DIRECTOR’S REPORT

Fifty-fifth Convocation
12th August 2017

By

Prof. Devang V. Khakhar
Director, IIT Bombay

INTRODUCTION

Mr. Manohar Parrikar, Dr. Yusuf K. Hamied, Mr. Dilip Shanghvi, Vice-Chancellor and President of Monash University Prof. Margaret Gardner, members of the Board of Governors, members of the Senate, parents, distinguished guests, colleagues and most importantly, graduating students.

I have great pleasure in welcoming you all to the 55th Convocation of the Indian Institute of Technology Bombay. We are indeed privileged to have with us, Hon’ble Chief Minister of Goa Mr. Manohar Parrikar, as our Chief Guest today and I thank him for accepting our invitation.

Mr. Manohar Gopalkrishna Prabhu Parrikar has been the Chief Minister of Goa since March 14, 2017. He served as the Defence Minister of India from November 2014 to March 2017.

Mr. Parrikar graduated in metallurgical engineering from IIT Bombay in 1978. He is the first IIT graduate to become the Chief Minister of any Indian state. IIT Bombay awarded Mr. Parrikar with the Distinguished Alumnus Award in 2001. He was awarded Indian of the Year in politics category in 2012 by CNN-IBN.

His political career started in the year 1994, when he became an MLA in the Goa Assembly. He soon climbed the organisational as well as legislative ladder to become opposition leader in the Goa Assembly in 1999. Mr. Parrikar went on to become the 10th Chief Minister of Goa on October 24, 2000 and continued to be so till 2005. He was re-elected and served another term as Chief Minister from 2012 to 2014.

In his earlier stints as the Chief Minister of Goa, he was instrumental in initiating various social welfare schemes like Dayanand Samajik Suraksha Yojana, which provides financial assistance to senior citizens, the Cyberage Scheme which provides computers to students, Chief Minister Rojgar Yojana, etc.

Mr. Parrikar was invited by Prime Minister Narendra Modi to join the central government in the Ministry of Defence.

Mr. Parrikar’s tenure as (Raksha Mantri) Defence Minister was marked by fast-paced decision-making as the Defence Acquisition Council (DAC)
cleared a range of projects. He had also pushed for a number of stalled acquisition projects. In 28 months, Mr. Parrikar as (Raksha Mantri) Defence Minister developed excellent relationships with the top brass of the three Services (Army, Navy and Air Force). His efforts significantly enhanced operational capabilities of the forces and boosted their morale.

He resigned from the post in March 2017, after the the Goa Legislative Assembly election to become Chief Minister of Goa.

I am delighted to announce that in this convocation, the Institute will honour Dr. Yusuf K. Hamied, Chairman, CIPLA Limited by conferring the Degree of Doctor of Science (Honoris Causa) for his outstanding contributions to the growth of the pharmaceutical industry.

I am also happy to announce that the Institute has decided to confer the ‘Life Time Achievement Award 2016-17’ on Professor N.B. Ballal, Department of Metallurgical Engineering and Materials Science for his services to IIT Bombay. He will be felicitated today.

I am pleased to inform you 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 59 years of its existence, more than 52,600 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 is an increasing focus of activity of the Institute coupled with strong efforts to see that the fruits of the research are translated into commerce through licensing or through start-ups. The Institute has been able to attract outstanding faculty members from not just India but other parts of the globe also. Today, I am happy to inform you that we have 629 faculty members on roll – the largest by far among all the IITs – 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.

The progress of IIT Bombay on all fronts has been creditable in the past year and I would like to acknowledge the devoted efforts of the faculty, staff and administration of the Institute towards these goals. I will now present a brief report of the Institute activities this year.

**ACADEMIC PROGRAMME**

IIT Bombay continues to make forays into newer territories pertinent to undergraduate and postgraduate education. After elaborate discussion at various levels in the Institute, a four-year Bachelor of Science program in Economics has been started this year with admission through the JEE(Advanced) for its 26 seats. Another new initiative is the offering of an interdisciplinary dual-degree program (B.Tech in one department and M.Tech in another) to the undergraduate students of this Institute.
With the possibility of minors already existing, actions such as the above allow for increased flexibility to the students to essentially custom-design their own curriculum and leap over any barriers that might exist between various disciplines. At the postgraduate level, a new doctoral program in Policy Studies (with 10 fellowships) has been initiated this year.

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). Among 23 IITs in the country, 41 out of top 50 rankers and 61 of top 100 rankers in JEE 2017 have joined IIT Bombay and 7 of the top 10 All-India JEE rank holders have chosen to join IIT Bombay. Similar trends are observed for the candidates qualifying in other entrance examinations as well.

With an increase in undergraduate (UG) and postgraduate (PG) intake, the student population has undergone significant changes in the last 10 years. In 2006-07, the number of on-roll UG students was 2460 (46.67 %) while the number of PG students was 2810 (53.32%) [Masters – 1598, PhD – 1212]. This changed to 3400 (43.79 %) and 4363 (56.17 %) for UG and PG students, respectively in 2011-12. Presently, the Institute has about 10169 students of which 4141 (41%) are UG and 6028 (59%) are PG.

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

The PhD student strength has increased in leaps and bounds in the last 15 years. From 771 PhD students in 2001-02, the number increased to 1879 in 2011-12 and currently stands at about 3000.

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 350. A significant fraction of these are in the engineering disciplines. All students involved in research at the Institute are given an opportunity to interact with the research community at the national and the international level by providing funds to attend international conferences. During the academic year 2016-17, 327 students were granted financial assistance for attending international conferences and an amount of Rs. 3,23,02,122/- was utilised for this purpose.

This year, four M. Tech students and one M. Des student were selected for the DAAD Scholarships 2016-17 under the Sandwich System for Master's students.

UG Teaching Assistantship: In an effort to make the senior UG students more self-sufficient and responsible towards academics, UG Teaching Assistantship was introduced during the academic year 2009-10. This year, 211 UG Teaching Assistants (115 in Spring Semester and 96 in Autumn Semester) were appointed to assist the faculty members in conducting the various UG courses.
In this Convocation, a total of 2612* degrees will be awarded. These include 357 PhD., 32 (M.Tech./M.Phil + PhD), 20 Dual Degree (M.Sc. + PhD), 6 M.Sc (by Research), 8 Dual Degree(M.Sc.+M.Tech), 4 Dual Degree (M.Sc.+M.Phil.), 590 M.Tech., 50 M.Des., 25 M.Phil., 117 M.Mgt., 220 two-year M.Sc., 29 five-year integrated M.Sc., 482 Dual Degree (B.Tech. + M.Tech.), 616 B.Tech Degrees, and 21 PGDIIT. I am glad to announce that this year, we will be granting 15 joint PhD's along with Monash University. Prof. Margaret Gardner, Vice-Chancellor and President of Monash University is here to confer the degrees in person. (* including 179 degrees awarded during interim convocation)

The possibility of a minor in Entrepreneurship for B.Tech students was approved in the recent years. I am happy to announce that 5 of the graduating B.Tech students have completed a minor in Entrepreneurship.

This year, 33 research scholars have been selected for the ‘Award for Excellence in PhD thesis’ for the year 2015-17.

RESEARCH AND DEVELOPMENT ACTIVITIES

Research and development activities at IIT Bombay are growing rapidly. During the last ten years, R&D receipts grew over 42 percent at a compound annual growth rate (CAGR) and with a remarkable increase of 55% over last year. The R&D receipts for projects during the financial year 2016-17 is Rs. 390 crores. Figure 1 shows the growth of research funds in the last few years.

![Figure 1: Growth of R&D receipts in the last decade](image)

1. Overview

During the year 2016-17, new R&D projects were initiated in all the 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).
Table 1: Information on new projects sanctioned during last 3 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Sponsored Projects</th>
<th>Consultancy Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Sanctioned outlay (Rs. in crores)</td>
</tr>
<tr>
<td></td>
<td>294</td>
<td>165.25</td>
</tr>
<tr>
<td>2014-15</td>
<td>261</td>
<td>255.5</td>
</tr>
<tr>
<td>2015-16</td>
<td>297</td>
<td>499.3</td>
</tr>
<tr>
<td>2016-17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sponsored projects sanctioned outlay ranges during the financial year 2016-17 from few lakhs (in Rs.) to Rs.160 crores and the distribution of outlay ranges is shown in the Figure 2.

Figure 2: Distribution of Sponsored projects-sanctioned outlay ranges

External Grants for R&D

The total money received for R&D activity in 2016-17 was Rs. 393.46 crores (Table 2). This includes grants received in the year for the new projects sanctioned and the ongoing projects.

Table 2: Money received for R&D in 2016-17

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Number</th>
<th>Funds received (Rs. in crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponsored Projects</td>
<td>631</td>
<td>342.96</td>
</tr>
<tr>
<td>Consultancy Projects</td>
<td>706</td>
<td>47.15</td>
</tr>
<tr>
<td>Royalty</td>
<td>-</td>
<td>1.24</td>
</tr>
<tr>
<td>Equipment usage</td>
<td>-</td>
<td>2.11</td>
</tr>
<tr>
<td>Total</td>
<td>1337</td>
<td>393.46</td>
</tr>
</tbody>
</table>
The R&D work continues to be mainly supported by the government entities (Figure 3 and Table 3). Table 4 indicates some of the major sponsors from industry and other sponsors.

![Pie chart showing distribution of receipts from different agencies]

**Figure 3: Distribution of receipts from different agencies**

<table>
<thead>
<tr>
<th>Agencies</th>
<th>Grant received (Rs. in crores)</th>
<th>Number of new / ongoing projects funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Human Resource Development</td>
<td>62.39</td>
<td>15</td>
</tr>
<tr>
<td>Department of Science &amp; Technology</td>
<td>49.81</td>
<td>201</td>
</tr>
<tr>
<td>Ministry of New And Renewable Energy</td>
<td>38.21</td>
<td>10</td>
</tr>
<tr>
<td>Ministry of Culture</td>
<td>31.00</td>
<td>1</td>
</tr>
<tr>
<td>Department of Electronics &amp; Information Technology</td>
<td>24.77</td>
<td>18</td>
</tr>
<tr>
<td>Defence Research &amp; Development Organisation</td>
<td>16.72</td>
<td>26</td>
</tr>
<tr>
<td>Department of Biotechnology</td>
<td>15.61</td>
<td>46</td>
</tr>
<tr>
<td>NTPC Energy Technology Research Alliance</td>
<td>11.72</td>
<td>5</td>
</tr>
<tr>
<td>Board of Research in Nuclear Sciences</td>
<td>9.74</td>
<td>38</td>
</tr>
<tr>
<td>Rajiv Gandhi Science and Technology Commission</td>
<td>7.40</td>
<td>2</td>
</tr>
<tr>
<td>Ministry of Textiles</td>
<td>7.39</td>
<td>2</td>
</tr>
<tr>
<td>Indo-US Science &amp; Technology Forum, New Delhi</td>
<td>3.95</td>
<td>8</td>
</tr>
<tr>
<td>Oil &amp; Natural Gas Commission</td>
<td>3.47</td>
<td>7</td>
</tr>
<tr>
<td>Ministry of Environment, Forest &amp; Climate Change</td>
<td>3.25</td>
<td>3</td>
</tr>
<tr>
<td>Indian Space Research Organisation</td>
<td>2.64</td>
<td>5</td>
</tr>
<tr>
<td>Aditya Birla Science and Technology Co Ltd.</td>
<td>2.37</td>
<td>1</td>
</tr>
<tr>
<td>Power Grid Corporation of India Limited</td>
<td>2.10</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4: Sponsors from Industry and other organisations

| Applied Materials Inc., USA       | Aditya Birla Science and Technology Co. Ltd., Mumbai |
| Faceook, USA                     | Bihar Rajya Pul Nirman Nigam Limited, Patna         |
| Google, USA                      | CEAF Tyres Ltd., Mumbai                             |
| Indo-German Science and Technology Centre, Germany | CIDCO Limited, Navi Mumbai                           |
| International Business Machines Corporation, USA   | Grind Master Machines Pvt. Ltd., Aurangabad         |
| Johns Hopkins Bloomberg Scholl of Public Health, USA | IDEA Cellular Limited                              |
| Murata Manufacturing Co., Ltd., Japan | IL&FS Transportation Networks Limited, Mumbai       |
| Oracle, USA                      | Intel Technology India Pvt. Ltd., Bengaluru        |
| Qualcomm, USA                    | Jalpa Devi Tollways Limited, Bhopal                 |
| Research Council of Norway, Norway | Jamsetji Tata Trust, Mumbai                         |
| Sandvik Materials Technology, UK  | Jaysbree Machines & Tools, Mumbai                   |
| Seagate Technology LLC, USA       | Larsen & Toubro Limited, Mumbai                     |
| Secretariat of the Basel, Rotterdam and Stockholm conventions, Sweden | Oil & Natural Gas Commission, Dehradun, Uttrakhand |
| Terra Biologics, USA             | SAP India Pvt Ltd., Mumbai                          |
| The Boeing Company, USA          | Shapoorji Pallonji and Company Pvt. Ltd., Mumbai    |
| U S India Educational Foundation, USA | State Bank of India, Mumbai                        |
| Volkswagen Ag, Germany           | Tata Education and Development Trust, Mumbai        |
| Wellcome Trust, UK               | Wadhwani Foundation, Bengaluru                      |

Institute continues to get international funding for research and our international interactions (with countries) are shown in Figure 4.

