prof. Anirudha Joshi, Convener and Library Committee members inaugurated Hindi Book Exhibition on September 12, 2019

Library Visitors: Around 1000 visitors visited the Central Library from various schools/ colleges/ institutes from India and abroad during 2019-20.



Select photos of Library visitors during 2019-20

Librarian's Day Celebration

The Central Library celebrated Librarian Day which is Dr. S. R. Ranganathan's 127th Birth Anniversary on August 13, 2019. Dr. S. R. Ranganathan is known as father of library movement in India. The celebration was graced by the presence of Prof. Subhasis Chaudhuri, Director, Prof. Anirudha Joshi, Convenor, Library Committee, Dr. R. Premkumar, Registrar and other functionaries. Following new services were launched by the Director Prof. Subhasis Chaudhuri on the occasion: Launch of Books Issue from Children Collection; Launch of E-reader Service (Kindle) for Children from Diamond Jubilee Fund. Prof. Anirudha Joshi and Dr. Premkumar,

Registrar, and Library staff donated books to Prof. Parag Bhargava who is managing library (free-of-cost) for underprivileged people staying near Powai. The celebrations included various activities like quiz for campus children, essay writing competitions and skill test for library staff. The winners in the competitions were felicitated during the event.



Launch of E-reader Service (Kindle) by Prof. Subhasis Chaudhuri, Director, Prof. Anirudha Joshi and Dr. R. Premkumar, Registrar

Dr. Manju Naika, Chief Library Officer attended the Librarians Day/ Librarian's Appreciation Day event organized by Wiley, Royal Society of Chemistry and American Chemical Society and received highest publications and highest usage awards. He also delivered invited talk on "Importance of Resources for Institution Ranking and Reputation" at Wiley Library Award 2019 function in New Delhi.



Prof. Subhasis Chaudhuri, Director, IIT Bombay handing over the prizes to essay competition winners



On the occasion of Librarian Day, Prof. Anirudha Joshi and Dr. Premkumar, Registrar donated books to the library for underprivileged in Powai managed by Prof. Parag Bhargava



Dr. Manju Naika, Chief Library Officer receiving award from Wiley Publishers for highest number of publications in Wiley Journals from IIT Bombay



Dr. Manju Naika, Chief Library Officer receiving award from RSC publisher for the highest number of OA publications in RSC Journals from IIT Bombay

Computer Centre

Computer Centre Activities toward enabling online semester Autumn 2020

Direct Initiatives:

- 1) Rolling out Single Sign On (SSO) with two factor authentication (2FA): IIT Bombay network will interface with outside world at a significantly enhanced level due to the online semester activity. As a security feature for CC Services, SSO will ensure that users connecting from outside are legitimate. From users point of view, a single sign on will enable them to use various services without the need to logging in again
- 2) Rolling out of G Suite for Education integrated with IIT Bombay SSO at Institute level: This facility brings Google's features and services at the fingertips of IITB users, including enhanced space in Google, drive, richer features in Google Meet, etc. Faculty can use Google Meet for online classes
- 3) Rolling out of Microsoft Azure for Education integrated with IITB SSO at Institute level: Same as above but for subscription services of microsoft being available to all users. Faculty can use MS Teams for online classes
- 4) Cisco's Webex learning centre for Higher Education: This purchase will enable each faculty member and student an account for conducting online classes
- 5) Reverse Proxy with SSO authentication for access of ASC server (all academic records of IITB) from outside campus network: Since large number of connections will take place from outside, and to secure data in ASC, reverse proxy server implemented so that accessing from external networks is more secure
- 6) New web portal for validation of new student IITB network access account for Autumn 2020: All new master and PhD students had to connect from outside, which required new websites to be created
- 7) Enhanced VPN access: New VPN services have been rolled out which can allow up to 1,500 simultaneous VPN connections to IITB network
- 8) Enabled VPN access for concurrent network license servers for technical computing software: In order for students to use our software from outside, CC enabled VPN access. Indirect Initiatives
- 9) Enhanced monitoring of traffic on all network switches: To ensure that faculty members can teach from their residence or department, all switches are being monitored for downtime in a continuous fashion
- 10) Enhanced cybersecurity monitoring: All activities on outward facing servers of IIT Bombay are being monitored for any unusual activity

Centre For Distance Engineering Education Programme

The Centre for Distance Engineering Education Programme (CDEEP) continued its functioning as a support unit to various 'outreach' activities of the Institute. During the year, CDEEP recorded 34 courses, covering 14 disciplines at IIT Bombay.

During the year, CDEEP provided 13 semester long courses content to National Programme on Technology Enhanced Learning (NPTEL) which are offered as Massive Open Online Course (MOOC). The Centre has an archive of 329 full semester long courses.

This year, contents of 24 courses were supplied to 17 individuals on demand. The viewership (enrolled) of courses through web stood at 2046 for 288 active courses.

The Centre continues to offer (recorded)

current semester courses with certification showing grades by the course faculty to distant participants as individuals or as a group.

The Centre covered Institute events such as Annual Convocation, Foundation day, which were webcast live having more than 9000 viewers. The Centre covered other 130 events including Institute colloquia, seminars and talks by distinguished speakers on campus.

During the lockdown period due to COVID 19 pandemic in March 2020, CDEEP offered its online services to create video courses for the current semester and shared it with IIT Bombay students. A detailed documentation for "making course videos", "sharing videos with students" and "different distance learning tools for online student interaction" were/ is made available on CDEEP website.



DEPARTMENTS/ CENTRES/ SCHOOLS AND INTERDISCIPLINARY GROUPS

Science & Engineering Departments:

The engineering departments at IIT Bombay offer undergraduate and postgraduate programmes leading to BTech, BS, MTech and PhD degrees. The five-year Dual Degree programme pioneered by the Institute in 1996 offers a BTech degree in a basic discipline and an MTech degree with specialization in a field on its completion. This programme is now offered by all engineering departments. The Science departments at IIT Bombay were set up to provide basic grounding in Science and Mathematics to engineering students. However, apart from providing core courses in undergraduate programmes, these departments also offer postgraduate courses which lead to MSc or PhD. Following are the Science & Engineering Departments at IIT Bombay:

- ▶ Aerospace Engineering
- ▶ Biosciences & Bioengineering
- ▶ Chemical Engineering
- ▶ Chemistry
- ▶ Civil Engineering
- ▶ Computer Science and Engineering
- ▶ Earth Sciences
- ▶ Electrical Engineering
- ▶ Energy Science and Engineering
- ▶ Environmental Science and Engineering
- ▶ Mathematics
- ▶ Mechanical Engineering
- ▶ Metallurgical Engineering and Materials Science
- ▶ Physics

Arts and Humanities Department:

The Arts and Humanities Department at IIT Bombay were set up to familiarize the students of Science and Technology studies with the broader social, cultural, economic, ethical and humane concerns underlying social change. The advanced courses offered at the PG level aim at cultivating critical thinking and enhancing the analytical

capabilities of students engaged exclusively with the study of these concerns. However, these departments offer postgraduate courses which lead to MSc, MPhil, MDes, and PhD degrees.

- ▶ Humanities and Social Sciences

Schools:

- ▶ IDC School of Design: The school offers an excellent environment for academics, research and applications in the field of design. The centre interacts with industries and institutions for promotion and awareness of design
- ▶ Shailesh J. Mehta School of Management (SJMSoM): The school offers postgraduate programmes in new, emerging areas and aim to expand the scope of the academic programmes in the Institute. They have been set up with substantial support from IIT Bombay alumni and industry.

Centres/ Interdisciplinary Groups:

Some of the Centres and Interdisciplinary groups offer postgraduate programmes and reflect the Institute's multi-disciplinary approach and emphasis on staying with leading-edge technologies in its academic approaches. Following are the Centres at IIT Bombay:

- ▶ Centre of Studies in Resources Engineering
- ▶ Centre for Technology Alternatives for Rural Areas
- ▶ Centre for Formal Design and Verification of Software
- ▶ Centre for Urban Sciences and Engineering
- ▶ Centre for Research in Nanotechnology and Science
- ▶ Centre for Policy Studies
- ▶ Education Technology
- ▶ Industrial Engineering and Operations Research
- ▶ Systems and Control Engineering



- ▶ Corrosion Science and Engineering
- ▶ Climate Studies

Other Centres/ Research Facilities:

Other Centres host a large number of sophisticated equipments and advanced facilities for carrying out R&D activities at IIT Bombay. Following are the research facilities at IIT Bombay:

- ▶ Application Software Centre
- ▶ Center for Aerospace Systems Design & Engineering
- ▶ Computer Centre
- ▶ Centre for Distance Engineering Education Programme
- ▶ Desai Sethi Centre for Entrepreneurship
- ▶ IITB-Monash Research Academy
- ▶ National Centre for Aerospace Innovation and Research
- ▶ National Centre for Mathematics
- ▶ Tata Centre for Technology and Design
- ▶ Wadhvani Research Centre for Bioengineering
- ▶ Centre of Excellence in Steel Technology
- ▶ Centre of Propulsion Technology
- ▶ Biomedical Engineering and Technology Incubation Centre
- ▶ Centre for Computational Engineering and Science
- ▶ Centre of Excellence in Nanotechnology
- ▶ Forbes Marshall Energy Efficiency Laboratory
- ▶ Geospatial Information Science and Engineering
- ▶ National Centre for Photovoltaic Research and Education
- ▶ National Centre of Excellence in Technology for Internal Security
- ▶ National Mission on Education through ICT
- ▶ National Solar Thermal Research, Testing & Simulation Facility
- ▶ Tata Teleservices- IIT Bombay Centre of Excellence in Telecommunication
- ▶ Water Innovation Centre: Technology, Research and Education (WICTRE)

Department of Aerospace Engineering

Established in 1966-67 as the Department of Aeronautical Engineering, it was renamed as the Department of Aerospace Engineering in 1992. The department has 26 regular faculty members. The academic programs of the Aerospace Engineering department focuses mainly on science and engineering/ technology of flight vehicles and their sub-systems. The curriculum focuses on fundamentals of fluid dynamics, propulsion, structural mechanics, vehicle dynamics, control and guidance etc., as well as applications of these fundamentals to the analysis and design of aerospace vehicles.

Academic Programmes: The Department runs strong undergraduate and graduate programs in Aerospace Engineering and carries out basic and applied research as well as continuing education activities in various sub-disciplines of Aerospace Engineering such as aerodynamics, propulsion, structures, dynamics, control and design. The academic programs include the four-year BTech degree program, five-year Dual Degree program, two- year MTech program and the PhD program. The Department has around 350 students, out of which about 120 are graduate students and 230 are undergraduate students. The Department has MTech and PhD students from armed forces, HAL, ISRO, DRDO and various other government and private agencies related to Aerospace Engineering.

	Student intake	Degrees awarded
BTech	73	47
MTech	64	35
DD (BTech+MTech)	0	15
PhD	18	15

R&D Activities: During the year 2019-20, the Department continued to be actively engaged in teaching, research and other professional activities such as workshops, seminars, industry interactions, projects, professional development

course modules, etc. As a result of these activities, the Department has published over 40 papers in international/ national journals, over 60 papers in international/ national conference proceedings and carried out sponsored and consultancy projects for government organizations like ISRO, DRDO, DRDL etc. and as well as for private agencies.

	Sponsored Projects	Consultancy Projects
New Projects	09	03
Ongoing	18	08
Completed	04	09

The Department has extensive experimental and computational facilities that support its research and teaching activities. Among these are:

- a) aerodynamic lab houses wind tunnels, laser doppler velocity meter (LDV), anechoic chamber
- b) instrumentation lab has experimental set-ups for control education, in addition to sensors, actuators and other accessories as part of mechatronics related facilities
- c) structures lab has facilities for composite fabrication, testing, apart from experimental set-ups for demonstrating static and dynamic aspects of structures
- d) propulsion lab houses axial flow compressor research test rig, low speed low turbulence wind tunnel, diffuser test rig centrifugal blower and motor control unit for air delivery
- e) MAV Lab has facilities for building and flying unmanned aircraft models, hardware in loop simulation for MAVs.

The Department also has powerful serial and parallel computers, which provide computational resources for sophisticated flow simulation tasks like in computational fluid dynamics and computational electromagnetics. The Department has supported many students' technical activities like Mars Rover, Student Satellite, Autonomous UnderWater Vehicle, Unmanned Air Vehicle etc. Students are also engaged in national and international competitions as participants/ organizers.

Notable Activities in the Department:

FEM software development:

Finite Element Analysis of Structures is ISRO's structural analysis software based on Finite Element Method (FEM) realized by Structural Engineering Entity of Vikram Sarabhai Space Centre (VSSC). Following a MoU with VSSC, an elasto-plastic module capable of doing small deformation plastic simulations of structures has been developed at the Department and transferred to VSSC for implementation in FEAST^{SMT}. The module can handle linear and nonlinear isotropic and kinematic hardening for 2D plane stress, plane strain and axisymmetric elements and 3D elements.

Open-Source Software packages/ versions developed in the Department released:

Open -Source software is important as it is freely available for anyone to use, and modify. New version of an online programming testing platform called `online_test` (https://github.com/FOSSEE/online_test/) was released. A new package called `Compyle` (<https://github.com/pypr/compyle>) that allows one to use different high-performance computing architectures easily was made available. A new version of `PySPH` (<https://pysph.rtfid.io>) which is an open source framework for Smoothed Particle Hydrodynamics (SPH) simulations was also released. `Automan` (<https://github.com/pypr/automan>) is a new framework for reproducible computing which was also released this year. A new version of the popular 3D scientific data visualization package called `Mayavi` (<https://github.com/enthought/mayavi>) was developed. Similarly, a new version of `ViXeN` (<https://vixen.rtfid.io>), a simple tool to facilitate easily viewing, adding and annotating metadata associated with media is released.

The department conducted the 7th P J Paul Memorial Combustion Researchers Meet on February 14 & 15, 2020. The meeting was hosted by Prof. Sudarshan Kumar and Prof. Kowsik Bodi.



Photo session by Guests during 7th P J Paul Memorial Combustion Researchers Meet

Department of Biosciences and Bioengineering

The Department of Biosciences and Bioengineering comprises two broad areas representing Biotechnology and Biomedical Engineering. The Department aims to create an ambience for the efficacious pursuit of scholarly activity in research and education and endeavors to produce the leaders of tomorrow in this field.

Academic Programmes: The academic Programme currently consist of the DBT-supported MSc Biotechnology programme, MTech in Biomedical Engineering programme and the PhD programme. All these programmes are well-regarded nation-wide. The Department has 14 Post-Doctoral Fellows.

	Student Intake	Degree Awarded
MSc	26	23
MTech	25	26
PhD	34	23
DD (MSc+PhD)	-	05
DD (MTech+PhD)	-	04

R&D Activities: Research in the Department

encompasses both basic biology and applied bioengineering topics.

A high-level of research output is ensured by the research infrastructure in the Department that has been built up assiduously over the years. Miscellaneous cutting-edge facilities such as MASSFIITB (Mass Spectrometry facility), 3-D Laser Lithography have been extremely proved beneficial.

Extensive interactions with various groups in Electrical Engineering, Chemical Engineering, Aerospace Engineering, Computer Science, Mechanical Engineering, Material Sciences, Physics, Chemistry, and Mathematics make the departmental research activities truly interdisciplinary. In addition, the Department faculty members are collaborating with numerous faculty members of national and international institutes.

	Sponsored Projects	Consultancy Projects
New Projects	20	04
Ongoing	79	0
Completed	18	0

Several symposiums/ workshops/ CEP courses were organized including PROTEOMICS BOOTCAMP - HR-LC-MS/MS Workshop (March 2020), Big Data and Precision Medicine (March 2020), OMICS Technologies for Life Sciences (September 2019), Newton-Bhabha India-UK Researcher Links Workshop (jointly organized with University of Bath, November 2019), Biophysics Paschim (2019), Biology for Engineers (2019), Laboratory and Ergonomic Safety for Engineers (2019).

Department of Chemical Engineering

The Department of Chemical Engineering at IIT Bombay was started in 1958. Today the Department is recognized as a leading department in India primarily because of its strong academic programmes, large faculty strength and diverse range of research areas. Currently, the Department has 41 faculty members, 14 Emeritus Fellows/ Professor Emeritus/ Adjunct/ Visiting Faculty and 14 Post- doctoral Fellows/ Research Associates.

Academic Programmes: The academic programmes offered by the Department are BTech (4- year), MTech (2-year), Dual Degree (5-year) and PhD programme (5-Year).

	Student Intake	Degrees Awarded
BTech	137	118
DD (BTech+MTech)	-	05
MTech	60	27
PhD	33	19
PGDIIT	-	02

The Department has seen a steady increase in the strength of doctoral students resulting in a vibrant research culture. This is reflected in a large output in research as seen by the publication record of the Department (4 journal articles per faculty per year).

R&D Activities: The Department has a strong focus on education and research. The diverse

research areas of the Department include Biological Systems Engineering, Soft Matter Engineering, Process Systems Engineering, Catalysis and Reaction Engineering, Thermodynamics and Molecular Simulations and Energy, Environment & Sustainability. The Department has developed strong industry interaction and the faculty has been engaged in supporting various industry consultancy projects. The industry reciprocation has been strong in terms of responding to various initiatives such as Students-Industry meet, Course on Wheels, Role Model Lecture Series and Sponsorship support to various department events.

	Sponsored Projects	Consultancy Projects
New Projects	25	23
Ongoing	60	21
Completed	19	10

During 2019-2020, the Department received a significant grant from the government and private agencies towards various sponsored and consultancy projects.

Department of Chemistry

The Department of Chemistry at IIT Bombay is one of the premier research and teaching hubs for chemical and chemistry-driven interdisciplinary sciences in India. Today, the department houses 40 faculty members with diverse expertise in various areas of Chemistry. The faculty is strongly supported by a large number of motivated and talented young students.

Academic Programmes: The Department offers six academic modules including Masters in Chemistry (2-Year), BS in Chemistry (4-year), Integrated MSc, Integrated (MSc+PhD) and PhD programmes. The General Chemistry programme of the Department harbors two theory and two laboratory courses in the core curriculum of the first year BTech program.



	Student Intake	Degrees Awarded
BS (4-Year)	34	21
MSc (5-Year)	0	05
MSc (2- year)	45	41
DD (MSc + PhD)	0	01
BS + MSc	-	03
PhD	75	33

R&D Activities: Research problems of basic, applied and interdisciplinary nature are actively pursued in the department through sponsored and industrial research projects. Major thrust areas of research include Biophysical Chemistry, Coordination Chemistry, Bio-inorganic Chemistry, Organometallic Chemistry, Bio-organic Chemistry, Chemical Biology, Theoretical Systems Biology, Membrane Biology, Chemistry of Natural Products, Synthetic Organic Chemistry, Photochemistry and Spectroscopy, Polymer Chemistry, Thermodynamics, Electrochemistry, Solid state Chemistry and Physics, Catalysis and Theoretical Chemistry.

	Sponsored Projects	Consultancy Projects
New Projects	37	08
Ongoing	55	16
Completed	30	02

The year 2019-2020 witnessed many great events such as scientific conferences, workshops such as Mumbai workshop on Quantum Chemistry, June 2019 & Ultrafast Sciences 2019, November 2019 and prestigious awards brought to the department by the hard work of faculty and students alike. The department in December 2019 hosted symposium Magnetism and Photomagnetism. The symposium witnessed several speakers of international repute from India and abroad. IITB- FU Berlin workshop entitled “Emerging

Trends in Chemistry and Materials” was held in the Institute in August 2019.

Several eminent personalities visited the department during the year and delivered lectures. **Prof. G. Vijayakumaran Nair**, NIIST-CSIR Trivandrum gave “Professor K. D. Deodhar Memorial Lecture” on October 04, 2019. In the year 2019-2020, approximately 60 national and international scientists delivered invigorating distinguished guest lectures on varied research themes aligning with the department focus.

MoU has been signed between Prof. Devang Khakhar, Former Director, IIT Bombay and Mr. Kedar Vaze (on behalf of donor Mr. Rasiklal Hemani) for setting up a laboratory for nurturing research and creation of new knowledge for the Indian Speciality Chemical Industry (Indian Fragrance and Flavour Industry) in the Chemistry Department in 2019.

Department of Civil Engineering

The Department of Civil Engineering, one of the founding Departments of IIT Bombay, over the years, has grown tremendously and is now recognized as one of the best and major engineering Departments in the country and ranked highly in the world for Civil Engineering. With its multifaceted faculty, the Department continues to maintain and cultivate its strong links with the building and construction industry and academic and research institutions both within and outside the country. Besides high-quality teaching at both UG and PG levels, the Department is actively involved in basic and applied research and consultancy and provides high-quality technical advisory support through various R&D projects and consultancy services to various organizations. The Department has attracted a significant amount of sponsored

research consultancy funding from government and private agencies. The Department has 49 full-time and three adjunct faculties.

Academic Programmes: The Department of Civil Engineering offers BTech, MTech and PhD programmes with its additional Dual Degree (BTech-MTech) programme in Civil Engineering.

The Department also hosts a Postdoctoral Fellowship programme in various specializations sponsored by Institute, Science and Engineering Board (SERB), sponsored research and other agencies.

	Student Intake	Degrees Awarded
BTech	137	106
DD (BTech-MTech)	05	05
MTech	83	56
DD (MTech-PhD)	08	03
PhD	44	31
PGDIIT	-	04
MS by Research	-	01

R&D Activities: The Department has a strong focus in the research areas of Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Transportation Systems Engineering, Remote Sensing, Ocean Engineering, and Construction Technology and Management. The Department has 17 high-end teaching and research laboratories in these areas. The Department is actively involved in basic and applied research and consultancy and provides high-quality technical advisory support through various R & D projects and consultancy to various organizations. Through academic and sponsored research, faculty and students have published a large number

of research publications in quality journals having a high impact factor. The Department has attracted significant amount of sponsored research funding from government and private agency and delivered excellent output in terms of implementable solutions.

	Sponsored Projects	Consultancy Projects
New Projects	29	~513
Ongoing	52	~262
Completed	20	~260

Outreach Activities: The Department disseminates the knowledge gained from its high-quality research through training programs and interacts with world-renowned personalities through workshops and conferences. During 2019-20, the Department has conducted quality improvement and continuing education programmes for the academicians, students and field-engineers. 26 distinguished academicians from world-renowned universities visited the Department and enlightened faculty and students with their seminal presentations. The students and faculty have won prestigious national and international awards and recognition and continue to bring laurels to the Department and the Institute. 14 of the faculty members have won 16 prestigious awards this year. Quite a good number of our faculty members continue to be Editors or Associate Editors or Members of the Editorial Boards of more than 20 reputed International/ National Journals.

Department of Computer Science and Engineering

The Department of Computer Science and Engineering is the largest department among CSE department of Institutes in India. The Department has 45 faculty members, including two visiting faculty and one adjunct faculty.

Academic Programmes: The Department offers Bachelor of Technology (BTech), Master of Technology (MTech) and Doctor of Philosophy (PhD).

	Student Intake	Degrees Awarded
BTech	132	113
MTech	107	101
DD (MTech+PhD)	-	03
PhD	18	07
MS	-	02

R&D Activities: The research and teaching in the Department span a wide spectrum of areas including algorithms, animation, artificial intelligence, compilers, combinatorial optimization, computer vision, data mining, embedded systems, formal methods, functional programming, e-commerce, graphics, databases, image processing and analysis, machine learning, medical image computing, mobile computing, natural language processing, object-oriented systems, parallel and distributed processing, programming languages, reinforcement learning, query processing and optimization, real-time systems, security, speech processing, software engineering, systems, theoretical computer science, wireless and sensor networks, and verification.

	Sponsored Projects	Consultancy Projects
New Projects	21	21
Ongoing	76	15
Completed	14	05

Department of Earth Sciences

The Department of Earth Sciences was constituted in 1982 from the erstwhile Geology section of the Department of Civil Engineering of IIT Bombay (where an MSc programme in Applied Geology was offered since 1964).

The Department draws strength from the reputation of its 26 faculty members with specializations covering a wide spectrum of research areas in Geosciences, including both Geology and Geophysics. The faculty members of the Department are actively engaged in both teaching and research and contribute significantly towards the advancement of different Geoscience disciplines. The close links that the Department enjoys with the industry and research organizations has helped towards elevating the level and quality of research work and facilities. The Department has nearly 115 research scholars and 5 post-doctoral fellows.

Academic Programmes: The Department offers academic programmes leading to MSc (Applied Geology), MSc (Applied Geophysics), MTech (Geo-exploration), MTech (Petroleum Geoscience), and PhD degree programmes. All the core and elective courses included in these programmes have been specifically designed to meet industry standards and research requirements.

	Student Intake	Degrees Awarded
MSc (2-year)	48	44
MTech (Geo-exploration, Petroleum Geoscience)	33	20
PhD	20	06
DD (MSc+PhD)	02	01
PGDIIT	01	-

R&D Activities: The research areas are diverse and include igneous and metamorphic petrology, sedimentology, microbial signature in siliciclastic sediments and recent sediment analysis, organic geochemistry, micropalaeontology, microfacies analysis, ichnology, structural analysis, neotectonics, petroleum geology, remote sensing applications in mineral exploration and geomorphology,

ore petrology, kimberlite petrology, fluid inclusion studies, mathematical modeling of ore deposits, engineering geology, geomechanics, neural network modelling, earthquake and theoretical seismology, gravity and magnetics, electromagnetic, electrical resistivity, electrical signal processing, geophysical modeling and inversion, Petrophysics and rock physics, satellite geomagnetism and remote sensing. The Department has several state-of-the-art laboratories and research facilities including three major national facilities – 40Ar/ 39Ar Mass Spectrometer, Electron Probe Micro Analyzer (EPMA), and Imaging Spectroscopy laboratory.

	Sponsored Projects	Consultancy Projects
New Projects	08	06
Ongoing	21	04
Completed	05	04

Sponsored research projects, both in pure and applied geology, and geophysics and solid-earth geophysics, were taken up by the Department. Several eminent personalities visited the Department and delivered lectures. Notably, Dr. Prajka Mane from NASA Johnson Space Center, Prof. Mary S. Hubbard from Montana State University, Prof. Nicholas Christie-Blick from Columbia University, and Dr. Nils Lenhardt from the University of Pretoria delivered lectures on leading topics in the field of Earth Sciences. A workshop entitled “Integrated Reservoir Characterisation” in the oil and gas sector was organized by the faculty members of the Department through the Centre of Excellence in Oil, Gas and Energy to identify joint research projects in consultation with the oil and gas public sector units (PSUs).