![Figure 4: International Interactions](image)

Some major sponsored projects initiated:

- **Centre of Propulsion Technology**
  
  Sanctioned outlay: Rs. 160 crores over five years
  
  Funding agency: Defence Research and Development Organization
• National Centre for Photovoltaic Research and Education (NCPRE) Phase-II
Sanctioned outlay: Rs. 62.35 crores over five years
Funding agency: Ministry of New and Renewable Energy

• Solar Urja Lamps (SoUL Program)-Distribution of 5 lakh lamps & 70 lakh lamps
Sanctioned outlay: Rs. 64.73 crores over two years
Funding agency: Ministry of New and Renewable Energy

• Design Development and Prototype of 720 Gbps capable Transport Cross Connect Prototype
Sanctioned outlay: Rs. 11.15 crores over two years
Funding agency: Defence Research & Development Organisation

• Teaching Learning Centre for Information and Communication Technologies
Sanctioned outlay: Rs. 9.75 crores over four years
Funding agency: Ministry of Human Resource Development

• High Resolution Mass Spectrometry based Proteomics Research and Training Facility
Sanctioned outlay: Rs. 9.67 crores over five years
Funding agency: Department of Biotechnology

• Development of Lab-on-chip platforms for efficient and automated farming Agricultural Sensors
Sanctioned outlay: Rs. 9.55 crores over three years
Funding agency: Department of Science & Technology

• Centre for Computational Engineering and Science
Sanctioned outlay: Rs. 4.99 crores over three years
Funding agency: Board of Research in Nuclear Sciences

• Design & Development of a single cylinder free piston Stirling engine for net 3 kW electrical output using solar energy as input
Sanctioned outlay: Rs. 1.68 crores over three years
Funding agency: ONGC Energy Centre Trust, Delhi

• Ministry of Human Resource Development (MHRD) funded seven projects with an outlay of Rs. 17 crores over two to three years under Uchhatar Avishkar Yojana (UAY) scheme with a view to promote innovation in areas that are directly of relevance to the manufacturing industry. Under this scheme, each project is funded by MHRD (50%), participating industry (25%) and the rest (25%) by participating Department/ Ministry such as Department of Science and Technology, Ministry of Environment, Forest and Climate Change, Ministry of Health & Family Welfare, Ministry of Heavy Industries and Public Enterprises. MoUs between Institute and the partnering industries were signed in the presence of Hon’ble President at the function held during Visitors Conference at Rashtrapati Bhavan, New Delhi on November 16, 2016.
In addition, MHRD has initiated new scheme called **IMPacting Research INnovation and Technology (IMPRINT)** focussing research to solve major engineering and technology challenges in ten domains needed by the country. Thus it aims to enable, empower and embolden the nation for inclusive growth and self-reliance. IMPRINT scheme was launched by the Honourable President of India, in the presence of the Honourable Prime Minister of India and the Honourable Union Minister of Human Resource Development on November 5, 2015.

Under this scheme, each project is funded by MHRD (50%) and the rest (50%) by participating Department/ Ministry such as Department of Science and Technology and Indian Council of Medical Research, Ministry of Power, etc. At the first stage, MHRD funded eleven projects for our Institute with an outlay of Rs. 28.8 crores over two to three years.

Efforts were made to disseminate information and provide support to faculty regarding project funding from sponsors (both national and international).

**Consultancy activities:** Consultancy activities were taken up for 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.
Some consultancy projects initiated

- Advanced combustion models
- Air quality monitoring and emission source apportionment studies for 10 cities
- Analysis of Algorithmic Trading, HFT & Colocation in Indian securities market
- Battery electrode materials characterization
- Capacity evaluation of underground metro structures
- Classification of chemical compounds
- Demonstration of biogas scrubber using water
- Design and development of an online platform for HR services
- Design improvement in aesthetics and ergonomics of guard for Victory and Galaxy machines
- Developing processes for manufacture of various fragrance compounds
- Development of Continuous Flow Process
- Development of environmentally sound management of hazardous waste in Chittagong, Bangladesh and Gadani/Hub, Pakistan
- Development of process strategies for BOF steel making
- Effluent treatment plants study at Mumbai trans harbour link
- Energy audit of Haryana distribution utilities
- Evaluation of enterprise wide data warehouse software
- E-water project for Godavari basin
- Extreme wind and wave data analysis for Bavanapadu port
- Hazardous waste audit
- Interoperability of set top box
- Mechanism of film formation
- Mould cleaning by laser technology
- Municipal solid waste-classification & characterisation
- Noise reduction of cooling towers in hotel
- Quantifying the ecosystem services of Park
- R&D of current and future education projects
- Ridership estimation study
- Set up a pilot plant of pigment grade Titanium Di-Oxide
- Setting up of wind augmentation and air purifying unit for traffic junctions and congested roads
- Solar steam generator with absorber integrated storage and cooker
- Stabilizing Lipase and Protease via conjugation with Polymer Surfactants
- Statistical analysis of Interregional Flows
- Studies on ANG system for NG storage in transport networks
- Surge analysis
- Technology roadmap for Tata Communications’ transmission core, wireline & wireless access network
- Validation of wireless links – BharatNet Planning tool
Internal Grants for R&D

The Institute provided internal funding for supporting faculty research and student activities. Around Rs. 47.6 crores were sanctioned for these activities, which included the following:

- Seed grant for initiation of research for new faculty and healthcare consortium
- Augmenting research resources of faculty recipients of research/review paper/ Young Investigator awards
- Research internships and fellowships for PhD students
- Student research/competition: projects such as Automotive Racing, Intelligent Ground Vehicle Competition and Underwater Vehicle
- Augmenting research facilities and maintenance of central and national research facilities
- Leverage grants and bridge grants
- Grants for development of prototypes

R&D Award Grants from External Agencies

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

Department of Science & Technology awarded:
- Swarnajayanti fellowship in Mechanical Engineering
- Ramanujan fellowship awards in Physics
- Faculty Innovation in Science Pursuit for Inspired Research (INSPIRE) grant in Earth Sciences, Industrial Engineering and Mathematics
- Post-Doctoral Fellowship in Civil Engineering
- Women Scientist Fellowship in Biosciences and Bioengineering
- C.V. Raman international Fellowship for African Researchers (from Tunisia) in Electrical Engineering

Department of Atomic Energy awarded
- Dr. Raja Ramanna Fellowship in Mathematics

Ministry of Human Resource Development awarded
- Fellowships to visiting Canadian students (9 Nos.) under student research mobility programme of the World Bank-assisted technical education quality improvement programme

Industry awarded
- Google India PhD Fellowship in networking
- Qualcomm Innovation Fellowship in Computer Science & Engineering
2. Licensing Activities

a) Entrepreneurship:
Rights to technology/ Intellectual Property created in the Institute were given to researchers for incubation/ entrepreneurship activity. The incubated companies started during this year in SINE are as follows:
- Swasthya Guru
- WKA Technologies Pvt. Ltd

b) Technology Transfers:
We continue to receive royalties for different IPs licensed in the past. Some of the technologies licensed in this year are:
- A surgical instrument with multiple degrees of freedom
- Board games design
- Design for high performance compliant mechanisms
- Designing of thermal atomic layer deposition system
- Fuel additives for improving efficiency
- Method for frictionless precision guidance using flexible links in vertical plane
- Multi utility heat pump
- Omnipresent ethernet router
- Software for bid matching in power exchange
- Super heat recovery water heaters based on tube heat exchangers
- Technology on wind augmentation and purifying unit
- Web based software for transmission usage cost and loss allocation

3. Dissemination/Outreach:

- Asia Pacific HRM Congress & National CSR Leadership Congress Meet – 2016

IIT Bombay organized R&D Exhibition in the Asia Pacific HRM Congress & National CSR Leadership Congress and Awards (15th Edition) event held during September 1-2, 2016 at Vivanta by Taj, Bangalore. It was organized by Times Ascent and theme for the Congress was “Next Now..? The Future is Now”. About 250 HR Heads & CSR Leaders from industry participated in the event. IIT Bombay showcased CSR opportunities at the Institute and exhibits included posters on technologies developed in the Institute (both in print and video version).

- International Engineering and Technology Fair – 2017
IIT Bombay participated in the International Engineering and Technology Fair - 2017, organised by the Confederation of Indian Industries, held in Pragati Maidan, New Delhi during February 2-4, 2017. More than 300 international and domestic industries participated in the event and the themes were industrial automation, green mobility, real estate, water and welding. IIT Bombay showcased the technologies and IP assets of the Institute in the KnowledgeExpo domain of the event. IIT Bombay’s posters, flyers and brochures were very well received.

- **International Engineering Sourcing Show-VI**

IIT Bombay participated in the International Engineering Sourcing Show-VI organised by the Engineering Export Promotion Council, Ministry of Commerce & Industry along with Russia at Chennai Trade Centre, Chennai during March 16-18, 2017. The theme of the show was Manufacturing (Smart Tech for Smart Engineering). The event was inaugurated by Hon. Ms. Nirmala Sitharaman, Minister of State for Commerce & Industry (Independent), Govt. of India and Mr. Denis Manturov, Hon. Minister of Industry & Trade, Russia. The event had an exclusive Technology and Innovation Pavilion where IIT Bombay, IIT Madras and few other research institutions participated and show-cased their innovations especially in the areas of manufacturing. In addition, ~400 exhibitors mostly from micro, small and medium enterprises participated at the show.

IIT Bombay exhibits included few prototypes, posters on technologies developed in the Institute (both in print and video version), and IIT Bombay videos. We distributed R&D Resources booklet, Technology brochure and R&D Highlights fliers. IIT Bombay stall attracted an overwhelming response mostly from R&D personnel from the government institutions, industry, students apart from general public.

- **TechConnect 2016**

‘TechConnect 2016’ was organised during Techfest event held at IIT Bombay between December 16-18, 2016 to showcase R&D exhibits from
different academic units. Brochure on ‘Academic Programs’ prepared by IRCC was released by the Director on December 16, 2016. Stalls from Office of the Dean(R&D) and Academic Office exhibited posters on technology development and distributed respective brochures to visitors. A large number of students and general public visited the exhibition.

- **Publications of Booklets:**

Brochures titled ‘R&D Highlights’, ‘Intellectual Property available for licensing’, ‘Innovations licensed to industry’, ‘Partner with us’ highlighting the possible modes of interactions between IIT Bombay and Industry were updated.

These brochures were distributed in various industrial forums like International Engineering & Technology Fair- 2017, International Engineering Sourcing Show - VI, Asia Pacific HRM Congress & National CSR Leadership Congress meet - 2016 as well as to visitors of the Institute to disseminate information on R&D activities and industry interactions of the Institute.

A brochure titled “Glimpses of Research” describing the research work of some of the faculty members was published in the Institute. It was released by Mr. Sanjai Kohli of Facebook during the National Education Day function held on November 11, 2016 in the Institute.

**4. Augmentation of Research Infrastructure**

As part of creating and upgrading infrastructure for enabling R&D activities, the Institute has been establishing state-of-the-art equipment, based on the recommendations of the Research Infrastructure Funding Committee (RIFC). Under this initiative, this year, Bio Safety Level-2 Laboratory at the Department of Biosciences & Bioengineering was established. In addition, several equipments and facilities were procured from external grants. Some of these are as listed below:

- Field emission Electron Microscope and accessories
- Flow Cytometer System with 5 Lasers
- High Temperature Conical Nozzle Levitator instruments
- Omni-directional laser cladding system
- Scala Platform facility -Integrated electronics and optical measurement unit
- SDR- based 5G platform
- Universal Testing Machine-250kN capacity
5. Intellectual Property (IP) Protection Activities

During the year, 109 patent applications were filed. List of all Indian and international IPR filed & granted are given in Table 5.

Table 5: Patents Applications file during 2016-17

<table>
<thead>
<tr>
<th>IP type</th>
<th>Applications filed (No.)</th>
<th>Granted (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Patent</td>
<td>86</td>
<td>20</td>
</tr>
<tr>
<td>PCT</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>US Patent</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Trademark</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Design</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Some of the trademarks are given below:

IIT Bombay continued its efforts for licensing of these technologies, products and designs

Areas of IP filings included: Biomedical devices & Biosensors, Chemical processes, Communication systems & ICs, Drug delivery systems, Electronic & Energy storage devices, Light weighting of vehicle bodies, Memory Devices, MEMS sensors, Microfluidics, Multilevel converters, Optics, Photovoltaics, Precision motion, Robotics, Synthesis of nano fibres, Vortex Flow metering, Water Pollutant Filters, Wireless Communication systems and others.
As in the previous year, proactive efforts were made to assess the possibility of intellectual property in the work of M.Tech./Dual degree students to file for possible protection. For this, almost 587 abstracts were reviewed, out of which about 14 were shortlisted for a possible filing of patent applications and five patent applications were filed.

Nearly 50 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.

6. Awards for Intellectual Property Activities

i) Clarivate Analytics India Innovation Awards 2016

The Institute was awarded as one of the ‘Top 50 Indian Innovators’ for the year 2016 by Clarivate Analytics (formerly the Intellectual Property & Science division of Thomson Reuters) for its spirit of innovation in R&D.

![Clarivate Analytics India Innovation Awards 2016](image)

The award honours the most innovative commercial enterprises, research organizations and academic institutions headquartered in India for their innovation in R&D as represented by both the level and quality of patents.

It has identified the top 50 Indian Innovators as the award winners based on various patent metrics – volume, grant success rate, extent of globalization and Influence of innovation (citations).

ii) National Award for the Animation Film – Hum Chitra Banate Hai

Animation film, ‘Hum Chitra Banate Hai’, directed by Prof. Nina Sabnani, Industrial Design Centre (IDC), produced by IDC and animated by Mr. Piyush Verma and Mr. Shyam Sunder Chaterjee was awarded Rajat Kamal
Award for the Best Animation Film by the Government of India under Non-Feature Films category at the 64th National Film Awards for the year 2016. The initial research activity of this work was funded by the Institute as ‘Seed Grant project’ to Prof. Sabnani in 2008.