Department of Electrical Engineering

Since its inception in 1957, the Department of Electrical Engineering has been active in teaching and research. Currently, the

Department has 68 faculty members and more than 1300 students.

Academic Programmes: Initially the Department began with three programs, namely, Bachelor of Technology (BTech), Master of Technology (MTech) and Doctor of Philosophy (PhD). Since 1996, the Department has been offering a five-year Dual Degree (Bachelor of Technology and Master of Technology) in the two specializations - Communications and Signal Processing, and Microelectronics. From 2019 under the revised curriculum, the Department will be admitting Dual Degree (DD) students post-JEE without a pre-assigned specialization. Depending on the students' interests, they will be able to choose the specialization after completing five semesters in the Institute. The Department has initiated to admit UG students from another department to MTech programme through Interdisciplinary programme.

Since 2019, the Department of Electrical Engineering at IIT Bombay offered six MTech specializations as Communication Engineering (EE1), Control & Computing (EE2), Power Electronics & Power Systems (EE3), Electronic Systems (EE5), Integrated Circuit & Systems (EE6) and Solid State Devices (EE7).

The Department has been offering admissions to Dual Degree (MTech + PhD) programmes since 2009. The Department of Electrical Engineering has a strong Department Academic Mentorship Program (D-AMP), under the aegis of the Institute Student Mentor Program (ISMP).

	Students Intake	Degrees Awarded
BTech	76	54
MTech	181	96
MTech+ PhD	0	04
DD(BTech+MTech)	72	70
PhD	62	37

R & D Activities: The Department is equipped with the state-of-the-art experimental and computational facilities for undertaking research and development, and consultancy activities in various fields. Research collaborators also include researchers from several national and international universities, and research organizations. The Department has a strong collaboration with industry in the past two decades and around 30 laboratories have been established through such collaboration.

Recently set-up laboratories include MeDAL Laboratory, Stochastic Laboratory, Applied Integrated Micro Systems (AIMS) Laboratory, iCas Laboratory. The Centers that have been set up in the Department include Centre for Excellence in Nanoelectronics funded by the Ministry of Communications and IT, National Centre for Photovoltaic Research set up in 2010 (MNRE), Tata Teleservices IIT Bombay Center of Excellence in Telecom setup in 2008, Bharti Center for Communications, Power Anser Lab (with support from TCS) and Power Electronics Simulation Center.

	Sponsored Projects	Consultancy Projects
New Projects	29	32
Ongoing	116	27
Completed	26	01

R & D Activities: The Department Industry Day was held on April 12, 2019. The event was a great success and witnessed participation from industry giants viz. Reliance Jio, Samsung, Tata Power SED, Tata Motors, Coca-Cola, BEL, Siemens, Hero, TVS Motor Company, Bharat Forge, L&T, Ubisoft, Viacom 18 and others. Industrial participants delivered talks that showcased their expertise spread over three broad themes: 5G/IoT, Strategic Electronics and Electric Vehicles. Faculty, students and research scholars interacted with a varied number of industry professionals during a student poster session.

Department of Energy Science and Engineering

The Department of Energy Science and Engineering is a unique blend of science and engineering faculty working on developing sustainable energy systems and solutions for the future. The Department has 25 core faculty and about 30 associated faculty.

Academic programmes:

The department offers several academic programmes that include the (BTech+MTech) Dual Degree programme with intake through JEE, the (MSc+PhD) Dual Degree programme with intake through JAM, the MTech programme in Energy Systems Engineering, the PhD programme, and a Minor in Energy Engineering programme. The student intake to these programmes for the 2019-20 academic session is given below.

	Student intake	Degree Awarded
BTech	-	02
DD (BTech+MTech)	35	48 (24)
PGDIIT	-	01
MTech	31	18
MS	-	01
PhD	24	19
MSc	-	03
MPhil	-	01
DD (MSc +PhD)	14	12 (6)

* For the dual degree programmes, the bracket shows the number of the graduated students.

Department activities:

The Department's research areas include renewables (solar PV and thermal, wind, and biomass), thermal and electrochemical storage systems, power systems and power electronics,

energy integration and energy efficiency, and nuclear energy. Some of the major ongoing projects are the National Centre for Photovoltaic Research and Education (NCPRE), the Indo-UK Clean Energy Research Centre, Intelligent Microgrids and Advanced Storage (IMASE), the IMPRINT projects on fuel cells and hydrogen storage, and the DST-IIT Bombay Energy Storage Platform on Hydrogen. A new interdisciplinary Centre of Excellence in Oil, Gas, and Energy with support from the Indian public sector companies (IOCL, ONGC, HPCL, BPCL, GAIL, OIL and EIL) was recently inaugurated to provide a competitive advantage to India's energy sector in the emerging business ecosystem driven by climate challenges, stressed resources, and disrupting technologies globally.

The '7th International Conference on Advances in Energy Research' (ICAER 2019) was held during December 10 - 12, 2019. Sponsored by DST-SERB, ONGC, and Coal India Limited, among others, the conference saw active participation from academia and industry. Special sessions on the future of coal research and industry innovations in energy were organized in addition to the several invited talks and paper and poster presentations. Two workshops – hydrogen storage and technical writing and publishing by Springer – were also organized. The conference witnessed several participants, more than 100 industry personnel showcasing presentation and talks.

A symposium on 'Energy Transition in the Industry sector', jointly organized by DESE, IIT Bombay and British Petroleum was held during February 25 - 26, 2020. The event witnessed 50 participants from both academia and industry. The themes covered in the various sessions were energy efficiency and benchmarking, renewable energy use in the industry, and

the next generation industrial processes and carbon capture and sequestration (CCS) in industry. The participants focused to work on a roadmap for the low carbon industry.

	Sponsored Projects	Consultancy Projects
New Projects	11	07
Ongoing	36	03
Completed	07	0

Department of Environmental Science and Engineering

The Environmental Science and Engineering Department (ESED) was established in 1985 as a Centre, and in February 2019, got the 'Department' status. The Department has a core group of 15 faculty members with a multi-disciplinary background and diverse research interests. In addition to the existing MTech, PhD programmes and the Dual Degree (MSc+PhD) programmes, the Department started a Dual Degree (BTech+MTech) programme in Autumn 2018 as well. The Department also offers a minor in Environmental Science and Engineering for undergraduate students from other departments in IIT Bombay. ESED also offers an Institute core course "Environmental Studies: Science and Engineering" to all undergraduate students in addition to the above-listed academic programmes.

Besides, the Department runs several elective courses for sensitizing students across all disciplines towards the urgent need for protection and restoration of the environment and the need for sustainable development.

Academic Programmes: The Department currently offers MTech, PhD, Dual Degree (MSc+PhD), Dual Degree (BTech+MTech) programmes in Environmental Science and Engineering with a strong focus in teaching and

research. The graduate program offered by the department prepares individuals for careers as engineers and scientists in Environmental Quality & Pollution Control. This program offers course work and research opportunities leading to the masters and doctoral degrees and ultimately enables the students to contribute to the solution of current and future environmental problems.

	Student Intake	Degrees Awarded
DD (BTech+MTech)	33	-
MTech	22	10
PhD	18	06
DD (MTech+PhD)	-	01
MSc	-	04
DD (MSc+PhD)	08	01
MS By Research	-	01

R&D Activities: The ongoing research activities of the Department are focused towards addressing the priority areas (local and global) set by major national agencies like Ministry of Human Resource Development (MHRD), Central Pollution Control Board (CPCB), State Pollution Control Board (SPCB), Ministry of New and Renewable Energy (MNRE), Department of Biotechnology (DBT), Ministry of Environment, Forest and Climate Change (MoEF), Council of Scientific and Industrial Research (CSIR), Department of Science and Technology (DST).

In addition, the Department has already established strong links and collaborations with leading industries, academic institutions, and national/ international agencies by conducting sponsored research and offering consultancy and technical services. The research activities of ESED are supported by excellent experimental

and computational facilities. The Department is also actively engaged in organizing workshops and CEP courses for the benefit of professional from other academic institutions, industries and governmental sectors.

	Sponsored Projects	Consultancy Projects
New Projects	09	11
Ongoing	09	13
Completed	03	04

Department of Mathematics

From its inception to the present, the Department of Mathematics has evolved and grown in several directions. In the last five years, this change has been particularly striking in terms of faculty recruitment, research output and the diversity of research pursued. To consolidate and sustain these achievements and to enable continued future growth, the Department strives for its goals and the challenges it faces.

The Department of Mathematics conducts basic, applied, and interdisciplinary research in varied areas of Mathematics, including Algebra & Number Theory, Analysis, Geometry and Topology, Combinatorics and Theoretical Computer Science, Partial Differential Equations and Numerical Analysis, and Probability and Statistics. The current faculty strength of the Department is 53. The year witnessed excellent contributions and achievements of faculty and students in research; interaction with industry and noted national and international institutes, universities and organizations and extended educational activities beyond the departmental academic programmes. The Department is also involved in teaching Mathematics-related courses in the BTech programme of the Institute.

Academic Programmes: The Department

offers two Masters Programme - one in Mathematics [MSc (MA)] and other in Applied Statistics and Informatics [MSc (ASI)], an integrated MSc programme and also a PhD programme. The Department launched the 'Bachelor of Science (BS) in Mathematics' during the Academic Year 2018-19. The programme is designed to build a strong foundation in the initial semesters while encouraging students to pursue more targeted interests in the second half of the programme through advanced elective courses within the Department of Mathematics. The curriculum also includes basic science courses and incorporates elective courses from the science, engineering and humanities disciplines, allowing considerable flexibility and academic freedom. There are minor programmes for undergraduates offered in both Mathematics and Statistics, an integrated MSc programme in addition to the core undergraduate curriculum.

	Student Intake	Degrees Awarded
MSc (MA)	30	26
MSc (ASI)	37	24
PhD	12	04
MPhil	-	01
MSc 5 Year	-	04

R&D Activities: Continuing with its tradition, the Department has further augmented its basic research, focusing in contemporary areas of fundamental, developmental and strategic importance as well as applied and interdisciplinary research. It is also engaged in productive collaboration with industries and reputed R&D departments in India and abroad.

	Sponsored Projects	Consultancy Projects
New	14	0
Ongoing	20	0
Completed	02	0

Department of Mechanical Engineering

The Department of Mechanical Engineering is one of the largest departments at IIT Bombay. It has a total of 60 faculty members involved in teaching and research, 1 Emeritus Fellow, 1 adjunct faculty and more than 1000 students along with around 250 enrolled PhD students. The Department hosts more than 20 Institute Post-doctoral fellows working in various laboratories.

Academic Programmes: The Department offers the undergraduate BTech and postgraduate program awarding MTech and PhD degrees. The postgraduate program offers specializations in the areas of thermal and fluid engineering, design engineering and manufacturing engineering. Dual degrees which confer a combined BTech + MTech and MTech + PhD are options which students can avail to accelerate their career advancement.

	Student intake	Degrees awarded
BTech	141	123
DD (BTech+MTech)	26	32
MTech	109	53
PhD	56	27
DD(MTech + PhD)	-	02
PGDIIT	-	03

R&D Activities: The Department continues to evolve in research and development

activities, keeping up with times, in largely interdisciplinary manner. Such work has been undertaken in several thematic areas such as smart manufacturing, atomistic modeling and simulations, computational and experimental fluid and solid mechanics, to name a few. A completely new, state-of-the-art central facility, called the Advanced Mechanical Testing Facility (AMTF), is now housed in the Department. The facility caters to the needs of fatigue testing over a wide range of uniaxial-torsional-planer biaxial loading, and over a large range of temperatures. The equipment and accessories (worth more than 10 cr) in the facility provide for the need of academic research and also industrial requirements. The existing large independent research centres such as the National Centre for Aerospace Innovation and Research (NCAIR) and the Biomedical Engineering and Technology Incubation Centre (BETiC) continue to excel in their respective activities.

	Sponsored Projects	Consultancy Projects
New Projects	38	27
Ongoing	84	17
Completed	26	07

Department of Metallurgical Engineering & Materials Sciences

The Department of Metallurgical Engineering and Materials Sciences (MEMS) had a good 2019-2020, in terms of progress in research and teaching. Despite facing some difficult situation due to the ongoing pandemic, the Department continues to excel in a wide variety of areas, ranging from classical metallurgy to non-metallic materials in various forms and dimensional scales for applications ranging from advanced structural components to electronic, optical, sensing, health-care and energy harvesting/conversion/storage devices.

There has been a steady increase in the academic activities especially growth in PhD student intake. The student quality has made MEMS, one of the leading Departments in the country. Its annual output, which includes more than 200 publications in peer-reviewed international journals (including in highly rated journals like Acta Materialia, J Mater Chem A, etc.), allows it to compete with any other metallurgy-materials department in the world. The Department also continues to design and offer new courses pertinent to the cutting-edge areas.

	Student intake	Degrees awarded
BTech	103	80
DD(BTech+MTech)	29	27
MTech	71	51
PhD	19	06

The unique strength of the IIT Bombay MEMS department lies in its ability to balance between teaching and research, between traditional and emerging materials, and between applied and basic research. The Department strives for excellence in manpower development.

Quite a number of PhD students of the Department have been successful towards receiving highly renowned International Level Awards due to the excellence in research (like the 2020 Carbon Journal Prize for “an outstanding PhD thesis in carbon materials science and technology”.) The classical teaching combined with short-term courses (continuing education and quality improvement programs, special training programs like GIAN and SERB Schools, etc.) have generated an excellent pool of highly motivated and competent manpower for the country.

R & D Activities: There has been a significance contributions from some of the focused research

programs. These include CoEST (Centre for Excellence in Steel Technology: funded by Ministry of Steel), providing a platform for critical research collaborations for the Indian Steel Industry), several technological products, and a wide range of sponsored research projects. Another relatively new collaborative center funded by the Department of Science and Technology is the Water Innovation Centre: Technology, Research and Education (WICTRE), which focuses on a very important area, especially considering the present needs of our country.

	Sponsored Projects	Consultancy Projects
New Projects	19	17
Ongoing	50	05
Completed	08	03

The faculty members of the Department are recipients of various awards and honors (including fellowships of National Academies). This also includes the prestigious 'Metallurgist of the year award 2019 - Ferrous category', conferred by the Ministry of Steel, GoI.

Department of Physics

The Department of Physics, one of the oldest departments of the Institute was established in 1958. It has a tradition of vibrant teaching and offers many research topics. The Department has 46 faculty members on its roll.

Owing to its continued emphasis on quality in teaching and research, it has gained an important position in the academic scene of the country. For the last two years, the Department is rated as the number one Physics department in the country, according to the QS world ranking.

Academic Programmes: The Department offers four-year BTech in Engineering Physics, two-year MSc degree in Physics as well as the PhD program. Many of the Department students at all levels get opportunities to work with leading laboratories and universities all over the world. The Department attracts international students under the exchange program.

	Student intake	Degrees awarded
BTech	46	30
DD BTech+MTecch)	-	07
MSc	49	44
DD (MSc+MTech)	-	03
PhD	42	20

R & D Activities: The Department has five major research groups, namely Condensed Matter Physics, High Energy Physics, Soft Matter-Biophysics-Nonlinear Dynamics-Statistical Physics, Optics-Photonics-Spectroscopy and Astrophysics-Cosmology-Gravity. The Department has many high-end computational, materials preparation and characterization facilities for common use, in addition to a workshop. Major facilities include (i) material synthesis facilities like CVD, PLD helium liquefier, class 10,000 clean room for thin film and semiconductor device fabrication, (ii) characterization facilities such as ultrafast optical spectroscopy setup, NMR spectrometer, high resolution XRD, high field magnetometers, Raman spectroscopy setup for liquids and nanostructures, Spatio-temporal emission and photocurrent scanning microscopy setup, magneto absorption, emission and photoconductivity setup, Long time transient absorption spectroscopy setup and (iii) computational facility like HPC clusters etc. Many of these facilities are utilized by researchers across several departments.



	Sponsored Projects	Consultancy Projects
New	19	01
Ongoing	32	0
Completed	12	0

The faculty members have been engaged in many national and international collaborations at individual levels and also at group levels. Some of them have been part of the national missions such as quantum technologies, photovoltaics, solar energy, LIGO India and Daksha satellite. These collaborations have resulted in major deliverables and high-impact publications.

Department of Humanities and Social Sciences

The Department of Humanities and Social Sciences (HSS) plays a unique role in IIT Bombay. Its main thrust is on teaching and research, which is both essential and complementary to the education in science and technology. The Department houses the disciplines of Economics, English Literature, Philosophy, Psychology, Sociology and CISTS (Sanskrit) with current strength of forty-one faculty members. The Department is in the line of expanding by incorporating other disciplines History & Political Sciences in the upcoming years

At present, 82 students are enrolled in the BS program in Economics and the first batch of students will be graduating in 2021. The PhD programme of the Department has been running since 1973 and the MPhil program was initiated in 1993. At present, about 200 research scholars are working towards their PhD degree and about 240 students have already been awarded their PhD degrees. In addition to this, more than 350 students have been awarded MPhil degree since 1995 and about 36 students are currently pursuing their MPhil degree.

Academic Programmes: The Department commands an independent space within the Institute by offering a Bachelor of Science in Economics (newly launched), an MPhil in Planning and Development. The Department has a strong PhD program in all of the sub-disciplines mentioned earlier since 1973. The department will be offering the MA+PhD program in Philosophy in the next academic year. The Department provides a unique opportunity for students by providing an ambiance different from that of conventional university departments in the arts and social sciences, especially by facilitating conversations and discussions across multiple disciplines and research areas. Apart from the facilities made available to all students at the Institute-level, at the department-level, the students have access to the resources available in the Department's Library, Computer Labs and the newly established Econometrics Lab. The Department also has Psychology Laboratories. For the fulfilment of its teaching and research goals, the Department has competent faculty members in diverse areas, who keep pace with the current developments in their fields of specialization.

	Student intake	Degrees awarded
MPhil	14	26
PhD	36	17
BS (Economics)	30	-

The Department, apart from the production and dissemination of its disciplinary concerns, also plays a unique and distinctive role within the vision of the Institute, which seeks to promote a holistic science and technology education. The inclusion of the study of the Humanities and other Social and Behavioural sciences ensures the quest within the frontiers

of the Science and Technology takes place in an informed manner and attends to humanitarian and social concerns. The Department offers a number of core and elective courses for the BTech, MTech, and the MBA Programmes of the Institute.

R&D Activities: The department faculties are involved in a number of research projects independently, in collaboration with faculty members from other departments of IIT Bombay, and as part of international research networks and partnerships. Faculty members and student researchers of the department carry out research in several cutting-edge areas and emerging sub disciplines as well as trans-disciplinary themes such as computational linguistics, climate studies, organizational justice, digital media, innovation, gender and environmental change.

	Sponsored Projects	Consultancy Projects
New Projects	06	01
Ongoing	11	05
Completed	03	0

IDC School of Design

IDC School of Design at the Indian Institute of Technology (IIT Bombay) offers an excellent environment for academics, research, and applications in the field of design. The Centre interacts with industries and institutions for promotion and awareness of design. These are in the form of organizing seminars, conducting short-term courses and workshops. In the area of design practice, IDC offers professional design consultancy and advisory services to industries and other organizations. The potential for innovation at IDC lies fundamentally in terms of solving real-world problems.

Academic Programmes:

IDC School of Design at IIT Bombay has a well-established Master of Design degree (MDes) programme in Industrial Design, Communication Design, Animation Design, Interaction Design, Mobility and Vehicle Design & Minor courses as well as a PhD programme in Design. Since the year 2015 onwards, IDC has started a four-year, eight semesters Bachelor of Design (BDes) programme and a five-year, ten-semester dual degree (BDes + MDes) programme.

Bachelor of Design (BDes) programme is a four-year, eight-semester course, and (BDes + MDes) Dual Degree is a five-year ten semester course, which is available only at the end of the 3rd year. Both these programmes are credit-based and thus offer the flexibility to progress at one's own pace.

	Student intake	Degrees awarded
BDes	32	15
MDes	64	53
PhD	08	07

R&D Activities: IDC School of Design undertakes research and development in the field of product design, communication design, interaction design, mobility & vehicle design, and animation and film making. The projects at IDC are subjected to address cultural needs, livelihood and sustainability issues, humanizing technologies for mass use, addressing communication, interaction and product needs of the under-served, typography in local language, interfaces for masses, and conservation and development of ethnic craft techniques.



	Sponsored Projects	Consultancy Projects
New Projects	05	06
Ongoing	12	05
Completed	06	0

The department organized several workshops such as **Expo PDi, Expo CD 2019, TypoDay 2020, and Design Thinking: Upholding User Needs & Aspirations for Innovation** during the year.

IDC School of Design organized **Design Conference and Alumni Meet** on completion of 50 years during January 6-8, 2020 at IIT Bombay as part of the celebration of IDC Golden Jubilee.

There were Discipline-specific events viz. Product Design (Prologue, Talks followed by a Panel Discussion, Open House Session), Communication Design (Vinyas to Fontlab: Exhibition of Typographic journey of IDC, Book Exhibition, Exhibition of Identity design projects, Calligraphy Installation), Interaction Design (Invited Talk: Connections vs Contrasts, Panel Discussions - Uncommon Sectors and Entrepreneurship, Beyond Reality), Mobility and Vehicle Design (Design Jam Exhibition), Animation and Film (Students Short Film Festival 2020 (SSFF)).

Other Events included Research Activities: Perspectives on design research, Beyond academia— the role of research in industry, Research in and from IDC, The Future of Design Education – the next 50 years.

Industry Facing Events: Design Entrepreneurs Present, Speed networking - Design 20/20, Experience sharing, Exhibition of design consultancies/ design bazaar.

Plenary Events: Alumni awards, IDC’s New Building, Legacy Projects, Keynote Speakers, IDC 50 Years: Book + Exhibition + Installations.

As part of IDC Golden Jubilee Lecture Series, a talk was delivered by Swiss Graphic Designer Niklaus Troxler at IDC on Graphic Design in March 2020.

Prof. Sudesh Balan’s short film “*Saakshatkaaram*” partially funded by the SEED grant, IIT Bombay explores the concept ‘*Overview Effect*’ through a story about hand transplantation. This project is intended to promote organ donation and religious harmony among the public.

Shailesh J Mehta School of Management

Today, Shailesh J Mehta School of Management has occupied its distinct place in the globe as an Institute of Excellence in Management, Education and Research. The School currently has 24 full-time faculty members in all core fields of management.

The year 2019-2020 was marked by further strengthening and consolidation of the academic programmes of the School.

Academic Programmes: The School of Management offers Doctoral Program (PhD) in Management, full-time Master of Management, Executive MBA (E-MBA) joint degree by Shailesh J. Mehta School of Management, IIT Bombay India and Olin Business School Washington University in St. Louis USA, certificate programmes for Executive Education: short and long-term duration in-house and open Management Development Programmes for the Corporate executives/ professionals of all fields, BTech (Minor) Courses in all areas of Management.

	Student intake	Degrees awarded
MMgt	114	112
PhD	05	07
E-MBA	18 (Bach 5)	18 (Bach 4)

R&D Activities: Faculty members of the School are engaged in many research/ consultancy projects in all fields of management. The Management Development Programmes (MDPs) exclusively for the corporate houses as well as open for all professionals are always on at the School and reshaping the managers, executives and entrepreneurs as future leaders.

	Sponsored Projects	Consultancy Projects
New Projects	03	05
Ongoing	07	0
Completed	0	01

Centre of Studies in Resources Engineering (CSRE)

Centre of Studies in Resources Engineering (CSRE) is a teaching academic unit of IIT Bombay established in 1976. The Centre holds a global repute in the fields of remote sensing and natural resources management. The extremely-talented faculty members in CSRE hail from diverse backgrounds and domain expertise; thereby making CSRE a true leader in interdisciplinary studies in geo-spatial applications. The Centre is noted for its extensive research in the areas of geology and mineral exploration, microwave remote sensing, optical remote sensing using hyperspectral imagery, image processing and computer vision, GPS and applications, deep learning for remotely sensed imagery, geo-computation and HPC and finally, precision agriculture. To adhere to

global standards, research in CSRE is backed through peer-reviewed journal publications and participation in prestigious international conferences. The current academic year has been very fruitful in terms of publications, consisting 45 journals (mainly in international journals), 38 conference papers and 02 book chapters. In addition to this, two new PG electives were also added: 1. Geospatial Statistics and 2. Remote Sensing of Surface Water Resources

Faculty members of CSRE hold key positions in editorial boards of several high-impact journals, including positions like President, Editor, Lifetime members and Reviewers. The Centre has a global reach with international collaborations in the fields of microwave remote sensing, mineral resources exploration and data sciences in agriculture. The Centre also houses excellent research infrastructure in terms of state-of-the-art hardware (labs, servers, compute towers, HPC cluster etc.), supporting software (ArcGIS, MATLAB, ENVI etc.), image datasets and image acquisition platforms (UAV, Hyper and Multi spectral cameras, etc.).

Academic Activities: The Centre offers MTech and PhD programmes in Geoinformatics and Natural Resources Engineering (GNR). The Doctoral programme at the Centre aims to develop highly qualified and trained manpower that is needed for the effective utilization of contemporary technologies as applied to Natural Resources and related areas.

	Student intake	Degrees awarded
MTech	24	22
PhD	07	10
DD(MTech+ PhD)	-	01
MPhil	-	01

R&D Activities: The Centre is actively involved in several research and development activities through (sponsored projects) spanning across interdisciplinary domain expertise of faculty members and applications in geoinformatics. In addition, the Centre also is extensively engaged in various (consultancy services and projects) in the area of geoinformatics, remote sensing, GPS and its applications.

	Sponsored Projects	Consultancy Projects
New Projects	06	05
Ongoing	14	07
Completed	03	01

In order to meet the computational needs of students a dedicated state-of-the-art lab has been built in the centre. The lab currently has a sitting capacity of 40, with additional working space for students working with additional hardware (lab instruments, prototypes etc.) and personal laptops. In addition, a newly-styled and refurbished office complex was also built in this financial year, with state-of-the-art conference hall, meeting rooms, space for office staff and a renovated server room for housing latest computational resources. These new entities in the Centre were inaugurated by the Director Prof. Subhasis Chaudhuri on April 25, 2019.