7. Focused Initiatives

Several initiatives have been taken to promote and facilitate R&D activities, especially to encourage students to focus on R&D. Some of them are:

a. Enhancing industry partnership

Institute continued its efforts to enhance its interaction with industry. Visits by industry 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. New initiatives to promote linkages with industry were rolled out:

- Undergraduate student research internships in core industry leading to academic credits and
- Simplified terms for short duration visits by faculty to industry for R&D collaboration.

In addition, brochures and booklets were published and updated, highlighting the interactions with industry and disseminating the possible modes of collaboration.

Seven projects were initiated with industry partners under the Uchchatar Avishkar Yojana scheme launched by the Government of India. Nearly 200 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 IIT Bombay to explore research collaborations:

- Bosch,
- IBM,
- JCB,
- BSNL,
- Gas Authority of India Ltd. (GAIL),
- Bharat Forge,
- Hilti Corporation,
- Amazon,
- TATA Steel,
- BASF,
- Shell,
- Total,
- Toray Industries,
- ICL Innovation,
- Panasonic,
- Siemens,
- Murata Manufacturing,
- Ericsson,
- Suzlon,
- Indofil Industries,
- Lear Corporation,
- Wadia Group,
- Faurecia Interior Systems,
- Deniar,
- CEAT Tyres,
- RPG Enterprises,
- KEC International,
- Dhall Industries,
- Reliance Industries,
- MasterCard,
- L&T,
- Torrent Pharmaceuticals,
- Unilever,
- Tofler,
- Samsung Electronics,
- TE Connectivity Solutions,
- SBI,
- Semiconductor Research Corporation (SRC),
- Mahindra Comviva,
- Marvel Electronics,
- Huawei Technologies,
- Hindustan Petroleum Corporation Ltd. (HPCL),
- Mercedes Benz,
- BookMyShow,
- Chemlayer,
- Science and Engineering Research Board (SERB),
- SG Pharma, Kirloskar Oil Engines,
- Essar Steel,
- Jost Engg.,
- CME Group,
- Mumbai Fisheries & Seafood Ltd.,
- Eco Earth Solutions,
- HD Fire Protect,
- Georgia Gullini Fashions, etc.

b. Healthcare Research Consortium:

Healthcare Research Consortium Management Committee Meeting and Advisory Committee meetings were held in March 2017. Term of the consortium has been extended by five years. Two new seed grant proposals were approved this year. The members appreciated seed funding scheme that has helped researchers to write bigger collaborative projects. The consortium members agreed that focussed group discussions around thematic areas and increased academic collaborations and periodic networking sessions between the members is vital. Healthcare start-ups (BioNEST medtech incubator in SINE) will play an important role in taking the collaborative research to market.
c. **Institute Ethics Committee (IEC)**

The ethics committee **reviewed 25 proposals** of which **16 were approved** and the rest are under review. Guidelines have been revised to incorporate provisions for expedited review which will allow quicker turn-around-time for proposals involving less than minimum risk to the participants. In order to ease the pressure on primary reviewers due to increasing number of proposals, IEC was expanded to include more scientists/ clinicians/ experts. Training sessions have been conducted for the new committee members to keep them updated on their roles and responsibilities. Training on latest Health Ministry Screening Committee guidelines for “International collaboration involving clinical data” was imparted to all committee members to keep them up-to-date with the latest regulatory guidelines in clinical research.

d. **Incentives for R&D**

IRCC-IIT Bombay Research awards were instituted in 2004. The decade-old guidelines governing nominations, reviewing and selection, etc was reviewed by the Director-appointed committee as substantial changes in the research and development landscape of the Institute was observed during the last 12 years. The Committee recommended the following awards and guidelines for its review and selection among others:

- Research Publication Award
- Impactful Research Award
- Research Dissemination Award
- Early Research Achiever Award

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

<table>
<thead>
<tr>
<th>Awards Name</th>
<th>Names of Recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Publication Award</td>
<td>Prof. Mahesh S. Tirumkudulu, Department of Chemical Engineering</td>
</tr>
<tr>
<td></td>
<td>Prof. Chebrolu Pulla Rao, Department of Chemistry</td>
</tr>
<tr>
<td></td>
<td>Prof. Sagar Mitra, Department of Energy Science &amp; Engineering</td>
</tr>
<tr>
<td></td>
<td>Prof. (Ms.) P. Ramadevi, Department of Physics</td>
</tr>
<tr>
<td>Impactful Research Award</td>
<td>Prof. Maryam Shojaei, Department of Electrical Engineering</td>
</tr>
<tr>
<td></td>
<td>Prof. V.S. Raja, Department of Metallurgical Engg. and Materials Science</td>
</tr>
<tr>
<td>Research Dissemination Award</td>
<td>Prof. Harkesh B. Singh, Department of Chemistry</td>
</tr>
<tr>
<td></td>
<td>Prof. Vishnu D. Sharma, Department of Mathematics</td>
</tr>
<tr>
<td>Early Research Achiever Award</td>
<td>Prof. Supreet Saini, Department of Chemical Engineering</td>
</tr>
<tr>
<td></td>
<td>Prof. Srikant Srinivasan, Department of Mathematics</td>
</tr>
<tr>
<td></td>
<td>Prof. Dinesh Kabra, Department of Physics</td>
</tr>
</tbody>
</table>
Rewards for research excellence, technology development and transfer efforts, awarded during the year are as follows:

<table>
<thead>
<tr>
<th>Awards Name</th>
<th>Names of Recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.C. Bhattacharya Award for Excellence in Pure Science</td>
<td>Prof. Amiya K. Pani, Department of Mathematics</td>
</tr>
<tr>
<td>H.H. Mathur Award for Excellence in Applied Science</td>
<td>Prof. Rinti Banerjee, Department of Biosciences and Bioengineering</td>
</tr>
<tr>
<td>Dr. P.K. Patwardhan Technology Development Award</td>
<td>Prof. Anirban Guha, Prof. C. Amarnath, Prof. B. Seth, Prof. K. Kurien Issac and Mr. Abhay Kharade, Department of Mechanical Engineering</td>
</tr>
</tbody>
</table>
Awards recognition included cash awards, research grants and arranging Institute wide dissemination through lectures and electronic media.

<table>
<thead>
<tr>
<th>Awards Name</th>
<th>Names of Recipients</th>
</tr>
</thead>
</table>
| Research Internship awards   | Given to bright students across the country to undertake research at IIT Bombay for six months, based on national advertisement and selection process. Each selected intern gets monthly stipend of Rs. 10,000/- for six months.  
  - No. of applications received: 418  
  - No. of Intern selected: 86  
  - No. of Intern joined : 64 |

a. Dissemination/Outreach

**Workshop on Central facilities** was held on 23rd and 24th November 2016 to disseminate information about the central facility (CF) - capability, usage and research output to the academic community. Conveners of thirty five central facilities made presentations on technical specification & capability, types of experiments carried out and the usage. About 100 faculty members and students attended the workshop. Parallel Poster presentations were held showing the detailed research output (technical) obtained from the facility by the students.

Lectures by domain experts (faculty members from Institute and Tata Institute of Fundamental Research) on the work of **Winners of the Nobel Prize 2016** were organised at the Institute on November 3, 2016.

IP workshop for students and faculty members was organised at the Institute on January 25, 2017. Workshop had detailed presentations on Institute’s Intellectual Policy, IP Protection and Management process and IP Commercialisation activity.

f. Safety activities at the Institute

Keeping in mind the importance of safety, a workshop on Laboratory Safety was conducted on February 2, 2017. Around 125 people, students, faculty and staff members attended the workshop. Safety seminars were conducted in the Departments of Biosciences and Bioengineering, Chemistry, Physics and Centre of Excellence in Nanoelectronics. The Institute started online safety test consisting of multiple choice questions (~100 Nos.) with the aim to bring awareness on fire, chemical and gas cylinder safety. The students are required to go through the safety videos and other information available on the institute safety portal and then attend the test. Department of Biosciences and Bioengineering conducted this test for all its students. It is planned to conduct this test for all new students who will be joining in July, 2017.
g. Online processes

Online interface of R&D activities continued to make it more user-friendly. Few of the activities automated in this year are as follows:

- Module for research/patent write ups & its review
- Faculty members can send online request for advance and honorarium from respective DDF
- Automated scanning, attachment and dispatch of appointment / joining letters of Project staff
- Bulletin board for outside campus accommodation
- Biometric attendance, CL approval & its administration of IRCC staff
- Modification of consultancy request and its follow-up process
- Modification of sponsored projects administration proposal, sanctions, funds management & service tax
- Online web portal for 'Online Safety test', planned for new students who will be joining in the Institute in July/ later on
- NET & GATE score captured in online job opportunities portal.

For ERP system: Preparation of document, process & data; training to implementing ASC staff and related activity.

For ERP system: Preparation of document and process of all IRCC activities, training to implementing staff and related activity.

i. Project Manpower

The number of project staff working in various projects as on March 31, 2017 is 1310. Of them, 368 joined during the financial year 2016-17. Rules for accommodation of project staff were reviewed during this year and online processes were implemented for circular, applying and allotment of quarters.

OUTREACH PROGRAMMES

The Continuing Education Programme & Quality Improvement Programme (CE &QIP) office at IIT Bombay have 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 & students from academia have participated and acquired knowledge from short and long term courses during 2016-17.

The CE & QIP office took up the role of national co-ordinatorship for the QIP under AICTE, for the last 2 years. All the QIP admissions across the country were successfully co-ordinated by the office. Also, a number of short term training programs (STTP) courses, which are fully funded by the All India Council for Technical Education (AICTE) for faculty members
of engineering colleges, were conducted. 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 the various QIP courses.

Many of our CEP courses for the industry are now well established worldwide and continue to attract large participation, both from within as well as from abroad. The courses on “3D Printing”, “Urban Drainage Management”, “Human Computer Interaction”, “Energy Management”, “Elements of Chemical Engineering”, “Executive Programme in Management”, “Leadership Development Program”, “Dynamics and Control in State-Space (DCSS)”, “Expo CD and Expo PDI”, “Strategies for Organization’s Growth”, “Finite Element Method and Application”, “System Engineering and Principles”, “Data Analytics”, have all been appreciated by the industry.

During 2016-17, a large number of courses under **TEQIP II** for Engineering College teachers and students on new emerging areas were conducted. Amongst other programs, the courses on “Biology for engineers”, “Technology driven innovation”, “End to end innovation”, “Advances in Control systems and optimization”, “Innovations in teaching methodologies”, “Introduction to Research methodologies”, were conducted as per the requirement of the colleges/universities and industries.

The CEP course on “Piping Engineering” (contact version) has reached another milestone and has crossed its 70th edition in 2016. About 10000 engineers have registered in the last 25 years. The on-line version of the course on “Piping Engineering” commenced in July 2009 and has continued during the current year. Till now, over 500 participants have registered from all over the world and the list is expected to grow many folds in future.

In terms of the overall performance of CE&QIP during 2016-2017, a total of 152 CEP courses were conducted with about 2935 participants from across different disciplines as well as industries, organizations and institutions, with a revenue of around 7.58 crore (an increase of above 13%). Under the QIP category, **4 M.Tech and 11 PhD students** from AICTE approved engineering colleges were admitted. In addition, **13 teachers** were inducted into PhD programme under the advance admission scheme who would be joining the institute for the regular programme from July 2017. Further, **8 short term courses** (STC) were conducted for college teachers under the sponsorship from AICTE and a total of 248 participants from various engineering institutions/colleges attended these courses.
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 2016-17, IIT Bombay has signed 32 MoUs with various foreign universities and received functionaries from many universities, governmental and ministerial delegations, from countries across the globe, for exploring areas of collaboration and cooperation.