Inauguration of CSRE New Office Complex and MTech Lab II in the presence of Director Prof. Subhasis Chaudhuri, Former Deputy Director (Academic and Infrastructural Affairs) Prof. A.K.Suresh and Dean (Infrastructure Planning & Support) Prof. B.V.S. Viswanadham

Centre for Technology Alternatives for Rural Areas (CTARA)

The Centre for Technology Alternative for Rural Areas (CTARA) started in 1985 with the purpose to sensitize technical professionals to the problems of rural areas.

Academic Programmes: The centre offers an MTech program in Technology and Development and a PhD program. It also offers Technology and Development Supervised Learning (TDSL) courses to BTech students across the Institute. The course work provides an overview of development issues, resource analysis, rural needs assessment, technological interventions and impacts, and has a strong field component. Teaching and research are aimed at providing relevant solutions to the rural areas. In order to do this effectively, CTARA has developed linkages with NGOs, government departments and ministries, and industry.

	Student Intake	Degrees Awarded
MTech	26	25
PhD	10	06
MS by exit	-	02

R&D Activities: The major research areas at the centre are the sectors of agriculture and food, appropriate technology, drinking water, energy, environment, planning and policy and governance.

	Sponsored Projects	Consultancy Projects
New Projects	16	02
Ongoing	20	08
Completed	03	0

Unnat Bharat Abhiyan (UBA)

The following are some of the activities taken up in 2019-20 by CTARA as the Regional Coordinating Institute (RCI) for Konkan, Pune and Goa Divisions for UBA:

- **Participation and contribution in Tech4seva** (August) organised in IIT Delhi in August 2019
- **Initiation of a collaborative project with the Rajiv Gandhi Institute for Technology RGIT, Versova, for 100% social survey at Faizpur town, Jalgaon district**, for building a case study for “Design of Water Supply, Sanitation, Solid Waste Management and Storm Water Drainage (WATSAN)”.
- Regional Orientation Workshop for Participating Institutes (PIs) of UBA.

Unnat Maharashtra Abhiyan (UMA)

CTARA continues to work in close collaboration with the Government of Maharashtra and has assisted in the launch of the Unnat Maharashtra Abhiyan (UMA). The UMA Program Cell at CTARA serves as a link between the UMA Advisory Committee, participating institutions, and the government and runs the day-to-day operations of the program. Funding for the program for 2019-2020 was received in November 2019. Activities conducted include a ‘Thematic workshop on Analysis of Infrastructure for Energized Irrigation (AIEI) in Maharashtra’ held in Aurangabad in January 2020, and another ‘Thematic workshop on Techno-Economic Assessment of Micro, Small and Medium Enterprises (MSMEs) in Rural Areas’, in Ratnagiri in February 2020.

Child Nutrition

The Child Nutrition Team in CTARA conducted a number of activities, training and workshops



in the 2019-20. These include among others:

- a) A 'Breastfeeding during COVID' Health spoken tutorial video in five languages, which was then distributed to local government authorities like the state of Jharkhand.
- b) Training on maternal, infant and young child nutrition in different parts of the country such as Palghar, Gadchiroli and Chandrapur districts in Maharashtra and Pithoragarh in Uttarakhand.
- c) The operation of a 1800 toll-free poshan helpline number on nutrition-related queries for mothers and children since March.

Water and Sanitation services for Mumbai's BoP

CTARA in collaboration with CUSE is executing a project 'Water and Sanitation services for Mumbai's BOP' with funding support from TCTD. The project is aimed at improving access to water and sanitation services to the sections of society who are at the bottom of the pyramid in the city of Mumbai. The work includes a field-study of diverse dimensions - technical, legal, institutional, economic, socio-cultural, and political - of the problem of lack of access, including the reasons for the same, coping strategies adopted by people and communities, costs of the lack of access and of coping strategies.

CANALPY

An academic initiative was started in November 2017 in Alappuzha, Kerala, based on a MoU signed between IIT Bombay and the Kerala Institute of Local Administration (KILA). The effort was to develop a protocol - replicable and potentially-sustainable approach to a situational analysis of prevailing sanitation and wastewater practices in Alappuzha, which could then lead to developing a decentralised sanitation plan for the town.

Since then, the initiative has expanded to become a people's campaign called 'CANALPY' (CanAlappuzha). It has conducted two Winter Schools (Nov. 2017 and Dec. 2018) and a Summer School (May 2018) and developed a comprehensive analysis of solid and liquid waste management practices with the intention of developing an integrated plan to rejuvenate the canals of Alappuzha.

The work in 2019-20 included interventions at multiple canals in the Alappuzha region. Sanitation facilities were upgraded at Municipal Colony, a settlement of 52 households in a community of ex-manual scavengers. A 2 km stretch of a canal (Povvam Thodu) in the Kuttanad region (the most flood-affected pocket in 2018 floods), was cleaned as a flood mitigation measure. The third intervention in the project led to the creation of CANSAN (Canal Sanitation) clubs in schools in an effort to conscientise school students of Alappuzha towards the pollution in canals and developing them as 'student citizens'. A major initiative is water quality monitoring in collaboration with the Kerala State Pollution Control Board. This is regularly followed up with monthly activities.

RISE

In the year 2019-20 CTARA launched 'RISE', the rural immersion program for the undergraduate students supported by a donation from the Class of 1992 (alumni of IIT Bombay). The students are expected to stay for 2 weeks in villages (mostly in rural households), facilitated by local voluntary organizations. In the first offering of the program conducted in Summer 2019, 19 students were placed with four NGOs (BAIF, Shashwat, Vayam and Paoolwat) in Maharashtra and Gujarat. In the second batch conducted in Winter 2019, 21 students were placed with five NGOs (BAIF, Shashwat,

Vayam, Shivganga and FES) in Maharashtra, Madhya Pradesh and Andhra Pradesh. Details about the program are available on the website (<http://www.ctara.iitb.ac.in/en/RISE>).

District Development Dialogue and Follow-up

As a part of the Diamond Jubilee Celebrations, CTARA and the DPE-IITB CSR Study Unit had organised a District Development Dialogue on the theme of ‘Scalable Best Practices: Learnings from the field’, in February 2019.

As an extension of this initiative, two-day long workshops were conducted in 2019 on the following themes:

- a) Solid Waste Management
- b) Tribal Education
- c) Faecal Sludge Management

TDSC

The Technology and Development Solutions Cell was started in 2014. TDSC executes projects for government agencies and departments, NGOs, and CSRs based on the academic output from CTARA, and other departments of IIT. TDSC’s mandate is generalisation and opening up of engineering techniques for application at the grass-root level in rural areas. A few of the ongoing projects of the TDSC include are:

1. Technical evaluation of Rural Water Supply Schemes in Thane and Palghar districts for the districts’ Rural Water Supply Departments.
2. Creating a drought-resilient landscape (Deonadi basin in Nasik district), for Yuva Mitra, an NGO in Sinnar, Nasik.
3. Third party assessment of works done under Thakkar Bappa Yojana (Tribal Development Dept.), for the Palghar Zilla Parishad.
4. Estimation of the potential for ground-based, roof-top and canal-based solar power plants in Goa, for the Department of Science, Technology and Environment, Goa (*Completed*).

PoCRA

CTARA, jointly with CSE, is executing a project for the ‘Project on Climate Resilient Agriculture’, an initiative of the Government of Maharashtra (GoM) aided by the World Bank. A third MOU between IIT Bombay and PoCRA was signed in January 2020. Several PhD and MTech students’ theses in the water-energy for irrigation sector have contributed to this project, and several alumni continue to work as part of the team. The work done by CTARA includes water-budgeting and modelling, reliable energy access to farmers for irrigation through community and infrastructure intervention and analysing irrigation usage by farmers with respect to water and energy availability.

Center for Formal Design and Verification of Software (CFDVS)

CFDVS has established itself as a national R & D Centre in the area of formal verification of high-integrity software and hardware. Although the initial focus of the Centre was on design and verification of software, it was quickly realized that the scope of activities needed to be expanded to include both software and hardware systems, in order to provide a comprehensive approach to design and verification of safety-critical systems. Safety-Critical systems include computer based control systems used in nuclear reactors, space, avionics, process-control and robotics. Failures in such systems due to software or hardware bugs can be catastrophic both financially and in human terms. Verification of safety critical system was the primary inspiration behind DAE’s establishing the Centre for Formal Design and Verification of Software (CFDVS) through BRNS, and in collaboration with IIT Bombay and TIFR in 1999. The Centre has contributed to several R&D programs in formal verification, and has taken up sponsored industrial projects from various Government organizations like VSSC, ADA, DRDL and DRDO, and also from high-profile private organizations like Intel, Microsoft



Research, Texas Instruments, General Motors, etc. Establishing CFDVS has benefited DAE in terms of research and development of advanced formal verification tools.

The laboratories are equipped with several personal computers, high-end servers, HPC data center and workstations. The current software resources include a number of public domain tools for formal specification and verification, advanced static analysis, dynamic analysis and testing tools (test-beds), modeling languages and related environments for real-time software supporting simulations and verification, hazard analysis tools and CASE tools and general programming environments. During the past 21 years, tools and techniques developed at CFDVS have been applied successfully to small and medium sized problems, both from the academia and industry. This has demonstrated our ability to handle the technological challenges involved in addressing complex problems at the small to medium scale. CFDVS is currently focusing on automated techniques for larger real-life systems, and to make the resulting technologies available to the end-user community in India. This can reap significant benefits in verification projects undertaken at DAE, ISRO, DRDO.

Foundations of Software Technology and Theoretical Computer Science (FSTTCS), an international conference was organised at IIT Bombay during December 11-13, 2019, with several associated and co-located events viz. the fourth Indian SAT+SMT winter school (<https://sat-smt.in/>) from December 8-10, 2019 followed by pre-conference workshops on December 10, 2019 and post-conference workshops on December 14, 2019. The FSTTCS conference is a forum for presenting original results in foundational aspects of

Computer Science and Software Technology. It is an annual international conference being organized since 1981, under the aegis of IARCS (Indian Association for Research in Computing Sciences).

Ongoing Project

- 1 FMSAFE A Network Centre for Formal Methods in Validation and Certification Procedures for Safety-Critical ICT Systems.
- 2 IMPRINT Project: Development of a remote healthcare delivery system early diagnosis, therapy, follow up and preventive care for NCDS cardio pulmonary.

Centre for Urban Science and Engineering (CUSE)

The Centre for Urban Science & Engineering (CUSE) at IIT Bombay is an interdisciplinary centre for research, teaching and skilled manpower development with the primary mandate of improving urban quality of life.

The Centre aims to combine science and technology with sustainable, equitable and human-friendly design to deliver innovative and holistic services to improve the life of the rapidly urbanizing population in the developing world.

Academic Programmes: The Centre runs a PhD Programme offering specializations viz.

- ▶ Planning and Design: Housing, Land use policies, Public Spaces, Risk Management
- ▶ Policy and Governance: Housing Economics, Health, Education, Employment, Environment
- ▶ Infrastructure: Buildings, Transportation & Land use, Urban water, Waste Management, Smart Energy
- ▶ Informatics: Citizen Science, Cyber-Physical Systems, Urban Knowledge, Geospatial Technologies



The opening ceremony and inauguration of ICUSE 2020 on February 28, 2020. (Left to Right Prof. Arnab Jana (C-USE), Prof. Pradipta Banerji (Head, C-USE), Prof. Subhasis Chaudhuri (Director IIT Bombay), Prof. Geetam Tiwari (IIT Delhi), Prof. Arunava Dasgupta (School of Planning and Architecture, New Delhi) Prof. Pradip Kalbar (C-USE)



(L -R) CUSE Faculty (Prof. Himanshu Burte, Prof. Malini Krishnankutty, Prof. Pradip Kalbar, and Prof. Arnab Jana)



ICUSE 2020 Registration desk



Closing ceremony of ICUSE 2020

The overall on-roll students in the year 2019-20 is 33. The Centre has introduced a new postgraduate programme of Master's in Urban Design and Engineering (MUDE) from 2019-20. The aim of the programme is to take an interdisciplinary approach in teaching with greater emphasis on practical problem-solving.

	Student Intake	Degrees Awarded
MUDE (Master Programme)	04	-
PhD	03	03

R&D Activities: The research activities of the Centre focus on new products and solutions related to housing, transport, water management, energy efficiency, urban informatics, health, governance, urban poverty and citizen science while mitigating the effects of natural disasters and climate change. The Centre aims to establish links with various institutes within India and abroad that are addressing urban challenges.

	Sponsored Projects	Consultancy Projects
New Projects	04	02
Ongoing	06	02
Completed	01	0

The mission of the Centre is to be a globalized institution that would enable interactions among researchers, offer educational programs, encourage faculty and student exchanges and help learn from diverse contexts with the aim of making cities of the world, especially the developing world, more livable.

The first **International Conference on Urban Science and Engineering (ICUSE)** was held

during February 28-29, 2020 at IIT Bombay. The conference provided an excellent platform to know, exchange new ideas, and understand the challenges related to the urban sector at large.

Centre for Research in Nanotechnology & Science (CRNTS)

IIT Bombay is one of the leading institutions in the country for research in the area of Nanotechnology. The Institute has consolidated its Nanotechnology research activities through the formation of a Centre for Research in Nanotechnology & Science (CRNTS). The formation of this centre has been made possible through a generous grant from the Department of Science & Technology (DST), Government of India.

The Centre hosts Sophisticated Analytical Instrument Facility (SAIF) which houses a variety of major analytical instruments which are operated and maintained by a dedicated and qualified group of technical staff and students. It is an integral part of IIT Bombay and operates with an "Open Access Policy". During the year, SAIF provided facilities for the analysis of 15,531 samples from academic institutions, national labs as well as industry. Newly-installed facilities include "Small Angle X-ray Scattering (SAXS)". SAIF participated in TechConnect (Science and Technology Festival) organized by the IRCC during the year. The fest included poster presentation, interaction with many visitors from various domains that included academics as well as industry and these facilitated increased awareness about the facilities at SAIF/CRNTS.

Workshops on "Small Angle X-Ray Scattering (SAXS) and its applications, FTIR- Imaging and Laser Raman spectrometer and its

application, HPTLC-MS and LC-MS techniques and applications, Novel Correlative Technique using NMR spectroscopy & Electron Microscopy (NMR, TEM and SEM), and EPR Spectroscopy and its applications” were conducted during the year 2019-2020. SAIF also participated in the industry exhibition “PharmaTech Expo” as part of its outreach to industry.

Academic Programmes:

	Student Intake	Degrees Awarded
PhD	23	16

R&D Activities: The Centre is one of the leading interdisciplinary centres in the country for research in the area of Nanotechnology. At CRNTS, 98 PhD students guided by over 60 faculty members are working together in the broad areas of Nanotechnology, with support from various government agencies and private industries. This research has resulted in over 550 high quality publications in the last decade in international journals and conference proceedings and a large number of patents by CRNTS students and their thesis supervisors. External users of SAIF have published over 3000 high quality publications in the last decade in international journals and conference proceedings.

	Sponsored Projects	Consultancy Projects
New Projects	01	0
Ongoing	02	0
Completed	01	0

Educational Technology

The Interdisciplinary Programme in Educational Technology (IDP-ET) at IIT Bombay started in the Institute in 2010-11.

The IDP-ET conducts research in areas of pedagogies and tools for technology-enhanced learning. In addition to the Institute courses for PhD and MTech, the IDP-ET organizes short-term courses and MOOCs on effective teaching-learning with emerging technologies and educational research methods through CEP, NPTEL and IITBombayX. The faculty members, post-doctoral research scholars and PhD students of the IDP-ET play a significant role in the organization of international conferences. Faculty members carry out sponsored projects for government organizations, and provide consultancy to educational technology industries.

Academic Programmes: The group offers a PhD and MTech programme in Educational Technology. The group began an MTech program in Educational Technology in 2019-20. 6 students were admitted in the first batch. In addition to coursework and projects, MTech students pursue a 2-month summer internship in educational technology industry or R&D organizations. The group continues to offer core courses and electives in educational technology. These courses have received enrollment responses from BTech, MTech and PhD students in other academic programmes within the Institute. 8 new courses constituting core and elective courses for MTech, and electives for PhD were added.

Several events such as seminars, alumni interaction, industry dialogue, and an edtech hackathon have been planned during 2020 to commemorate the 10th year of the IDP-ET

	Student Intake	Degrees Awarded
PhD	23	03
MTech	06	-

R&D Activities: Several R&D activities were conducted keeping in mind the main research areas of the IDP-ET that comprised of Technology-enhanced learning of Thinking Skills (TELoTS), Teacher Use of Educational Technology (TUET), Educational data analytics (EDA) and Emerge.

	Sponsored Projects	Consultancy Projects
New Projects	0	0
Ongoing	02	0
Completed	0	0

Faculty members participated in the various conferences / symposia/ workshops / seminars/ Massive Open Online Courses (MOOC) organized for promoting a conducive learning environment. The various MOOC based programs included Designing Learner Centric, Introduction to Learning Analytics. Some of the presentations were made on Multi-Modal Data Analysis of Students' SRL Behaviors in Open-Ended Learning Environments. American Educational Research Association; Symposium on Multimodal Data during Learning with Advanced Learning Technologies. Toronto, Canada; Quantitative Evaluation of Concept Maps: An Evidence-Based Approach" In TEEL Workshop Track of the 9th International Conference on Learning Analytics and Knowledge (LAK19), Tempe, Arizona, USA; 'Planning, Designing and Orchestrating Learner-centric MOOCs using the LCM model' in International Conference on Computers in Education (ICCE), Kenting, Taiwan, Faculty members delivered the invited talks, chaired the conferences and conducted workshops.

Various Faculty Professional Development programs includes 'Pedagogical Techniques, Teaching & Learning Methods'; Training Seminar on 'Effective Research Writing'; Teaching Pedagogies for Engineering Education,

'Effective integration of pedagogy in classrooms', 'Designing Learner Centric MOOCs'.

Faculty, post-doctoral research scientists and PhD research scholars participate as: Reviewer for journals: ACM Transactions on Computing Education (ToCE), IEEE Transactions on Education (ToE), Educational Technology, Research & Development (ETR&D), International Journal of Distance Education Technologies (IJDET), Research & Practice in TEL (RPTEL), Interactive Learning Environments (ILE), Journal of Computers in Education (JCE), Cognitive Research: Principles and Implications, IEEE Transactions on Learning Technology (TLT), Journal of the Learning Sciences (JLS); International program committee member for various conferences: Artificial Intelligence in Education (AIED 2019), International Conference on Computers in Education (ICCE 2018), International Conference on Computational Thinking Education 2017 (CTE 2018), International Conference on Advanced Learning Technology (ICALT 2019).

Industrial Engineering and Operations Research (IEOR)

Industrial Engineering and Operations Research (IEOR) at IIT Bombay is an interdisciplinary programme that offers PhD and MTech Degrees in IEO and (MSc+PhD) Dual Degree in Operations Research. IEO has nine faculty members, one adjunct professor, and many associated faculty members from across departments. IEO has a depth and breadth in capability that makes the programme unique in the country. The discipline offers a blend of theory, modelling and application, drawing from traditional as well as modern areas of operations research, together with a system view derived from long-standing principles of industrial engineering. IEO contributes significantly to achieve the goals through various activities such as offering academic programmes, conducting continuing

education programmes (CEP), and carrying out research projects of different types. IEOR has a very vibrant alumni group.

Academic Programmes: IEOR offers PhD, MTech, and (MSc+PhD) Dual Degree programmes. IEOR offers a range of courses in the areas of optimization, stochastic models, simulation, statistics, machine learning, artificial intelligence, deep learning, supply chain, logistics, operations, service systems, etc. IEOR curriculum also includes computational labs that train students on various modelling and software tools that can help implement operations research theory and algorithms to solve practical problems.

	Student Intake	Degrees Awarded
MTech	28	23
MSc (2 Years)	-	07
PhD	05	03
MSc+PhD	11	04
PGDIIT	-	01

R&D Activities: The core areas of research includes theoretical and computational optimization, convex optimization, simulation modelling and analysis of complex systems, system dynamics methodology, probabilistic and stochastic models, data analytics, machine learning, reinforcement learning, Markov decision processes, queueing theory, optimal control, game theory and networks, mathematical finance, logistics and transportation, railway

operations, and supply chain analysis. Faculty members served as referees for several journals and international conferences. IEORs hosted several visitors from academia and industry in the year. Faculty members visited various universities to pursue joint research.

	Sponsored Projects	Consultancy Projects
New projects	09	01
On-going	04	01
Completed	02	0

Student Activities:

IEOR doctoral students, Ms. Chhavi Sharma and Ms. Vanessa Ann Beddoe Sawkmie have been awarded the highly competitive ACM-W scholarships for attendance to research conferences. Ms. Chavvi has been awarded the scholarship to attend & present her work at the Neural Information Processing Systems(NeurIPS) workshop on Beyond First order methods in ML held at Vancouver, Canada in December 2019. Ms. Vanessa has been awarded the scholarship to attend and present her work at the IEEE IEEM conference held at Macau in December 2019.

International Workshop on “**Games and Networks**” was held on August 3, 2019 at IIT Bombay. The workshop included talks by Prof. Kaushik Basu (Cornell University), Prof. Surajit Borkotokey (Dibrugarh University), Prof. Rajnish Kumar (Queen’s University Belfast), Prof. Jaideep Roy (University of Bath), Prof. Sudipta Sarangi (Virginia Tech), Prof. Saptarshi Ghosh (IIT



Bombay), Prof. Diganta Mukherjee (ISIKolkata), Prof. Jayakrishnan Nair (IIT Bombay), Prof. Alexandre Reiffers (IISc). The workshop was attended by faculty and students from various colleges across India.

As part of the Asian Universities Alliance (AUA), a program on “**Sun, Society and Sustainability (S3)**” was hosted jointly by IEOR and DESE, for the students of AUA member universities during December 9-15, 2019. 14 students from the seven overseas Asian universities participated in this program. Students from Tsinghua University (China), University Of Tokyo (Japan), Nazarbayev University (Kazakhstan), University of Malaya (Malaysia), National University of Singapore (Singapore), Seoul National University (South Korea), along with the students from IIT Bombay (India). The program included classroom sessions ranging from an introduction to various aspects of solar and sustainability, visits to Centres at IIT Bombay, as well as a field trip to Bancha village in Betul, Madhya Pradesh for an experiential learning on solar cookstoves.

SoULS Initiative, IIT Bombay wins the 1st Grand Prize in the IEEE’s Empower a Billion Lives (EBL) competition. The Finals were held from September 28 – October 1, 2020 in Baltimore,

USA. The award includes a citation and a grand prize of \$100,000, which was received by **Prof. Jayendran V**, IEOR, on behalf of the team. The global finalists of the competition represented innovative solutions to electricity access that are holistic, regionally relevant, and have the ability to scale. The initiative earlier qualified for the Global Finals, after winning the South Asia Regional round held in December 2018.

Solar Urja through Localization for Sustainability (SoULS) initiative, a flagship program of IIT Bombay, is based on the ‘Power to All’, including active interventions for providing clean, efficient, affordable and reliable energy access even to the last mile households. SoULS initiative encourages a localized solution involving local communities (localization) and ensures the transition from a ‘program-driven model’ to ‘market-driven model’. SoULS initiative envisages creating a Solar Ecosystem by Local for Local (SELL) that will serve the local customers by ensuring the provision of local financial mechanism, local institutions and local services, also establishing local manufacturing units for sustainable adoption of technology. SoULS encourages locals to undertake ownership, responsibility and mobilization of technology to create a positive impact in the lives of the rural households.



Prof. Jayendran V, IEOR receiving citation and a grand prize of \$100,000 on behalf of team

Systems and Control Engineering

The Systems and Control group formed in 1977, is a unique interdisciplinary program in the country that offers post-graduate education (MTech/ PhD/ (MTech+PhD)) in the broad area of Systems and Control. The group has 10 core faculty members and 11 associated faculty members from other academic units of the Institute. Many of the alumni of the group hold senior positions in the control and automation industry and research laboratories in the country.

Academic Programmes: The group offers post-graduate education (MTech/ PhD) in the broad area of Systems and Control. The average doctoral strength is around 25 and the MTech intake every year is around 12.

	Student Intake	Degrees Awarded
MTech	19	13
BTech+MTech	01	-
DD (MTech+PhD)	-	01
PhD	08	04
		MTech (Exit) :1

R&D Activities: The research focus of the core group is in the areas of nonlinear control, robotics, path-planning, embedded control, coordination of autonomous vehicles, multi-agent systems, sliding mode control and applications, fractional-order modelling and control, optimization and optimization-based control, stochastic processes, game theory, stochastic control, optimization, economics, information theory and combinatorial coding theory, control theory, NMR spectroscopy, nonlinear and geometric control, quantum information and control. In addition, research in the areas of Process Control, Identification, Behavioural Theory, Matrix Computation and Automotive Control are being pursued by the

associate faculty members. The experimental lab at Systems and Control is geared towards introducing students to hardware and software that implement control theories learnt as part of coursework. A variety of setups based on mechanical, electrical, and chemical principles are made available to the students for this purpose.

	Sponsored Projects	Consultancy Projects
New projects	07	02
On-going	14	01
Completed	04	0

Centre for Policy Studies

The Centre was set up in 2016 to provide a fillip to the study of Public Policy. The Centre for Policy Studies at IIT Bombay aims to produce scholars and practitioners who are equipped to engage in a critical study of public policy. Such an approach will contribute to holistic and contextualized evidence-informed policy analysis from within India. The centre's vision is to become a centre of excellence that facilitates evidence-informed and inclusive public policy and mission to encourage a sustained dialogue between academia and other policy stakeholders to promote evidence-informed and inclusive policy-making and analysis and create capacity for policy studies in the country.

Academic Activities: CPS offers a Doctoral program and a Master's program in Public Policy. During the academic year 2019-20, the Centre for Policy Studies worked on its mandate of creating space for core policy research as well as policy research in various sectoral forms.

	Student intake	Degrees awarded
PhD	11	-
Master's in Public Policy	11	-

R&D Activities: The Centre's researchers work on diverse topics such as information economy, governance, natural resource management, manual scavenging, smart cities, public health, corporate social responsibility, to name a few.