MoUs with Foreign Universities:

- Charles Darwin University, Australia
- University of Calgary, Canada
- Institut Mines-Telecom, France
- Texas Tech University, USA
- Malardalen University, Sweden
- University of Mons, Belgium
- Siberian Federal University, Russia
- The Ohio State University Institute for Materials Research, USA
- Yonsei University, Korea
- Nara Institute of Science and Technology, Japan
- National Tsing Hua University, Taiwan
- Freie University of Berlin, Germany
- Technische Universitaet Darmstadt, Germany
- Federal University of Minas Gerais (UFMG), Brazil
- Institut Superieur De L'Aeronautique et de l'Espace (ISAE-SUPAERO), France
- Ecole de Technologie Superieure, Canada
- Augsburg University of Applied Sciences, Germany
- Ontario Universities International, Canada
- University of Alberta, Canada
- Simon Fraser University, Canada
- St. Ignatius of Loyola University, Peru
- Washington University in St. Louis, USA
- Koc University, Turkey (Erasmus+ Programme)
- Holon Institute of Technology, Israel
- University of Cologne, Germany
- Kochi University of Technology, Japan
- Sharif University of Technology, Iran
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. Andrew S. Whittaker (Professor and Chair), Prof. Kellie Stanchak (Graduate Academic Coordinator) from Dept. of Civil, Structural & Environmental Engineering, University of Buffalo, USA.
- President of Universidad San Ignacio de Loyola in Peru, Dr. Ramiro Salas Bravo, Mr. Raul Diez Canseco Terry, Founding President of the University, Mrs. Luciana de la Fuente; Executive President, Mr. Diego Castrillon Diores, Head of Projects of the General Management visited IIT Bombay to discuss the possibilities of cooperation between the two institutions.
- Prof. Adam Habib (Vice Chancellor), Prof. Ian Jandrell (Dean of Engineering and the Built Environment), Ms. Kanina Foss (Chief of staff to the Vice Chancellor) from Witwatersrand University, Johannesburg, South Africa.
- Dr. Bertrand de Hartingh, (Counsellor for Cooperation and Cultural Affairs), Dr. Nicolas Idier (Books, Ideas and Knowledge Attache), Ms. Estelle Berruyer (Cultural Attache) from New Delhi and Mr. Alain Zayan, Director, Alliance Francaise, Mumbai.
- A delegation lead by Prof. Wei-Chung Wang, Senior Advisor for Global Affairs, National Tsing Hua University, Taiwan.
- A delegation led by Dr. Kim, Yong-Hak, President, Prof. Jooni Kim, Vice President and Professor of Law and team from Yonsei University, Korea.
- Cen Huang (Ms), Associate Vice President and team from University of Alberta.
- Dean Anil Makhija and Senior Associate Dean Peter Ward from Fisher College of Business, The Ohio State University.
- Prof. Maria do Rosario Trindade (Head of Cooperation Division) and Prof. Luis Filipe Malheiros (Full Professor and Subdirector of the Department of Metallurgical and Materials Engineering) from the Faculty of Engineering University of Porto (FEUP), Portugal.
- Japanese Ambassador Mr. Hiramatsu Kenji visited IIT Bombay on August 17, 2016 and gave a lecture regarding Indo-Japan relationship and interacted with the students.
- Ambassador of Finland to India Ms. Nina Vaskunlahti.
• Mr. Mauro Moruzzi, Ambassador, Head International Relations and State Secretariat of Education, Research and Innovation in Switzerland.
• Dr. Zerihun Kebede Wudie (Academic Research-General Director-From Ministry of Education), Mr. Mitiku Berecha Hunde (Head of Scholarship Office-From Ministry of Education), Mr. Asalf Habtegeorgis Wondemgezahu-Minister Counsellor-I (Education) from the Ministry of Education, Ethiopia.
• Prof. Yaron Oz, Rector and team from Tel Aviv University, Israel.
• Professor Phil Wright, Pro Vice Chancellor for Science Agriculture and Engineering, Newcastle University, UK.
• Prof. Bruce E. Seely (Dean, College of Sciences and Arts) and Prof. Ravindra Pandey, (Chairman, Department of Physics) from Michigan Technological University, USA.
• President and Vice-Chancellor Dr. Andrew Petter, Prof. Faisal Beg (School of Engineering Science), Carol Zachs (Director, International Partnerships and Protocol), Prof. Mirza Faisal Beg (School of Engineering Science and Associate Dean, Faculty of Applied Science) from Simon Fraser University, Canada.
• Mr. Kretschmann (Minister President of the State of Baden-Württemberg), Minister Hoffmeister-Kraut (Minister of Economic Affairs, Labour and Housing), Minister Hermann (Minister of Transport), Murawski (State Minister and Head of the State Chancellery) Mrs. Olschowski (State Secretary, Ministry of Science, Research and the Arts), Mr. Schwarz (Member of State Parliament), Mr. Stoch (Member of State Parliament), Mr. Kuhn (Mayor of City of Stuttgart), Dr. Mentrup (Mayer of the City of Karlsruhe) and team of approx 120 member delegation from Germany.
• Prof. Iwan Davies Pro Vice Chancellor of of Swansea University.
• Dr. Juan Manuel Restrepo Abondon, Vice-Cancellor and Rector of Universidad del Rosario.
• Prof. Tuula Teeri (President) and faculty members and administrative staffs from International Office, Aalto University, Finland.

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

**International Students**

A total of 98 International students (from countries like Afghanistan, Australia, Bangladesh, Bhutan, Canada, Dubai, Egypt, Ethiopia, Finland, France, Germany, Italy, Mongolia, Myanmar, Nepal, Norway, Palestine, Singapore, Sudan, Sweden, Switzerland, Syria, Taiwan, Turkey and USA) have registered at IIT Bombay during the financial year 2016-17. They have joined IIT Bombay for course work/ project work/ post graduate studies.
## Student Exchange Programs

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the University</th>
<th>No. of students/ Programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Aalto University, Finland</td>
<td>Two Dual Degree students from Electrical Engineering Dept., and Mechanical Engineering Dept. respectively.</td>
</tr>
<tr>
<td>2.</td>
<td>Bogazici University, Turkey</td>
<td>Four Dual Degree students from Electrical Engineering Dept.</td>
</tr>
<tr>
<td>3.</td>
<td>Ecole CentraleSupelec, France</td>
<td>Two Dual Degree students from Electrical Engineering and Energy Science and Engineering Dept. respectively.</td>
</tr>
<tr>
<td>4.</td>
<td>ETH Zurich, Switzerland</td>
<td>Two B.Tech., and one Dual Degree students from Physics Dept. and one M.Mgt., student from SJM School of Management</td>
</tr>
<tr>
<td>5.</td>
<td>KTH Royal Institute of Technology, Sweden</td>
<td>One Dual Degree student from Electrical Engineering Dept. and two Dual Degree students from Mechanical Engineering Dept.</td>
</tr>
<tr>
<td>6.</td>
<td>Nanyang Technological Univ, Singapore</td>
<td>Three Dual degree students from Electrical Engineering Dept.</td>
</tr>
<tr>
<td>7.</td>
<td>National University Singapore</td>
<td>Two Dual degree students from Electrical Engineering of Dept., one Dual degree student from Mechanical Engineering Dept., two B.Tech students from Chemical Engineering Dept. and Computer Science &amp; Engineering Dept., respectively</td>
</tr>
<tr>
<td>8.</td>
<td>Peter the Great Petersburg St. Polytechnic University, Russia</td>
<td>One Dual Degree student from Energy Science and Engineering Dept.</td>
</tr>
<tr>
<td>9.</td>
<td>Ryerson University, Toronto (OMG Program)</td>
<td>One Dual Degree student from Electrical Engineering Dept.</td>
</tr>
<tr>
<td>10.</td>
<td>Tallinn University of Technology, Estonia (Erasmus Mundus Heritage Program)</td>
<td>One Dual Degree student from Electrical Engineering Dept.</td>
</tr>
<tr>
<td>11.</td>
<td>Technical University of Denmark</td>
<td>Three Dual degree students from Chemical Engineering Dept., one Dual degree student from Aerospace Engineering Dept., one Dual degree student from Mechanical Engineering Dept., and one B.Tech student from Civil Engineering Dept.</td>
</tr>
<tr>
<td>12.</td>
<td>Technical University of Munich, Germany</td>
<td>Two Dual degree students from Mechanical Engineering Dept. and Electrical Engineering Dept. Respectively.</td>
</tr>
<tr>
<td>13.</td>
<td>Technion-Israel Institute of Technology, Israel</td>
<td>One B.Tech student from Mechanical Engineering Dept.</td>
</tr>
<tr>
<td>14.</td>
<td>Telecom Ecole de Management, France</td>
<td>Two M.Mgt. students from SJM School of Management</td>
</tr>
<tr>
<td>16.</td>
<td>The Cooper Union for the Advancement of Science and Art, USA</td>
<td>One Dual degree student from Chemical Engineering Dept., and two B.Tech, students from Chemical Engineering Dept., and Electrical Engineering Dept., respectively</td>
</tr>
<tr>
<td>17.</td>
<td>University of Quebec at Trois Rivieres, Canada</td>
<td>Two Ph.D. students from Energy Science and Engineering Dept.</td>
</tr>
<tr>
<td>18.</td>
<td>University of Toronto, Canada</td>
<td>One B.Tech student from Electrical Engineering Dept.</td>
</tr>
</tbody>
</table>
Foreign Language courses: Following language courses for the students and staff of IIT Bombay in the Autumn and Spring semester were organised:-

- French (in association with the Embassy of France, New Delhi)
- Japanese (in association with Koo International Co. Ltd., Japan)
- Italian (in association with University of Pavia, Italy)
- Mandarin (in association with Embassy of Taiwan, New Delhi)
- Persian (in association with Culture House of the Islamic Republic of Iran in Mumbai)

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

Curtin University of Technology, Australia: Workshop on Sustainable Smart Cities and Energy:

A one-day workshop was conducted at IIT Bombay on the topics of Sustainable Smart Cities and Energy in May 2016 where faculty members from both sides gave technical talks on their ongoing research areas to identify areas of common interests for future collaboration. On the topic of Sustainable Smart Cities, faculty members from Centre of Urban Science Engineering from IIT Bombay and Architecture, School of Built Environment faculty members from Curtin University participated.

Faculty members from the department of Electrical Engineering, Energy Science & Engineering and Aerospace Engineering at IIT Bombay, and those from the Chemical & Electrical Engineering departments at Curtin University participated in the session on energy.

The technical talks were followed by open discussion where few PhD and post-doc students also participated. Lastly, both universities showed interest to collaborate by offering courses, supervising PhD students and research work and publication through combined research projects. It was also decided to have another joint workshop between IIT Bombay and Curtin University at Curtin University, Australia during 2017 in mutually-agreed timeframe.
IIT Bombay - National Chaio Tung University, Taiwan Workshop on "Nanodevice Technology":

The MoU between IIT Bombay and National Chaio Tung University was signed on April 2016 by Director, IIT Bombay and President, NCTU. A joint workshop between IIT Bombay-NCTU on "Nanodevice Technology" was held during May 16-17, 2016 at IIT Bombay.

The NCTU delegation comprising of nine faculty members was led by Prof. Edward Chang, Vice-President of NCTU, and included Education and Science & Technology (S&T) officials from the Taiwanese embassy Mr. Yi Ta Chen and Dr. Henry Chen respectively, the President of Kun Shan University Prof. Yan-Kuin Su, and Prof. Chee-Wee Liu of the National Taiwan University.

On the first day, NCTU professors gave lectures on their research and later a short informal interaction session for the NCTU faculty with IIT Bombay post-graduate students was held. The second day witnessed technical presentations by IIT Bombay professors and faculty members from NCTU, NTU and KSU, on a broad variety of topics. Later the delegation was given an extensive tour of semiconductor research facilities in the departments of Electrical Engineering and Metallurgical Engineering & Materials Science followed by IIT Bombay campus tour.

The workshop witnessed high volume of student participation and interaction with delegations from NCTU, NTU and KSU. The major motive for the joint workshop is to strengthen the academic and research collaboration activities between the faculty members of the institutions and build strong relationship to facilitate the joint supervised PhD program, student exchange and faculty exchange.
IIT Bombay - Samara State Aerospace University (SSAU), Russia Joint Workshop:

IIT Bombay is keen to build the network of Russia-India Network (RIN) of Institutions of Higher Education. To further strengthen the tie-ups, a two-day workshop with Samara State Aerospace University was held in IIT Bombay. From SSAU, six Russian researchers and seven faculty members from IIT Bombay, participated in the joint workshop. The researchers from Russia and faculty members from IIT Bombay gave technical presentations on the topics covering “Biomedical and Biotechnical research areas”, “Aerospace Engines and Fuel Efficient Engines research progress”, “Automation and Cybernetics”, “Modern Space Technologies” and “Research in Physics”. On the second day, they visited labs in the Department of Aerospace Engineering, Department of Mechanical Engineering, Department of Physics and few centres.

After the open discussion in the concluding session, the researchers from SSAU and IIT Bombay mutually identified the areas of research interest to collaborate through joint research projects, faculty exchange and PhD co-guidance. It was also agreed upon to have a bilateral MOU in place to further strengthen the partnership between SSAU and IIT Bombay.

Joint workshop between IIT Bombay & Nanyang Technological University, Singapore in Health and Medicine:

The MoU between IIT Bombay and Nanyang Technological University was signed on April 2016 by Director, IIT Bombay and Vice President, International Affairs, NTU. Thereafter, a joint workshop between IIT Bombay-NTU on “Healthcare Technologies” was held on September 26-28, 2016 at IIT Bombay.

The NTU delegation comprising of 14 faculty members. Two students gave technical talks and poster presentation. The main objective of this workshop was to connect faculty members from both the institutions to identify topics of mutual interest for research collaboration, students research internship, short-term faculty exchanges, seed funding for selected joint research programs and joint PhD programs.
The follow-up workshop was held in NTU, Singapore on March 6-7, 2017 titled NTU NITHM – IIT Bombay symposium on “Healthcare and Medical Technologies II”. The workshop focused on small group discussions on focused areas of research and also student centric activities including poster presentations. The objective of the workshop was not only to bring academics and students of both IIT Bombay and NTU together but also to continue to build academic bridges between the two great institutions.

International Governing Board (IGB) Meeting of BRICS - Network University at IIT Bombay

The Institute hosted the meeting of the International Governing Board (IGB) of Brazil, Russia, India, China and South Africa (BRICS) Network University on September 27, 2016. The meeting was attended by Mr. Vinay Sheel Oberoi, Secretary (Higher Education), Ministry of Human Resource Development (MHRD) and Mr. Siljo V.K., Deputy Secretary, Department of Higher Education, Ministry of Human Resource Development, Government of India along with Prof. Ved Prakash, Chairman of University Grants Commission (UGC) and Dr. Manju Singh, Joint Secretary for International Cooperation of UGC. Senior government officials and the following academic leaders from the BRICS countries were present for the IGB meeting.

FROM BRAZIL:
- Leandro Gomes Cardoso, Head of International Affairs, Ministry of Education of Brazil
- Elisa Maria Costa Pereira de S.Thiago, General Coordinator, Evaluation Department of CAPES, Brazil

FROM RUSSIA:
- Vladimir Timonin, Deputy Director, Department of State Policy in Higher Education of Russian Ministry of Education, Russia
- Maxim Khomyakov, Vice-President for International Affairs, Director of the BRICS Studies Centre, Ural Federal University, Russia
FROM SOUTH AFRICA:

- Sandile Williams, Director, University Policy and Development Support at DHET, South Africa
- Diane Parker, Deputy Director General, Department of Higher Education and Training, South Africa
- Stephanie Burton, Vice Principal, Research and Postgraduate Education, University of Pretoria, South Africa.

During the meeting, mechanisms to enhance research collaboration and student exchanges at a pan-BRICS level were discussed. The activities of BRICS Network University are focused on the following thematic areas: Energy, Computer Science and Information Security, BRICS studies, Ecology and Climate change and water resources and pollution treatment. India is currently the Chair of BRICS for the year 2016-17.

**IIT Bombay-University of Sydney, Australia Joint Workshop on “Photonics and Nano Materials”**:

The IIT Bombay - University of Sydney joint workshop on Photonics was held at IIT Bombay on November 21-22, 2016. This was the first of the series of workshop planned between the two institutes.

Talks on the photonics-related research being carried out at the two institutes and few invited lectures on specific topics from faculties of both institutes were organised on the first day. The second day was devoted to lab visits in Physics and MEMS departments.

Participants from IIT Bombay included Prof. R. Dusane (MEMS, Dean (IR)), Prof. B.P Singh, Prof. T. Kundu, Prof. P. Vasa (from department of Physics) and Prof. S. Shukla (MEMS), and Mr. A. Das (Dean IR office)

Participants from University of Sydney included Prof. S. Fleming, Prof. G. Lakhwani, Dr. A. Choudhary and Ms. Amanda Sayan (Office of Global Engagement).
The attendees also actively discussed various aspects of the IIT Bombay - University of Sydney PhD program. The concluding session included discussions on the admission procedure, criteria for student evaluation and awarding joint degree as well as on the possible dates of follow-up workshop to be held in University of Sydney.

The major goal of the joint workshop was to strengthen the interactions between the faculty members of the two Institutes for eventually facilitating the joint PhD program, a goal which participants believe was successfully achieved.

**IIT Bombay - University of Alberta, Canada and IC-IMPACTS Joint Workshop on “Clean Water Technologies”:**

A one-day workshop was organized at IIT Bombay on the “Clean Water Technologies”. The workshop was jointly funded by IIT Bombay and IC-IMPACTS. Researchers from Canadian and Indian institutions partnered with IC-IMPACTS joined the workshop and gave technical talks on their ongoing research areas to identify common interests for future collaboration and to identify seed funding for selected joint research programs.

![Signing of the renewal of MOU between IIT Bombay and University of Alberta](image)

The MOU between IIT Bombay and University of Alberta was renewed on the same day in the presence of Director of IIT Bombay Prof. Devang Khakhar and President, University of Alberta, Dr. David. H Turpin. Both the institution agreed through the agreement to foster collaboration on graduate programs, including the co-supervision of PhD students. One of the major goal of the joint workshop was to identify joint PhD students. The workshop witnessed high volume of student participation including poster presentations from 20 students and interaction with Canadian researchers. It was agreed upon to hold the next edition of this workshop in University of Alberta, Canada.
Visit of Minister President of Baden - Wuerttemberg, Germany:

The Minister President Winfried Kretschmann from the State of Baden-Wuerttemberg, Germany with a delegation of 120 participants visited IIT Bombay on January 27, 2017. The delegation wished to understand India’s economic, research and university landscape, country’s Smart City Mission and to strengthen ties between the state of Maharashtra and Baden-Wuerttemberg. During the visit, IIT Bombay hosted thematic discussions on Entrepreneurship, Smart Cities & Urban Challenges and Energy. The session ended with Minister-President of the State of Baden-Wuerttemberg Winfried Kretschmann’s keynote address on “The Future Of Mobility And Energy”.

IIT Bombay - Aalto University, Finland Mini-Symposium:

IIT Bombay and Aalto University are founding members of the consortium of Finnish-India Higher Educational Institutions and share a very strong networking relationship. Both the institutions are keen to enhance their research collaboration, so a Mini-Symposium was held in February 2017 at IIT Bombay during the visit of President of Aalto University Dr. Tuula Teeri and faculty team of ten members from Aalto University.

The one day mini-symposium focused on departmental research strength by faculty members from both the institutions. Department visit, lab tour and student interaction were also organised. The session ended with President Dr. Tuula Teeri’s talk on “Universities and Innovation-Driven Growth: The Case of Aalto University.”
International visits by Dean International Relations, IIT Bombay:

Apart from hosting foreign delegations and joint workshops, IIT Bombay also made efforts to reach out to partner institutes. In this regard, the Dean (IR), Prof. R.O. Dusane visited Ohio State University & University of Binghamton, USA and discussed ways of future collaboration. He also visited Yonsei University, Korea and had discussions with the VP of International Affairs & several Heads of Departments. Further steps to enhance collaborations with Yonsei University are underway.

In addition Prof. Dusane along with Deputy Director, Prof. P. Mujumdar paid visits to the University of Notre Dame and New York University and met their Presidents. Both the universities are quite keen on scientific collaborations with IIT Bombay. As a result a small team from University of Notre Dame visited IIT Bombay and interacted with faculty member from Chemistry & MEMS department.

In addition to these visits, Prof. Dusane along with the Dean (ACR), Prof. Ravi Sinha visited University of Pittsburg and had several meetings with their leadership. They also interacted with faculty members and explored the possibilities of joint research programs.

They also paid visits to University of Toronto and McMaster University in Canada. IIT Bombay and University of Toronto are already engaged in joint research programs and as a result, various joint activities are undertaken.
Deputy Director, Prof. P. Mujumdar and Dean (IR), Prof. R.O Dusane with President University of Toronto, Canada

Visit of IIT Bombay delegation to University of Toronto, Canada

Meeting with the President of University of Wollongong and others in Mumbai

Taiwanese university delegation visit to IIT Bombay on the occasion of agreement signing for Taiwan Education Centre in IIT Bombay
ALUMNI & CORPORATE RELATIONS

The Dean Alumni and Corporate Relations (ACR) Office integrates two strategic thrusts for IIT Bombay. One is nurturing and enhancing alumni relations and other is the same with corporations. The government of India, through MHRD, continues to be the primary source of funds for the Institute. 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 2016-17, the Institute received a total donation of Rs. 33.46 crores. The Institute expresses our deep gratitude and appreciation for the constant support shown by our alumni and other well-wishers to IIT Bombay. The major donors, among others, were Sir Dorabji Tata Trust, Portescap India Private Limited, SAP, CISCO, GE, Applied Materials and Class of 1990. 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 modernisation 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, which provides a grant of Rs. 1 lakh per year for the first four years to newly-recruited young faculty members. This grant acts as an incentive to the prospective faculty at IIT Bombay. The “Young Faculty Joining Bonus”, initially a Class of ‘82 Legacy Project, has been awarded from 2010 onwards. Class of ’78, ’83, ’84, ’85 and ’88 have also joined this project. Nomura has also contributed to the YFA. 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.

Chair Professorship: The Chair Professorship is a distinguished academic position of the Institute. Besides acting as a recognition for the permanent faculty of the Institute, it is also used to attract outstanding academicians to join the institute as visiting faculty or permanent faculty. Each Named Chair is supported by an endowment created from a donation to the Institute. The endowment for a Chair is currently Rs. 90 lakh.

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.

**Student Development:**
(a) **Scholarships**: One way to nurture excellence amongst students is by awarding scholarships to deserving candidates. The scholarships funded by the alumni, trusts and corporations supplement the scholarship available from government funds and enable the Institute to provide support to a larger number of deserving students. During the year 2016-17, about 350 scholarships of varying amounts were granted.

(b) **Awards and Prizes**: As every year, about 50 awards and prizes of varying amounts and forms (certificates, medals, etc.) were given away during 2016-17.

**Major Events:**
(a) **Institute Valedictory Function**: The Valedictory Function for the graduating students was organised on April 28, 2016. The event was graced by the presence of Institute dignitaries—Director Prof. Devang Khakkar, Padmashri Prof. D. B. Phatak, Valedictory Speaker, Dean of Student Affairs Prof. Soumyo Mukherjee, Dean of Alumni & Corporate Relations Prof. Ravi Sinha and CEO of IIT Bombay Alumni Association Ms. Damayanti Bhattacharya. During the function, the Director also presented Certificate of Appreciation for outstanding contributions to the select members of the Student Alumni Relationship Cell. Prof. Phatak delivered the Valedictory Address on “Building India where dreams come true”. The graduating students also took the ‘Give One for IIT’ pledged, wherein they pledged to donate 1% of their income to the Institute to support its various activities.

b) **Visit of Mr. Takeshi Furuichi, Executive Vice President and Representative Director of Nippon Life Insurance Company to IIT Bombay:**
IITs are often mentioned in Japanese media as the center of innovation. This led Mr. Takeshi Furuichi to visit IIT Bombay’s campus. Mr. Takeshi Furuichi is the Executive Vice President and Representative Director of Nippon Life Insurance Company. He is also a Non-Executive Director of Reliance Life Insurance Corporation. Mr. Furuichi had a brief meet with Prof. Devang Khakhar, Director and Prof. Ravi Sinha, Dean (ACR). The meeting was followed by his visit to the Centre of Excellence in Nanoelectronics in the department of Electrical Engineering and Tata Centre for Technology and Design (TCTD) at IIT Bombay. During the visit, he also interacted with faculty members and students at TCTD and got a close view of innovation cycle in the Institute.

c) Alumination: The Students Alumni Relationship Cell (SARC) hosted its annual Student Alumni Meet 'Alumination’ during October 1-2, 2016. The meet was a highly career-centric event designed especially for the students appearing for placements this year and was organized in association with Placement Office. An overwhelming participation was seen from both students and alumni. Our alumni were delighted with the opportunity to share their expertise and experience with the students. Mock interviews, speed mentoring, group discussions, core engineering talks, etc. were scheduled during the event. Under the Alumni Student Mentorship Program (ASMP), an event called “Break the Ice” was organized where the students got an opportunity to meet their alumni mentor for the very first time.

d) US Roadshow by IIT Bombay:

i) Faculty Alumni Network (FAN) Symposium: US Faculty Alumni Network (FAN) Symposium on ‘Innovation and Entrepreneurship’ was held on October 14-15, 2016 at St. Louis, Missouri. The symposium was organized jointly with IIT Bombay Heritage Foundation and Washington University in St. Louis. A number of highly-distinguished speakers participated as keynote speakers, panelists and participants. Special highlight was the startup pitch competition where 10 startup companies, selected through rigorous screening, pitched to a panel of venture capitalists and angel investors. About half of participating companies are by IIT Bombay alums based in India.

ii) Distinguished Alumni Meeting: A meeting of the Institute’s distinguished alumni was held during October 15-16, 2016. The meeting was held following the FAN event. Eleven distinguished alumni participated in the brainstorming sessions with the Deputy Director (Finance & External Affairs), Dean (Alumni and Corporate Relations) and other IIT Bombay officials to sketch a strategic plan for IIT Bombay’s future development. The updates from previous DA meetings in January 2015 and 2016, salient points of Institute Strategy Plan and priorities of IIT Bombay Research & Development Foundation were also discussed during the meeting.

iii) Meetings with University Leaderships: During the roadshow, the IIT Bombay team held meetings with leaderships of several universities in the US. These included Carnegie Mellon University, Georgia Institute
of Technology, New York University, Northwestern University, Notre Dame University, University of California at Los Angeles, University of Pittsburgh, University of Southern California, University of Toronto, and Washington University in St. Louis.

iv) Alumni Meetings: A number of meetings with alumni in the US were held during the roadshow. Alumni chapter meetings were held in Chicago, Los Angeles, New York City, Pittsburgh and Toronto.

e) Workshop by Global Leader Experiences for IITB Students: Global Leader Experiences (GLE) are leadership programs for students of all backgrounds and academic disciplines who are studying in the magnet cities. It was held during November 22-23, 2016 at IIT Bombay. Through addressing a global challenge, the students work towards finding solutions to the challenge and in the process, put their leadership skills to action. GLE aims to develop leadership skills to help influence the future of the world as leaders by giving them real and practical experiences, broadens their horizons, equips them with skills and challenges them to adapt and thrive in diverse situations. The programme addressed a global issue: “How can you increase civic engagement in your city?”

The program took the students off campus and out into the city to: learn from leaders from business, government and NGOs; develop cultural intelligence; discover how a city works and doesn’t work; and generate innovative solutions to the challenge, which are presented to city leaders.

f) Institute Alumni Day & presentation of Distinguished Service Awards (DSA): The annual Alumni Day, celebrated on December 25, 2016 (the last Sunday of the year), saw six 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. Pradip Nadkarni (B.Tech, 1970, Mechanical Engineering), Mr. Raj Nair (B.Tech, 1971, Metallurgical Engineering), Mr. Avinash Sankholkar (B.Tech 1974, Chemical Engineering), Mr. Dinkar Natraj (B.Tech, 1982, Chemical Engineering), Mr. Suneet Chitale (B.Tech, 1984, Mechanical Engineering) and Ms. Anuradha Narasimhan (B.Tech, 1990, Civil Engineering).