Other Activities: To form a collaboration between the Policy Centre and Computer Science, a workshop on mutual interest titled *“Artificial Intelligence and Policy: Breaking the Technological Ice”* was organized.

A Film Festival was organized by CPS during **February 19-22, 2020** put together by **Prof. Prabhir Vishnu and Dr. Vidya Subramanian** (Post Doctoral Fellow) on *“Atelier: Talking Policy Through Cinema”*. The objective of the film festival was to make students engage with various dimensions of policy making as seen through the lens of cinema. 6 films were shown during this Festival. **Prof. Prabhir Vishnu Poruthiyil** hosted a Writing Workshop for International Peer Reviewed Journals by **Prof. James Avis**, during December 3-4, 2019. **Dr. Girija Godbole** (Post Doctoral Fellow) helped organise Resilient Futures India Initiatives Partnership Summit on December 17, 2019.

Climate Studies

The Interdisciplinary Programme (IDP) in Climate Studies was initiated at the Institute, in January 2012, as one of the first doctoral programmes in India addressing research related to climate change. Over 30 faculty participants are drawn from 11 departments across IIT Bombay, increasingly apply a depth of expertise in their fields to address the complexity of climate change. Currently, 52 students are enrolled in the doctoral programme. The curriculum includes a set of courses on fundamental and applied topics that provide intellectual grounding for critical research, analysis, and application.

The IDP in Climate Studies is expected to emerge as an important knowledge and information resource to support national and state action responding to climate change in future endeavour.

Academic Programmes:

The Interdisciplinary Programme in Climate Studies aims to achieve educational excellence through a doctoral curriculum of courses in two broad tracks of climate science and climate policy, supplemented by elective courses on a broad range of theoretical and practical topics.

	Student Intake	Degrees Awarded
PhD	16	06

R&D Activities:

Ongoing research at IDP in climate studies cuts across the domains of climate science, vulnerability and adaptation, and mitigation and policy. Investigations address improvement of model physics related to clouds, ocean mixing, aerosol processes, climate change detection and attribution, climate change impacts on cities and communities, adaptation and mitigation responses, and the assessment of climate change policies and mechanisms. Important research findings relate to trends in Indian monsoon rainfall from changes in land-use land cover pattern, variability in recycled precipitation and from fast responses to aerosol forcing. A comprehensive flood risk and vulnerability mapping is underway at city and national-levels. Mitigation strategies have been assessed, regarding different scenarios of industrial development, various biofuel alternatives and opportunities to address short-lived pollutants. Long-term goals of IDP in Climate Studies include the creation of a pool of multi-disciplinary researchers to serve the growing national need for climate change professionals. Over a period, the IDP in Climate Studies is expected to emerge as an

important knowledge and information resource to support national and state action responding to climate change.

Outreach Activities:

6th Summer school: The Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay organizes a summer school every year which aims to draw the attention of students from various colleges all across India, who are interested to know and understand different aspects about the field of Climate Studies and also about the exciting areas of research. The sixth summer school was held from July 1-5, 2019 at IIT Bombay. The coordinators for the same were Prof. Pradip Kalbar and Prof. Subimal Ghosh. Eminent faculty members from IIT Bombay conducted various sessions and the students were given a basic understanding of various aspects related to Climate Science, Observations and Modelling, Impacts Assessment and Vulnerability, Mitigation and Adaptation and Climate Policy. It was an enriching experience for all the students and all of them were motivated and inspired to work in the interdisciplinary

field of Climate Studies and contribute towards building a better and sustainable future for our planet Earth.

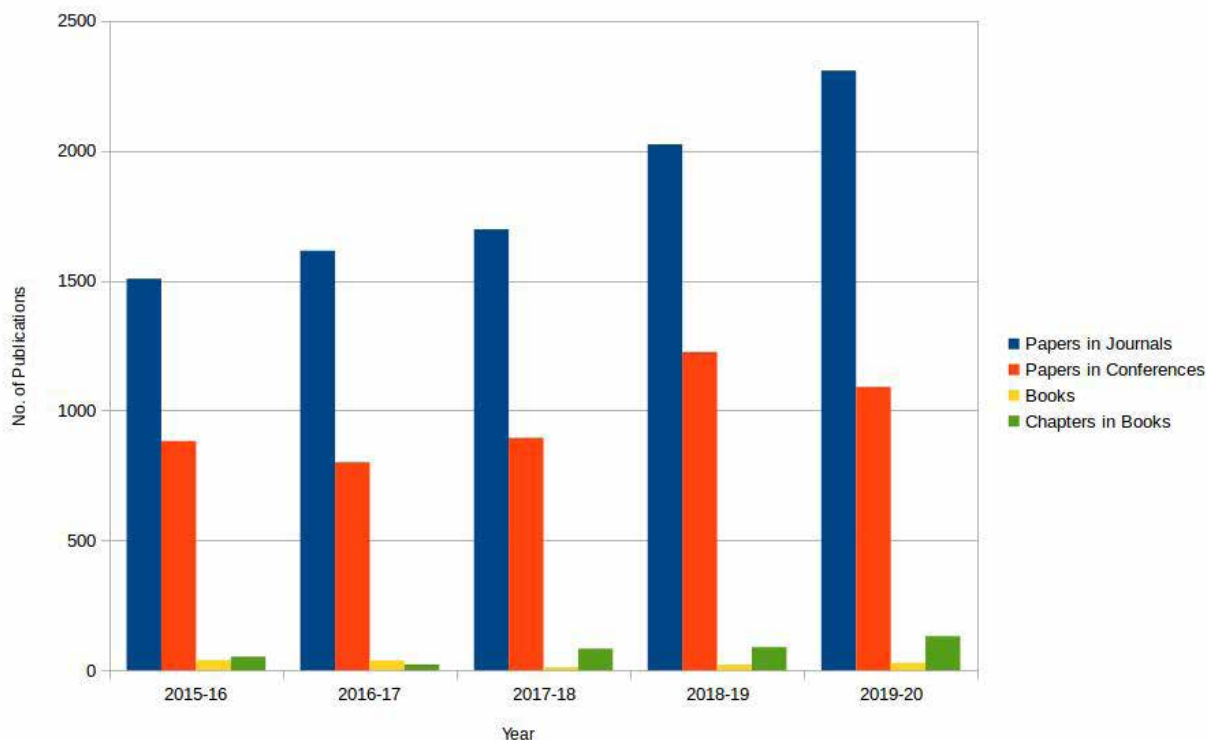
EU Day celebrations at IIT Bombay: In collaboration with the office of the Dean IR, IDP in Climate Studies organized a European Union (EU) Day event focusing on “*EU Policies and EU-INDIA Engagement on Sustainability, Environment, Climate Policies*”. The event was held on February 27, 2020. The Ambassador of the European Union to India, H. E. Ugo Astuto graced the event. Four faculty members of IDPCS made presentations on climate studies with a view to showcasing the research activities and their areas of specialization. Presentations were made about different EU scholarships (ERASMUS) to the students. Prior to the event, the EU delegates had a brief meeting with the Director, IIT Bombay, Prof. Subhasis Chaudhuri. The Heads and faculty of Energy Science and Engineering, Environmental Science and Engineering, Civil Engineering, Climate Studies, and Urban Science and Engineering also joined this meeting along with the Associate Dean (R&D), IIT Bombay.



Honorable delegates, faculty members, staff, and students at the EU Day event

PUBLICATIONS

The number of publications by faculty members of IIT Bombay are steadily increasing. From 1507 papers published in national and international journals during the year 2015-16, the total number of papers published in 2019-20 has increased by 801 papers in mere five years, taking the total number of papers published to 2308. Similar trends can be observed for the papers presented and chapters in books published authored by the Institute’s faculty, in the graph given below:



Year	Papers in Journals	Papers in conferences	Books	Chapters in Books
2015-16	1507	882	39	52
2016-17	1615	800	38	22
2017-18	1697	894	11	83
2018-19	2024	1225	21	89
2019-20	2308	1090	29	131

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(Up to July 14, 2020)



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Bombay	20	Prof. Subhasis Chaudhuri (from 18-04-2019), Prof. Devang Khakhar (upto 17-04-2019) Director, IIT Bombay, Mumbai – 400 076.	Member



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Delhi	23	Prof. V. Ramgopal Rao, Director, IIT Delhi, Hauz Khas, New Delhi – 110 016.	Member
Guwahati	24	Prof. T. G. Sitharam (from 01-07-2019), Prof. Gautam Biswas (upto 05.09.2018), Director, IIT Guwahati, Guwahati – 781 039.	Member
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Gandhinagar	27	Prof. Sudhir K. Jain, Director, IIT Gandhinagar, Vishwakarma Govt. Engg. College (VGEC) Campus, Chandkheda, Visat-Gandhinagar Highway, Ahmedabad – 382424.	Member
Hyderabad	28	Prof B. S. Murty (from 26-08-2019), Prof. U.B. Desai (upto 01-06-2019), Director, IIT Hyderabad, Ordnance Factory Estate, Yeddumailaram – 502205, Andhra Pradesh	Member
Jodhpur	29	Prof. Santanu Chaudhury Director, IIT Jodhpur, IIT Rajasthan Camp Office Jodhpur – 342 011.	Member
Indore	30	Prof. Nilesh Kumar Jain (from 01-01-2020), Prof. Pradeep Mathur (upto 31-12-2019), Director, IIT Indore, Institute of Engineering and Technology, DAVV Campus, Khandwa Road, Indore – 452 017.	Member

Mandi	31	Prof. Ajit Kumar Chaturvedi (from 14-01-2020) Prof. Timothy Gonsalves (upto 13-01-2020), Director, IIT Mandi, PWD Rest House, 2nd Floor, Near Bus Stand, Mandi – 175 001. (Himachal Pradesh)	Member
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Jammu	41	Prof. Manoj Singh Gaur Director, IIT Jammu, Jammu & Kashmir 181 221	Member



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Chairman of the Council Of the Indian Institute of Science, Bangalore (Ex-officio)	44	Dr. P. Rama Rao, Chairman, Governing Council of IISc. Bangalore, (and Former Vice Chancellor, University of Hyderabad, Balapur, Hyderabad 50005) Indian Institute of Science Campus, Bangalore – 560 012.	Member
Director of the Indian Institute of Science, Bangalore (Ex-officio)	45	Prof. Anurag Kumar, Director, Indian Institute of Science, Bangalore – 560 012.	Member

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To represent the Ministry of Finance	47	Secretary (Expenditure), Ministry of Finance, Department of Expenditure, North Block, New Delhi – 110 001.	Member
To represent any other Ministry	48	Secretary, Department of Information Technology, Electronics Niketan, CGO Complex, Lodhi Road, New Delhi – 110003.	Member
Nominee of the Visitor Council for Technical Education (AICTE)	49	Prof. Anil D. Sahasrabudhe, Chairman, All India Council for Technical Education (AICTE), 7th Floor, Chanderlok Building, Janpath, New Delhi – 110 001.	Member
Nominees of the Visitor (minimum three) (maximum five)	50	Prof. H.C. Verma, Department of Physics, IIT Kanpur, Kanpur, Uttar Pradesh	Member
	51	Prof. Shreepad Karmalkar, Professor, Department of Electrical Engineering, IIT Madras, Chennai-600 036.	Member

	52	Dr. V. K. Tewari, Professor & Former Head, (Machinery Systems, Ergonomics & Safety) Agricultural and Food Engineering Department & Rural Development Centre, IIT Kharagpur, Kharagpur - 721302 (WB)	Member
	53	Dr. G. Satheesh Reddy, Scientific Advisor to Raksha Mantri and Director General, Missiles and Strategic Systems, Distinguished Scientist, DRDO	Member
	54	Prof. Vikram M. Gadre, Department of Electrical Engineering, IIT Bombay, Powai, Mumbai 400076	Member
Three Members of Parliament (Two from Lok Sabha) (One from Rajya Sabha)	55	Mr. Kunar Hembram, Hon'ble Member of Parliament (Lok Sabha), Vill. Kanyadoba, P. O. and P. S. Jhargram, Distt. Jhargram – 721507, West Bengal.	Member
	56	Mr. Lavu Sri Krishna Devarayalu, Hon'ble Member of Parliament (Lok Sabha), 10, Western Court Annexel New Delhi - 110001.	Member
	57	Shri Prabhat Jha, Hon'ble Member of Parliament (Rajya Sabha), C-501, Swaran Jayanthi Sadan, Dr. Bishamber Dass Marg (Near R.M.L), New Delhi-110001.	Member
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	59	Ms. Darshana M. Dabral, Joint Secretary & Financial Advisor (JS&FA), Ministry of Human Resource Development, Department of Higher Education, New Delhi.	Member
	60	Dr. Rakesh Sarwal, Additional Secretary (TE) Secretary (IIT Council), Ministry of Human Resource Development, Department of Higher Education, New Delhi.	Member

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	Prof. Paresh K. Joshi Room 106 NIUS Building, Homi Bhabha Centre for Science Education, TIFR, V.N. Purav Marg, Mankhurd, Mumbai -400088.	Member
	Prof. Aniruddha B. Pandit U.G.C. Professor, Department of Chemical Engineering, Institute of Chemical Technology Bombay, Matunga, Mumbai - 400019.	Member
	Mr. Sharad Kumar Saraf Chairman & Managing Director, Technocraft Industries (India) Ltd., Technocraft Group, Bombay, Technocraft House, A-25, MIDC, Marol Industrial Area, Road No. 3, Opposite ESIC Hospital, Andheri (East), Mumbai – 400 093.	Member