During this event, the Class of 1991 presented their ‘Silver Jubilee Class Legacy Project’ and pledged to contribute a record-breaking amount of Rs. 8 crore to the Institute. The Legacy Project will support important initiatives at the Institute. Distinguished Alumnus Mr. Pramod Chaudhari (B.Tech. 1971, Mechanical Engineering), Executive President of Praj Industries, made a huge contribution of Rs. 2.51 crores to the Institute towards establishing a Centre for Learning and Teaching, which will focus on promoting teaching and learning at IIT Bombay.

The Jade Jubilee reunion batch (1980) and the Decennial batch (2005) also addressed the meet on December 27, 2016.

h) Ruby Reunion: IIT Bombay celebrated the Ruby Reunion (40 years) for the batch of 1977 on January 20-21, 2017. The class of 1977 pledged to contribute an amount of Rs. 50 lakhs for student welfare activities.

i) Faculty Alumni Network India & Annual Distinguished Alumni Meetings: Distinguished Alumni Meet was held during January 21-22, 2017 in Goa. 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. The annual Faculty Alumni Network (FAN) India meeting was also held on January 21, 2017 in Goa in conjunction with the Distinguished Alumni meeting. The theme of FAN meeting was "Large Scale Computing & its Applications." The current status and future of large-scale computing applications in various domains of science and engineering were discussed during the meeting.

j) Director’s visit to the US: IIT Bombay has a very active San Francisco alumni chapter and several hundred alumni in the San Francisco Bay area. To leverage the goodwill amongst our alumni in the area and to further conversations between IIT Bombay and donors, Director Khakhar visited California on February 15-20, 2017. An alumni chapter meeting of the Bay Area Chapter was held on February 15, during the visit.

k) Tinkerers’ Laboratory Expansion Inauguration Ceremony: With generous donations from the class of 1975 and class of 1966, a much bigger area of the Tinkerers’ Lab has been set up. The class of 1966 inaugurated the facility on March 11, 2017 in presence of Prof. Devang Khakhar, Director IIT Bombay.

l) Foundation Day: The 58th Foundation Day of the Institute was celebrated on March 10, 2017. During the function, 11 alumni were honoured with the Distinguished Alumnus Awards and three Young Alumnus Achiever Awards. 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. Ajit Tamhane, B.Tech, 1968, Mechanical
- Mr. Paritosh Choksi, B.Tech, 1975, Mechanical
- Mr. Parag Saxena, B.Tech, 1977, Chemical
- Mr. Narendra Joshi, B.Tech, 1979, Mechanical
• Dr. Mukta Ghate Farooq, B.Tech, 1983, Metallurgy
• Mr. Ardeshir Contractor, B.Tech, 1984, Mechanical
• Prof. Nitin Padture, B.Tech, 1985, Metallurgy
• Mr. Rajesh Subramanian, B.Tech, 1987, Chemical
• Prof. Umesh Waghmare, B.Tech, 1990, Engineering Physics
• Dr. Ganesh Natrajan, PhD, 2005, School of Management
• Dr. K. Sivan, PhD, 2006, Aerospace

The recipients of the Young Alumni Achiever Awards are as follows:
• Prof. Pramod Reddy, Dual Degree, 2002, Mechanical
• Mr. Prashant Mali, Dual Degree, 2003, Electrical
• Mr. Harpreet Singh Grover, Dual Degree, 2005, Civil

m) Deans’ Meet for Alumni and International Relations: A meeting of Deans of all IITs who are responsible for external and alumni relations was held on March 17-18, 2017 at IIT Kharagpur. The meetings are held once or twice a year, and is intended to share best practices, explore collaboration opportunities and brainstorm on common problems. This two-day event was inaugurated by Prof. Sriman Kumar Bhattacharyya, Deputy Director, IIT Kharagpur.

n) Lecture Series: The following lectures were organised with the involvement of Dean ACR Office:

NR Kamath Chair Colloquium Lecture Series – Three lectures were organised in the NR Kamath Chair Colloquium Lecture Series on July 4, 2016; August 10, 2016 and December 9, 2016. Dr. Samir Mitragotri, Director, Center for Bioengineering, Professor, Department of Chemical Engineering, University of California, Santa Barbara, CA, USA & NR Kamath Chair Professor, IIT Bombay delivered a lecture on ‘Making of Smart Medicines’ on July 4, 2016. Prof. Bruce Hajek, Coordinated Science Laboratory Hoeft Chair in Engineering, University of Illinois, Urbana-Champaign, delivered a lecture on ‘Community Detection in Networks: Algorithms, Complexity, and Information Limits’ on August 10, 2016, and Prof. Kaushik Basu, C. Marks Professor at Cornell University, New York, (former Chief Economist, The World Bank) & NR Kamath Chair Professor at IIT Bombay delivered a lecture on ‘The Economics of Corruption, Black Money and Demonetisation’ on December 9, 2016.

Prof K.C. Khilar Lecture in Chemical Engineering – This annual Institute Distinguished Lecture in Chemical Engineering in memory of Prof. K.C. Khilar was delivered by Dr. Pradip P., Vice President, Chief Scientist & Head of the Process Engineering Lab, Tata Research Development & Design Centre, Pune on “Challenges Facing the Global
Minerals and Metals Processing Industry and Opportunities for the Chemical Engineers to Drive Innovation’ on April 12, 2016.

**Institute Distinguished Lecture in memory of Professor C.V. Seshadri** – The Institute Distinguished Lecture in Chemical Engineering in memory of Prof. C.V Seshadri was delivered by Prof. Shankar Narsimhan, Department of Chemical Engineering, IIT Madras on “Monitoring, Management and Control of Water Distribution Networks” on November 24, 2016.

**Tinkerer’s Lab Lecture Series:** The first lecture in the Tinkerer’s Lab lecture series was delivered by Mr. Sameer Katdare, Vice President, Technical, Alkyl Amines Chemical Ltd. On “Engineering Lessons from a Disaster Bhopal Gas Tragedy” on April 7, 2016.

The second lecture in the series was delivered by Mr. Ranjit Deshpande, Chief Technology Officer, K2 Inc. On “Internet of Things” on September 29, 2016.

**FACULTY AFFAIRS**

During the year, 38 faculty members were appointed. The number of full-time faculty members on the roll of the institute has risen to 629 comprising 306 Professors, 150 Associate Professors, and 173 Assistant Professors. In addition, there are 41 adjunct faculty members and 122 post doctoral fellows on the roll. During the year 9 faculty members retired – seven of whom were re-employed and three resigned.

The institute provided financial assistance to 359 faculty members for participating in international conferences. In addition, 87 faculty members travelled abroad for attending international conferences using external funding and one faculty member went abroad on Fellowship for research work.

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. Satish Agnihotri**, Centre for Technology Alternative in Rural Areas (CTARA), has been appointed as a Member on the Central Advisory Committee of the Central Electricity Regulatory Commission.

**Prof. Suvarn Kulkarni**, Department of Chemistry, has been admitted as a Fellow of Royal Society of Chemistry (FRSc).

**Prof. Suvarn Kulkarni**, Department of Chemistry, has been selected to receive the prestigious CRSI Bronze medal for the year 2017.

**Prof. Suvarn Kulkarni**, Department of Chemistry, has been successfully nominated for Dr. H. C. Srivastava Memorial Lecture Award-2016.
Prof. Sourav Pal, Department of Chemistry, has been nominated as Visiting Professor in Chemistry at Gauhati University. He has also been nominated as a member to the School Board of School of Chemistry of University of Hyderabad.

Prof. Subhananda Chakrabarti, Department of Electrical Engineering, has been appointed to the editorial board of IEEE Journal of Electron Devices Society.

Prof. Ruchi Anand, Department of Chemistry, has been invited to join the Editorial Board of the journal Protein and Peptide Letters.

Prof. Ronita Bardhan, Centre for Urban Science & Engineering, has been awarded the fellowship “Building Energy Efficiency Higher & Advanced Network (BHAVAN)” fellowship by the Department of Science and Technology, Government of India and the Indo-U.S. Science and Technology Forum (IUSSTF).

Prof. Nand Kishore, Department of Chemistry, has been appointed as a Member of the Editorial Board of the journal Protein and Peptide Letters.

Prof. Deepankar Choudhury, Department of Civil Engineering, has been selected by the International Journal of Geomechanics as an ASCE 2015 Outstanding Reviewer.

The collaborative efforts of Prof. I. N. N. Namboothiri, Department of Chemistry and researchers at the Ariel University and Weizmann Institute, Israel has resulted in the development of a novel technique for membrane protein purification. This technology development was presented recently at the Techconnect event in Washington DC, USA. It was identified as one of the top 15% technologies submitted and selected for the Techconnect Innovation Award, 2016.

Prof. Ashutosh Gandhi, Department of Metallurgical Engineering and Materials Science, has been recognised by SCRIPTA MATERIALIA 2015 for his significant contributions made to the quality of the journal.

Prof. Srikant Srinivasan, Department of Mathematics, has been selected to receive the Young Scientist Award of the Indian National Science Academy, New Delhi.

Prof. R. Murugavel, Department of Chemistry, has been selected to receive the CRSI Silver Medal – 2017.

Prof. R. Murugavel, Department of Chemistry, has been appointed as honorary Professor of JNCAR Bangalore for a period of two years.

Prof. Bhaskaran Muralidharan, Department of Electrical Engineering, has been invited to serve as an Editorial Board Member for Scientific Reports.

Prof. Ramesh Singh, Department of Mechanical Engineering, Mr. Santanu Paul and Mr. Wenyi Yan has received the outstanding paper award for “Thermal Model for Additive Restoration of Mold Steels Using Crucible Steel” at 44th North American Manufacturing Research Conference and
ASME Manufacturing Science and Engineering conference held at Virginia Tech. from June 27 to July 1, 2016.

**Prof. Ashwin Gumaste**, Department of Computer Science & Engineering and **Prof. Subhananda Chakrabarti**, Department of Electrical Engineering have been selected for NASI-Reliance Industries Platinum Jubilee Award for Application Oriented Innovations in Physical Sciences for the year 2016.

**Prof. Aftab Alam**, Department of Physics, will be honored during a conference in Sweden by the International Association of Advanced Materials Congress with the prestigious “International Association of Advanced Materials Scientist Medal (IAAM Scientist medal) for the year 2016”.

**Prof. Aftab Alam**, Department of Physics, has been invited to join the editorial board of the journal Advanced Materials Letters (AML, www.vbripress.com/aml)

**Prof. Anand Khanna**, Department of Metallurgical and Materials Science, has been selected to receive the prestigious International Association of Advanced Materials Medal (IAAM) for the year 2016 in recognition of his outstanding contributions in the field of “Advanced Materials Science and Technology”.

**Prof. A.S Khanna**, Department of Metallurgical Engineering & Materials Science has been selected for the award “Skoch Order-of-Merit”. Prof. Khanna has also been chosen by CIA World Magazine for the award “Innovation in New Building Products”.

**Prof. Saravanan Vijayakumaran**, Department of Electrical Engineering: As per the copy of the Minutes of the meeting of the Closure Report Review of ISRO sponsored project “Signal Processing for Performance Improvement of MOTR”, the Review Committee has appreciated the research work carried by Prof. Saravanan Vijayakumaran, and his team in this director and used the CFAR algorithm code for the successful launch of the satellites on June 22, 2016.

**Prof. Nina Sabnani**, Industrial Design Centre, won the grandprize “Light of Asia” at the International Animation Festival Indie-Anifest at Seoul for the film “Hum Chitra Banate Hain” (We make Images) made under the TCTD project.

A film “We Make Images” produced and directed by **Prof. Nina Sabnani**, Industrial Design Centre, has won the following awards:

1. SIGNS 2016, Kerala: Jury’s Special Mention Award October 2, 2016
2. MAMI 2016, Mumbai: Silver Gateway Award for short film (Half Ticket category) October 27, 2016
3. Aadhar, Heritage Film Festival, Ahmedabad 2016: Best Animation Film in Professional category November 4, 2016.
Prof. Nina Sabnani, Industrial Design Centre, has been invited to be a jury member for Indie-AniFest 2017 to be held in September 2017 in Seoul Animation Center. The film “We Make Images” of Prof. Nina Sabnani has been invited to be screened in the Indie Ani Tour to be held in Japan.

Prof. Debabrata Maiti, Department of Chemistry, has been invited to be a Member of the Editorial Advisory Board of Organometallics.

Prof. Debabrata Maiti, Department of Chemistry, has been invited to become ‘Associate Editor’ of ‘The Journal of Organic Chemistry’.

Prof. Prasenjit Ghosh, Department of Chemistry, has been invited to be a Member of the Editorial Advisory Board of Organometallics.

Prof. Abhay Karandikar, Department of Electrical Engineering, has been selected to receive the IEEE-SA Standards Medallion award for his significant contributions to the development of Standards.

Prof. Amartya Mukhopadhyay, Department of Metallurgical Engineering & Materials Science, has been selected to receive the INAE Young Engineer Award 2016. Prof. Mukhopadhyay has also been awarded the ASM-IIM North America Visiting Lectureship Award 2016.

Prof. Santanu Bandyopadhyay, Department of Energy Science and Engineering, has been appointed as : (1) Associate Editor, International Journal of Energy Technology and Policy, Interscience, (2) Section Editor (Energy Engineering), INAE Letters, Springer Nature, (3) Editor-in-Chief (with Prof. Dominic Foo and Prof. Raymond Tan), Process Integration and Optimization for Sustainability, Springer Nature and (4) Section Editor (Energy Systems), Encyclopaedia of Sustainable Technologies, Elsevier.

Prof. D. Bahadur, Department of Metallurgical Engineering & Materials Science, has been invited to serve on the editorial board of journal “Scientific Reports” published by the Nature Publishing Group.

Prof. Anil Kumar, Department of Chemistry, has been invited to join the editorial advisory board of ACS Sustainable Chemistry and Engineering journal.

Prof. G. K. Lahiri, Department of Chemistry, has been selected by the Council of the Indian Chemical Society to receive Rev. Fr. L. M. Yeddnapally Memorial Award for the year 2015. He has also been elected as a Fellow of The National Academy of Sciences, India (2016).

Prof. Sanjeeva Srivastava, Department of Bioscience and Bioengineering, has been selected as a member of the Human Proteome Organization at the HUPO World Congress in Taipei in 2016.

Prof. Sanjeeva Srivastava, Department of Bioscience and Bioengineering, has been invited to be the Editor of a special issue of the journal PROTEOMICS – Clinical Applications (Wiley) devoted to neglected and tropical diseases.

Prof. K.P Madhavan, Emeritus Professor, Department of Chemical Engineering, has been selected by the International Society of Automaton for its life time achievement award.
Prof. S. R. Kotha, Department of Chemistry, has been elected as a Fellow of Indian National Science Academy, New Delhi.

Dr. Parthasarathi Subramaniam, Former Ph.D student, has been selected to receive the Eli Lilly and Company Asia Outstanding Thesis Award for the year 2016.

Prof. Avik Bhattacharya, Centre of Studies in Resources Engineering (CSRE), has been appointed as the Associate Editor of IEEE Geoscience and Remote Sensing Letters (GRSL). Prof. Bhattacharya has also been appointed as the Guest Editor of a Special Issue on “Applied Earth Observations and Remote Sensing in India” in IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS).

Prof. Avik Bhattacharya, Center of Studies in Resources Engineering (CSRE), students Arnab Muhuri, Shaunak De, Surendar M, from the Univiversity of Erlangen-Nuremberg; Swinky Dhingra, Debanshu Ratha, Abhishek Maity presented a paper entitled “Novel Scattering Power Decomposition from Full and Compact Polarimetric SAR Data” at the National Symposium on “Recent Advances in Remote Sensing and GIS with Special Emphasis on Mountain Ecosystems” & Annual Conventions of Indian Society of Remote Sensing and Indian Society of Geomatics held during December 7 – 9, 2016 at Dehradun. It has been adjudged for Best Poster Presentation Award (Student Category).

Prof. Gopal Dixit, Department of Physics, has been selected for the Max-Planck Society’s India Mobility grant for the years 2017-2020.

Prof. R.B. Sunoj, Department of Chemistry, has been invited to become a Member of the Editorial Advisory Board of an ACS journal “Organic Letters” for a period of three years from January 2017.

Prof. R.B Sunoj, Department of Chemistry, has been elected as a Fellow of the Indian Academy of Sciences.

The film “Boundaries of Memory” written, shot and directed by Prof. Sudesh Balan of Industrial Design Centre is among the 21 non-feature films to be selected in the Indian Panorama section in this year’s The International Film Festival of India. This film is a part of his academic research (SEED grant project) on making cost-effective films for delivering social messages without loosing cinematic value.

Prof. Amit Agrawal, Department of Mechanical Engineering, has been appointed as Editor of the journal “Experimental Thermal and Fluid Science”. Prof. Agrawal has joined the Editorial board of the Journal “Nature Scientific Reports”.

Prof. Manoj Prabhakaran, Department of Computer Science and Engineering (CSE), has joined the editorial board of the “Journal of Cryptology,” an official journal of the International Association for Cryptologic Research (IACR).

Prof. Alok Porwal, Centre of Studies in Resources Engineering (CSRE), has been invited to co-edit a special issue of the journal "Ore Geology

Prof Alok Porwal, Centre of Studies in Resource Engineering (CSRE) has been appointed as Associate Editor of the international journal “Arabian Journal of Geosciences”.

Prof. Ramgopal Rao, Department of Electrical Engineering, currently Director of IIT Delhi, has been elevated to the Fellowship of the IEEE Society for his contributions to CMOS System-on-Chip technologies.

Prof. Surya Durbha, Centre of Studies in Resources Engineering, has been awarded the NVIDIA Innovation Award 2016 in recognition of his work in the area of Image Information Mining and High Performance Computing (HPC) carried out along with his PhD students Mr. Kuldeep Kurte and Ms. Ujwala Bhangale.

Prof. S. Sudarshan, Department of Computer Science and Engineering, has been chosen to receive the Distinguished Alumnus Award for the year 2017 by IIT Madras.

Prof. Rajesh Gupta, Department of Energy Science and Engineering, along with his UK academic partner won the Research Excellence Award 2016 by the Confederation of Indian Industry (CII) and the British Council under India-UK collaboration in higher education. The award has been given in a ceremony under UK-India Tech Summit, which was held in New Delhi during the recent visit of UK Prime Minister Theresa May with her high-level delegation team.

Prof. Kaivan Munshi, alumnus, Department of Civil Engineering, has been awarded the Infosys Prize 2016 for Social Sciences (Economics) in recognition of his research.

Prof. Preeti Rao, Department of Electrical Engineering, has been appointed as a member of the editorial board of the Journal of “New Music Research”.

Prof. D. N. Singh, Department of Civil Engineering, has been invited to become Fellow of the Institution of Civil Engineers (ICE), London by a Presidential Invitation.

Prof. Prasenjit Ghosh, Department of Chemistry, has been invited to be a member of the Editorial Advisory Board of Organometallics.

Prof. B. Ravi, Department of Mechanical Engineering, Prof. B.G. Fernandes, Department of Electrical Engineering, & Prof. Chandra Venkataraman, Department of Chemical Engineering have been inducted in the Indian National Academy of Engineering.

Prof. Vivek Borkar, Department of Electrical Engineering, received the INAE Lifetime Contribution Award in Engineering.

Prof. Santanu Banerjee, Department of Earth Sciences, has been selected to receive the National Geoscience Award - 2016 in Basic Geosciences.
Prof. Pushpak Bhattacharyya, Department of Computer Science and currently Director of IIT Patna, has been awarded “the Eminent Engineer Award” by the Institute of Engineers (India).

Prof. S.A. Khaparde, Department of Electrical Engineering, has been awarded “The Eminent Engineer Award” by the Institution of Engineers (India) for his valuable contributions in the field of Electrical Engineering.

Prof. D. Parthasarathy, Department of Humanities and Social Sciences, has been elected as a Board Member of the Commission on Legal Pluralism, a part of International Union of Anthropological and Ethnological Sciences (IUAES).

Prof. Rinti Banerjee, Department of BioSciences and Bioengineering, has been appointed as Associate Editor of ACS Biomaterials Science & Engineering published by the American Chemical Society.

Research work of Prof. Souvik Mahapatra, Department of Electrical Engineering, on reliability methodology in simulation CAD tools for advanced CMOS process development has been mentioned in First Quarter 2017’s earning call of Synopsys, a leading CAD tool company. This methodology would impact design of VLSI chips that would go into future electronics products such as smartphones.

Research collaboration of Prof. Souvik Mahapatra, Department of Electrical Engineering, with the Synopsys has resulted in the release of a Sentaurus TCAD Model for NBTI Reliability Simulation of Advanced Transistors.

Prof. Milind Atrey, Department of Mechanical Engineering, has been awarded Fellowship by the Indian Cryogenics Council in recognition of his notable contributions to the field of Cryogenics.

Prof. D.K. Sharma, Department of Electrical Engineering, along with Prof. D.T. Shahani and Prof. Agarwala of IIT Delhi and Prof. Rajat Moona, Dir. Gen. CDAC received special felicitation from the Election Commission of India as members of its technical experts committee on Voters’ Day, January 25, 2017. The award was given by the Honorable President of India Mr. Pranab Mukherjee in a function organized at the Maneckshaw centre in New Delhi.

**INFRASTRUCTURE DEVELOPMENT**

The infrastructure projects that were completed during the year include ‘Retrofitting of Staff Hostel and Hostel No. 1 except ‘A’ wing.

Some projects started earlier year, and nearing completion are ‘Guest House No.3’ with 96 rooms and 48 utility apartments, with a 300 seat dining hall and a conference room facility, and Common building for the ‘Department of Energy Science and Engineering’ and ‘Centre for Environmental Science and Engineering’.

The construction work of Hostel 18 (1000 capacity) has started in March 2017 and is now proceeding at a fast pace.
The projects that are in pre-execution stages are Type B-Faculty housing Building ‘A’ (78 flats) and Facility for Executive MBA programme. All new projects are being designed and built to meet minimum GRIHA-3 standards. Many other projects such IITB Science Research Park (phase-I) and a new building for Rahul Bajaj Technology Innovation Centre – Building for Society for Innovation and Entrepreneurship (SINE), Industrial Research Consultancy Centre and Industrial Design Centre are at various stages of planning.

Apart from these, building projects that would be constructed in the near future include Hostel 17 (1000 student capacity), Steel Centre, development of Workshops/ Labs, Centre for Propulsion Technology, Common building for Estate Office, National Centre for Aerospace Innovation & Research, Tata Centre for Technology & Design, DS Foundation Centre for Entrepreneurship and Bio-medical Engineering Technology Incubation Centre, Type B-Faculty housing Buildings (2 Nos. with 78 flats each), Central Animal Facility and Married Students Apartments (400 units). The Design Consultants for these projects have been appointed after undertaking a ‘Concept Design’ competition.

CENTRAL LIBRARY

IIT Bombay’s Central Library housed in a huge 3-story building having central air-conditioned 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 reference materials both on-line and off-line. It holds a huge collection of books, back volume of journals, monographs, standards, thesis/dissertation and subscription of 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 also attract large number of users from academia and industries throughout the year.

The library collection was used by 16,791 members during the year. The institutional repository of IIT Bombay publication, with over 20,172 records, has also attracted more than 4,01,159 hits during 2016-17. During this year, 757 Masters degree dissertations, 350 PhD theses and 254 dual degree were submitted online.

The budget of Central Library, typically for a given year, is about Rs.18.17 crores. Central library subscribed to more than 15,890 e-journals and e-resources and 235 print journals and added about 1,404 volumes including books, theses, reports, standards, pamphlets and other reading materials during the year. It also acquired 1244 e-books during the year. All the library collection can be accessed through online-public access catalogue.

In addition to the above, the library also renders services like reference and consultation, 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 arranging 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 interlibrary loan facilities of books and other informational documents for its members as and when required. It also provides internship facilities to Library Science students from other educational sectors. It handled over 75,882 loan 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.16,79,000 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. However, around the clock air-conditioned reading hall facility with 150 seating capacity for the bonafide users of the library is also available.

The library interacts with its members/ users mainly through its homepage (www.library.iitb.ac.in) which is dynamically updated during the year to make it more user-friendly. The library provides wi-fi connectivity. The library extensively uses social media like blog, Facebook and Twitter for improved communication and interaction to post current and interesting information and news items.

Librarian’s Day 2016 was celebrated on August 12, 2016 on the 124th birth anniversary of Dr. S. R. Ranganathan, the father of Library Science in India for the first time in the Central Library.

IIT Bombay established new facility for students with visual-impairment at Central Library. This facility was inaugurated on January 4, 2017 by the Director Prof. Devang Khakhar. The facility was set up with the aim to empower and encourage visually-challenged students to pursue education/ research. Bibliotheca/ Libre8 self checkout kiosk has been procured and installed during the year. Under NVLI project, the staff have undergone training programme in library automation.

The Central Library successfully conducted 100% physical stock verification of the library books during May 25, 2016 to June 24, 2016 on recommendation of library committee and with the approval of the Director.

**COMPUTER CENTRE**

The Computer Centre continues to provide computational, network infrastructural facilities and services to the IIT Bombay user community.

**Network and Connectivity**

The Centre manages the campus network and is responsible for the availability of intra-campus connectivity of all the departments, hostels, residential complexes and internet connectivity of Institute with the outside world. In addition, about 1080 wireless access points provide wi-fi access at various departments and other key locations on campus.
The following activities were undertaken during the year:

The total Internet bandwidth for IIT Bombay campus users have been around 1000 Mbps from NKN on Vodafone:

- BGP routing to connect to the three ISPs through simple load balancing using open source software.
- Internet access is by NATting via four Class C address ranges recently acquired from APN.
- Web access is through proxy and 'direct access’ where a legitimate user authenticates the IP address.
- Users at the residences have a separate web access account and employees do not have to share their passwords with family.
- Transport layer security has been purchased via digital certificate from GeoTrust.

Few external WiFi access points have been deployed on campus to cover student’s hostels. Access through IITB-Wireless for IIT Bombay users, IITB-Guest for guests of IIT Bombay and EduRoam for visitors with affiliated with EduRoam partners have been made available along with these wi-fi access point. Currently the facility is being used by about 100 user groups to a total of around 350 research scholars.

A new cluster was bought which could fit within the power and cooling capacity of the existing Data Centre. The new system is equipped with 49 HPE Apollo 6000 server with a theoretical peak of 45 TF. Each server has 2 X Intel Xeon 2680 v3 processors and 128 GB of RAM. The system is also connected to a 100 TB of parallel file system as storage. Currently there are 15 users from different research groups using the Corona facility.

**National Knowledge Network:** IIT Bombay continued to be a member of the National Knowledge Network (NKN) during the year. This multi-gigabit network initiative started by the National Informatics Centre (NIC) is being used by CDEEP to conduct distance education programmes. Staff from the Computer Centre represented IIT Bombay in the national level meet of the NKN.

**Grid Computing Facility GARUDA:** The grid computing facility GARUDA is also supported by the Computer Centre allowing the users of the Institute to access the available resources on the National Grid.