STATE GOVERNMENT NOMINEES (TWO)

MAHARASHTRA	Secretary, Higher & Technical Education Government of Maharashtra, Mantralaya, Mumbai – 400 032.	Member
DADRA & NAGAR HAVELI	Shri Praful K. Patel Administrator, U.T. of Daman & Diu and Dadra & Nagar Haveli, Silvassa	Member
Senate Two	Prof.P. V. Balaji (from 01.01.2020) Department of Biosciences and Bioengineering, [Prof. K. Narasimhan (upto 31.12.2019) Department of Met. Engg. & Mats. Science] IIT Bombay, Mumbai 400 076	Member
	Prof. S. C. Patwardhan (from 01.01.2010) Department of Chemical Engineering [Prof. Chandra Venkataraman (upto 31.12.2019 Department of Chemical Engineering], IIT Bombay, Mumbai - 400 076.	Member
Ex-officio	Dr. R. Premkumar Registrar, IIT Bombay Powai, Mumbai – 400 076	Secretary

MEMBERS OF THE FINANCE COMMITTEE

	Prof. Subhasis Chaudhuri, Director, IIT Bombay, Mr. Dilip Shanghvi (upto 03.04.2019) [Managing Director, Sun Pharmaceutical Industries Ltd., Sun House, CTS No.201 B/1, Western Express Highway, Goregaon (E), Mumbai – 400 063.]	Chairman
(Ex-officio)	Prof. Subhasis Chaudhuri Director, IIT Bombay, Powai, Mumbai – 400 076.	Member
	Dr. Rakesh Sarwal, Additional Secretary, Ministry of Human Resource Development, Department of Higher Education, Government of India, Shastri Bhavan, New Delhi – 110 015.	Member
	Mr. V. B. Aras, B2-1101, Mahindra Eminente, Near Patkar College, S. V. Road, Goregaon (West) Mumbai – 400 062.	Member
	Mr. Darshana M. Dabral, Joint Secretary & Financial Advisor, Ministry of Human Resource Development, Department of Higher Education, Technical Section-1, Government of India, Shastri Bhavan, New Delhi – 110 015.	Member
	Prof. P. M. Mujumdar Dy. Director (Finance & External Affairs), IIT Bombay, Powai, Mumbai – 400 076.	Member
(Ex-officio)	Dr. R. Premkumar Registrar, IIT Bombay, Powai, Mumbai – 400 076.	Secretary



BUILDING AND WORKS COMMITTEE

Prof. Subhasis Chaudhuri Director, IIT Bombay, Powai, Mumbai – 400 076.	Chairman
Superintending Engineer, Office of the Supdt. Engineer, Mumbai Central Circle-1, CPWD, 5th Floor, Pratishtha Bhavan, 101 MK Road, Mumbai – 400 020.	Member
Superintending Engineer, Mumbai (P.W.D) Circle 25 Murzban Road, Fort, Mumbai – 400 001.	Member
Mr. K. Srinivas, Head, Architectural & Civil Engg. Division, BARC, North Site, Trombay, Mumbai – 400 085.	Member
Ms. Uma Adusumilli (from 22.11.2018) Chief, Planning Division Mumbai Metropolitan Region Development Authority (MMRDA) 6th Floor, MMRDA New Building, Bandra Kurla Complex, Mumbai – 400051.	Member
Prof. B.V.S. Viswanadham Dean (Infrastructure Planning & Development), IIT Bombay, Powai, Mumbai – 400 076.	Member
Dr. R. Premkumar, Registrar, IIT Bombay Powai, Mumbai – 400 076	Member-Secretary (Ex-officio)

Heads of Departments

Prof. Avijit Chatterjee
Aerospace Engineering

Prof. Rohit Srivastava (from 22.05.2019)
Prof. Rinti Banerjee (upto 21.05.2019)
Biosciences & Bioengineering

Prof. R. D. Gudi
Chemical Engineering

Prof. Anindya Datta
Chemistry

Prof. T. I. Eldho
Civil Engineering

Prof. Umesh Bellur (from 01.05.2019)
Prof. Uday Khedkar (upto 01.04.2019)
Computer Science & Engineering

Prof. H.S. Pandalai (from 28.01.2020)
Prof. S. C. Patel (from 30.05.2018)
Earth Sciences

Prof. B.G. Fernandes
Electrical Engineering

Prof. Ragan Banerjee
Energy Science and Engineering

Prof. Suparna Mukherji (from 02.07.2018)
Department of Environmental Science and Engineering

Prof. Pushpa Trivedi
Humanities & Social Sciences

Prof. K. Suresh Kumar
(from 28.12.2018)
Mathematics

Prof. B.P. Puranik
Mechanical Engineering

Prof. K. Narasimhan (from 18.01.2019)
Met. Engg. & Mat. Science

Prof. K.G. Suresh
Physics

Heads of Centres

Prof. Anil Kottantharayil (from 22.06.2018)
Centre for Research in Nanotechnology and Science & SAIF

Prof. J. Adinarayana
Centre of Studies in Resources Engineering

Prof. G. Sivakumar
Centre for Formal Design and Verification of Software

Prof. Avijit Chatterjee
Centre for Aerospace Systems Design and Engineering

Prof. S. B. Agnihotri
Centre for Technology Alternatives in Rural Areas

Prof. Sharad Bhartiya (from 01.03.2019)
Computer Centre

Prof. Sridhar Iyer
Centre for Distance Engineering Education Programme

Prof. Pradipta Banerjee
Center for Urban Science & Engineering

Prof. Shishir K. Jha
Centre for Policy Studies

Prof. K. Narasimhan
Centre for Excellence in Steel Technology

Heads of Schools

Prof. Phani Tetali (from 21.11.2019)
Prof. G.V. Sreekumar (upto 20.11.2019)
IDC School of Design

Prof. S. Bhargava
Shailesh J. Mehta School of Management

Convenors of Interdisciplinary Programmes

Prof. Jayendran V (from 22.08.2019)
Prof. Narayan Rangaraj (upto 21.08.2019)
Industrial Engineering & Operations Research

Prof. B. Bandyopadhyay
Systems & Control Engineering

Prof. Sridhar Iyer
Education Technology

Prof. D. Parthasarthy
Climate Studies



SUMMARY OF ACCOUNTS

CONSOLIDATED ACCOUNT BALANCE SHEET AS ON 31/03/2000

(Amount in Rupees)

Particulars	Schedule	Current Year 2019-2020	Previous Year 2018-2019
SOURCES OF FUNDS			
CORPUS / CAPITAL FUND	1	2994552577	2353334688
DESIGNATED / EARMARKED / ENDOWMENT FUNDS	2	7187459239	6670001963
CURRENT LIABILITIES AND PROVISIONS	3	24921998626	26875639769
TOTAL (A)		35104010442	35898976420
APPLICATION OF FUNDS			
FIXED ASSETS			
TANGIBLE ASSETS	4	4649267888	4631513707
INTANGIBLE ASSETS	4	146542360	83274049
CAPITAL WORKS-IN-PROGRESS	4	11461287475	10203022052
INVESTMENTS FROM EARMARKED / ENDOWMENT FUNDS	5	937771761	699036148
INVESTMENTS OTHERS	6	2750000000	2750000000
CURRENT ASSETS	7	10342241985	10189764939
LOANS, ADVANCES AND DEPOSITS	8	4816898973	7342365525
TOTAL (B)		35104010442	35898976420
SIGNIFICANT ACCOUNTING POLICIES	24		

**INCOME & EXPENDITURE FOR
THE YEAR ENDED 31/03/2020**

(Amount in Rupees)

Particulars	Schedule	Current Year 2019-2020	Previous Year 2018-2019
INCOME			
Academic Receipts	9	1021139779	972252795
Grants/Subsidies (Irrevocable Grants Received)	10	6418866000	6137100000
Income From Investments	11	921078878	856962095
Interest Earned	12	3721489	2156156
Other Income	13	646759989	557352607
Prior Period Income	14	1879185	45184952
Total (A)		9013445320	8571008605
Expenditure			
Staff Payments and Benefits (Establishment Expenses)	15	5736668346	5459401753
Academic Expenses	16	1102804876	964082778
Administrative And General Expenses	17	1453499774	1248236513
Transportation Expenses	18	5626452	5567634
Repairs & Maintenance	19	419604630	425255443
Finance Costs	20	78553868	10893739
Other Expenses (Write Off)	21	4673511	2374021
Prior Period Expenses	22	43929376	0
Depreciation	4	663552900	537085710
Total(B)		9508913733	8652897590
Balance Being Excess Of Income Over Expenditure (A-B)		-495468413	-81888985
Adjusted From Capital Fund (Depreciation)		663552900	537085710
Adjusted From Capital Fund (Write Off)		4673511	2374021
Transfer To Hefa		415000000	415000000
Transfer To Ircc Fund		364938055	367698218
Transfer To Reserve And Surplus Main Account		-710786902	-368183338
Transfer To Reserve and Surplus Donation Account		107611558	43055867
Balance Being Surplus/(Deficit) Carried To Corpus/Capital Fund		-710786902	-368183338
Significant Accounting Policies	23		
Contingent Liabilities and Notes On Accounts	24		

Note : Value of Rs. 710786902/- is arrived at after adding deficit of Rs. 899521/- (recurring) and Rs. 709887381/- actuarial value provision in r/o Leave Encashment, Gratuity and Pension



**RECEIPTS AND PAYMENTS FOR THE PERIOD FROM
01/04/2019 TO 31/03/2020**

(Amount in Rupees)

RECEIPTS	Amount In Rs.	PAYMENTS	Amount In Rs.
I. Opening Balances		I. Expenses	
a) Cash Balances	135994	a) Establishment Expenses	3719959359
b) Bank Balances	430653304	b) Academic Expenses	950197991
i. In Current accounts		c) Administrative Expenses	982551134
ii. In Deposits accounts		d) Transportation Expenses	5583792
iii. Savings accounts		e) Repairs & Maintenance	371666212
II. Grants Received		II. Payments against Earmarked/ Endowment Funds	280656
a) From Government of India	6762200000		
b) Grant in aid due in 2018 - 2019 received in 2019 - 2020			
c) From State Government			
d) PMRF	16160000		
III. Academic Receipts		III. Payments against Sponsored Projects/Schemes	1461586029
a) Fee from Students	748489517		
b) Other Receipts from Students	147710705		
c) All India Entrance Examination Receipts	235637975		
IV. Receipts against Earmarked/ Endowment Funds	21422467	IV. Payments against Sponsored Fellowships/Scholarships	
V. Receipts against Sponsored projects/Schemes	2426345248	V. Investments and Deposits made	8778583237
		a) Out of Earmarked/Endowments Funds	
		b) Out of own funds (Investments - Others)	
VI. Receipts against sponsored Fellowships/Scholarships	270752872	VI. Term deposits with Scheduled Banks	5886687938
VII. Income on investments from		VII. Expenditure on Fixed Assets and Capital Works - in - Progress	
a) Earmarked/Endowment Funds		a) Fixed Assets	1229063699
b) Other investments		b) Capital Works - in - Progress	318058907

RECEIPTS	Amount In Rs.	PAYMENTS	Amount In Rs.
VIII. Interest received on		VIII. Other Payments including statutory payments	1619130564
a) Bank Deposits	724151740		
b) Loans and Advances			
c) Savings Bank Accounts			
IX. Investments encashed	14475121624	IX. Refunds of Grants	
X. Term Deposits with Scheduled Banks encashed	0	X. Deposits and Advances	
		a) Advances account	561184080
		b) Refundable Deposits	103558963
		c) Recoverable Deposits	3424294
XI. Other income (including Prior Period income)	0	XI. Other Payments	
a) Continuing Education programme	0	a) Grants from other organisations	238246210
b) Miscellaneous Receipts	230022646	b) Sundry Creditors	333551190
c) Guest House receipts	43974737	c) Loan - Inter Department	
		d) Surplus transfer to Endowment	
		e) Other Payments -main account	471144922
		f) Other Payments -IRCC account	2052137578
		g) Other Payments -Donation account	256794749
XII. Deposits and Advances		XII. Closing balances	
a) Advances account	27357210	a) Cash in hand	294492
b) Refundable account	94201950	b) Bank balances	
c) Recoverable Deposits		I. In Current Accounts	402559267
		II. In Savings Accounts	
		III. In deposits Accounts	
XIII. Miscellaneous receipts including Statutory receipts	271962720		
a) Other Adjustable Accounts	74983878		
XIV. Any Other Receipts			
a) Grants from other Organisations	929046931		
b) Sundry Debtors	104669781		
c) Loan - Inter Department	50000000		
d) Other Receipts - Main account	123928096		
e) Other Receipts - IRCC account	1533862055		
f) Other Receipts - Donation Account	3453815		
TOTAL	29746245264	TOTAL	29746245264



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

CONTACT

Indian Institute of Technology Bombay
Powai, Mumbai 400076, India Tel: +91 22 2572 2545 | Fax: +91 22 2572 3480
Web: <http://www.iitb.ac.in>

Public Relations Officer,
Indian Institute of Technology Bombay
3rd Floor, Main Building, Powai, Mumbai 400076, India
Tel: +91 22 2576 7026/ 7027



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