**Hardware/Software Infrastructure :** All service offerings at the Computer Centre are based on OPEN SOURCE Software Systems. Computer Centre has registered as official mirror for various flavors of Linux Operating Systems on its anonymous FTP server which is available to the user community at large. A new disk storage system having a capacity of 175 RAW data has been purchased to replace the 7-year-old storage system.

The Institute continues to be a member of Microsoft Developer Network Academic Alliance (MSDNAA) software licensing programme. This allows
The user community to use most of the Microsoft software products in a non-production environment. Campus-wide license of AVG anti-virus software has been in operation.

The Institute Software Committee solicits, specifies and negotiates the purchase of useful commercially-available licensed software for the IITB Academic community.

Software packages meant for scientific and technical computation such as Abaqus, SPSS, Labview, OriginLab, Cisco’s webex for video conferencing facility etc that are available through appropriate licenses schemes are procured, upgraded and administered by Computer Centre as per the requirements of the students, faculty, scientists and staff.

The Computer Centre encourages and has installed Open Source Software Systems for Office Automation in about 775 PCs deployed in the various administrative sections of the Institute. Additionally 30 Desktop PCs with Microsoft Windows operating systems (Under appropriate Volume Licensing scheme), appropriate antivirus software, and other essential software as per requirement are also used for various administrative activities. The use of Open Source operating systems and software has eliminated to a great extent the menace of the spread of computer virus and thus has optimised the IT support overheads required for Network Management and PC maintenance.

**User awareness sessions:** At appropriate intervals and as per requirements, Computer Centre conducts a two hour training session on the usefulness of the applications under the Open Source Operating Systems for office automation and also apprises about the IT Infrastructure facilities provided by the Computer Centre for the administrative staff of the Institute.

**IP CCTV Surveillance activity of the Institute:** The Computer Centre continues to play a secondary role by providing technical support to install and run the newly acquired IP-based Security Surveillance Systems having 284 IP cameras and storage for the security section.

The computer network set up by the Computer Centre enables the Electric Maintenance Division to monitor the power distribution systems, check the status of various Lifts, functioning of UPS Systems, etc. in the Institute. The Telephone Exchange also runs about 1000 new IP telephones (Voice over IP) using the computer network of the Institute. The schedules of the availability of doctors at the IIT Hospital is uploaded on the web site of the hospital and this information is accessible over the IITB LAN.

**Projects for the Near Future:** Expansion planned for WiFi access: Process for providing additional 400 wireless access points for the academic area for “blanket coverage”:

The HPC roadmap: Current infrastructure is about eight years old and upgradation of this facility is planned in west wing on the ground floor of the Old CSE building.
Space for about 100 racks is divided into three parts viz. Central HPC facility of the Institute; Data Centre for the Computer and backup services for the different services in IITB (mail servers of departments, data from ASC, IRCC, Academic Office, etc.); and Bring Your Own Hardware facility: Resources to house high performance computing hardware acquired by different research groups through their funding sources. These will be provided housing, power, cooling and networked access.

Currently, the centre is in the process of building a new Data Centre with major modification to the existing building premises. It will be used to house all the HPC systems of IIT Bombay. This Data Centre will also be used to house the new servers. The centre is also creating a facility to promote Bring Your Own Hardware model, so that all the small clusters/server scattered over the campus can be brought under the same roof, which will help in reducing power consumption as well as the operational cost.

Email and storage: Following are some of the proposed facilities that would be available in the near future for email and storage:

- An integrated mail and calendar system for the Institute
- Extend IMAP service to all departments
- Increase storage allocation for email and BigHome
- Lifetime email to alumni and all faculty/staff

SOCIETY FOR INNOVATION AND ENTREPRENEURSHIP

The Society for Innovation and Entrepreneurship (SINE) is an umbrella for fostering entrepreneurship and nurturing tech start ups at IIT Bombay. It administers a business incubator, which provides support for technology-based entrepreneurship and facilitates the conversion of research activity into entrepreneurial ventures.

Since inception, 104 companies have been incubated. In the year 2016-17, SINE hosted 54 companies, of which, 26 new companies got incubated and 15 have graduated. During the period, four companies received VC/Angel investments and 12 companies are based on technology/knowhow from the institute. The existing companies are from various technologies such as education, cleantech, mechatronics, nano technology, engineering software, fintech, environment, medtech and healthcare. SINE has also supported around 30-40 innovators/entrepreneurs under various other programmes.

SINE has been selected as “Centre of Excellence” by Department of Science and Technology (DST), Government of India. SINE has also been approved for setting up a BIO-Incubator, i.e. BIO-NEST to support the medtech start ups, and also has partnered with ONGC to run a joint incubation program to support the start ups in oil & gas, energy and cleantech sectors.
SINE has been self sustaining its operations since inception. It has received grants from GoI organisations like DST, TDB, DeiTy and also some CSR funding from a few corporates to seed support its start-ups.

SINE also actively associates with the entrepreneurial ecosystem of the IIT Bombay like eCell, Desai Sethi Centre for Entrepreneurship, Healthcare Consortium, Tata Centre, BETiC IITBAA etc.

SINE conducts various end-to-end support programmes for technology start-ups. This will also enhance its incubation support and also serve as a pipeline for incubation. Support programmes undertaken during the year are as follows:

- **SINE partnered with CAMTECH and Lattice innovation to organize a two day hack-a-thon with a focus on healthcare for urban poor.**

- **Prototyping support** program to fund innovators to build their ideas into prototype. **Entrepreneurial fellowship** program supports an aspiring or budding entrepreneur of considerable potential to pursue a promising technology business idea. These programs serve as a pre-incubation initiative.

- **Short term incubation/ accelerator programme** in joint collaboration with **SAP**, to assist technology-based start-ups that are developing for-profit business solutions with a clear social and/ or environmental impact and with **Intel India** to help hardware and electronic based start ups to develop their products and assist in go-to-market strategies and scaling up.

- **Seed Support program** which would provide assistance to start ups and act as a bridge between development and commercialization of innovative products/services.

- **Cross border programmes** like **Academia Industry Training (AIT)** - A bilateral entrepreneur exchange program in partnership with Swissnex India, to help them translate their applied research into market applications. **India Russia Bridge for Innovations (IRBI)**, for entrepreneurs to explore market, provide startup ecosystem and mutual synergies in Russia.
CENTRE DISTANCE ENGINEERING EDUCATION PROGRAMME

Centre for Distance Engineering Education Programme (CDEEP) has taken a leap in reaching out to more institutions/organisations in India and abroad. During the year, CDEEP recorded and transmitted 25 courses, covering 11 disciplines at IIT Bombay. It now has an archive of 347 full semester long courses. This year, 95 courses were supplied to 51 individuals on demand. The viewership of courses through web stood at 4514. It has connected 81 institutions all over India and out of these institutions, 43 have signed MoU with IIT Bombay as Remote Centers (RC). The centre, as its continued parallel activity, covered 80 events, including 54th Annual Convocation, 58th Foundation day, Institute Colloquia and talks by distinguished speakers on campus. The Centre continued its support to various distance education and educational outreach projects being executed at IIT Bombay.

INSTITUTE EVENTS

54th Convocation

The 54th Convocation of IIT Bombay was held on August 13, 2016. Dr. Rajendra Singh, Chairman, Tarun Bharat Sangh and winner of Stockholm Water Prize 2015, was the Chief Guest and delivered the Convocation Address.

58th Foundation Day

IIT Bombay celebrated its 58th Foundation Day on March 10, 2017. Mr. Sanjay Mashruwala, Managing Director of Reliance Jio Infocom Limited, was the Chief Guest. The Institute honored 14 outstanding alumni this year with the Distinguished Alumnus Awards and two with Young Alumnus Achievers Awards. The 'Prof. S.C. Bhattacharya Award for Excellence in Research in Pure Sciences’ was conferred on Prof. Amiya Pani, Department of Mathematics. The 'Prof. H.H. Mathur Award for Excellence in Research in Applied Sciences’ was conferred on Prof. Rinti Banerjee, Department of Biosciences and Bioengineering.
Teacher’s Day
The 58th Teacher’s Day was celebrated on September 2, 2016. Prof. Sabyasachi Bhattacharya, Distinguished Professor, Tata Institute of Fundamental Research, was the Chief Guest. The “Excellence in Teaching Award – 2016”, “IRCC Research & Industrial Consultancy Award – 2015” and the “Dr. P. K. Patwardhan Technology Development Award - 2015” were presented on the occasion.

Vana mahotsav
Vana mahotsav was celebrated on July 1, 2016. Saplings were planted on the hill behind SAMEER and Ananata building located in IIT Bombay campus.

Centre of Propulsion Technology’s Foundation Stone Laying Ceremony
Honourable Union Minister of State (Defence) Subhash Bhamre laid the foundation stone of the Centre of Propulsion Technology at IIT Bombay premises set up by Defence Research and Development Organisation (DRDO) along with IIT Bombay and IIT Madras, on November 11, 2016.

Conferences/Colloquia/Lectures/Seminars
Many conferences and lectures were organised during the past year. Some of them have mentioned earlier and few are listed below:

Prof. Rana Adhikari, California Institute of Technology, United States spoke on ‘Discovery of gravity waves by the LIGO experiment: Dawn of a new era in experimental physics’, at an Institute Colloquium on April 13, 2016.

Mr. P. Ramkumar, General Manager, Materials Management Activities, Vikram Sarabhai Space Centre, Trivandrum, spoke on ‘Steel for Space Applications’ at the inaugural lecture of the Steel Colloquium Series on May 24, 2016.

Prof. Seshadri Seetharaman, Professor Emeritus, The Royal Institute of Technology, Stockholm, & Distinguished Visiting Professor, IIT Bombay, spoke on “Cleaning the ‘Backyard’–A Technological Challenge” at the Steel Colloquium lecture Series on June 24, 2016.


Prof. Nitin P. Padture, Professor and Director, Institute for Molecular and Nanoscale Innovation Brown University, School of Engineering, United States, spoke on “Harnessing the Power of the Sun Efficiently and Cheaply: The Unprecedented Promise of the New Perovskite Solar Cells”, at an Institute Colloquium on July 22, 2016.

Mr. T. V. Narendran, MD, Tata Steel India and South East Asia, spoke on “Why steel is a big deal ... in the life of people and nations and .. how can you help”, at the Steel Colloquium Lecture Series on July 27, 2016.

Prof. Sudarshan Iyengar, Distinguished Chair Professor in Gandhian Philosophy, IIT Bombay, spoke on “Individual Freedom in Gandhian Perspective: Implications for Nonviolence Society”, at the Institute Lecture on August 24, 2016

Prof. Dipak Mazumdar, Ministry of Steel Chair Professor, IIT Kanpur, spoke on “Engineering in Steel Making”, at the Steel Colloquium Series on September 2, 2016.

Dr. Srinath Raghavan, Senior Fellow, Centre for Policy Research, New Delhi, spoke on “The Economic Consequences of the War: India, 1939-45” on September 21, 2016.

Mr. Alok Chandra, Executive Vice President, JSW Steel Ltd, spoke on “Rebuilding of Blast Furnace by ‘Single Block’ Method An Engineering Marvel” at the Steel Colloquium on September 28, 2016.

Prof. Sugata Mitra, Professor of Education Technology, School of Education, Communication and Language Sciences, Newcastle University, United Kingdom, spoke on “The Future of Learning” on October 13, 2016.

Dr. Manish Gupta, Vice President and Director, Xerox Research Center, India, spoke on “Towards Personalized Education and Healthcare using Data and Behavioural Sciences” on October 19, 2016.

Dr. R. Balamuralikrishnan, Scientist ‘G’, DMRL, Hyderabad, spoke on “Low Alloy Steels for Naval Applications: From Lab to Product, From Science to Technology” on October 20, 2016.

Mr. Navroz H. Seervai, Senior Counsel, Bombay High Court & Supreme Court of India, spoke on “Article 368: Amending the Indian Constitution” on October 22, 2016.

Prof. Ikuo Towhata, Vice President for Asia, International Society for Soil Mechanics and Geotechnical Engineering, spoke on “Long term disaster management of the Nuclear accident at Fukushima (2011)” on December 5, 2015.


Dr. Bruce Allen, Managing Director, Albert Einstein Institute Hannover, Germany, Max Planck Institute for gravitational physics and Leibniz University, spoke on “Direct observation of gravitational waves from the merger and inspiral of two black holes” on December 15, 2016.
Prof. Tuula Teeri, President, Aalto University, Finland, spoke on “Universities And Innovation-Driven Growth: The Case Of Aalto University” on February 23, 2017.

Dr. Gururaj “Desh” Deshpande, Trustee of Deshpande Foundation, President and Chairman of Sparta Group LLC and Chairman of Tejas Networks delivered a distinguished lecture on “The Global Opportunity For Indian Institutions And Entrepreneurs” on January 12, 2017.


Conferences:

Sixth International Congress on Computational Mechanics and Simulation:

The sixth International Congress on Computational Mechanics and Simulation (ICCMS2016) was held during June 27 - July 1, 2016 at IIT Bombay. It was organized and hosted jointly by Department of Civil Engineering, IIT Bombay and Department of Structural Engineering, Veermata Jijabai Technological Institute (VJTI) Mumbai, under the auspices of Indian Association for Computational Mechanics (IndACM).

International Conference on Sustainability in Geotechnical Engineering Practices and Related Urban Issues:

International Conference on “Sustainability in Geotechnical Engineering Practices and Related Urban Issues” was jointly organised during September 23-24, 2016 by the Indian Geotechnical Society (IGS), Indian Geotechnical Society Mumbai Chapter (IGS Mumbai Chapter) in association with International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). Prof. Deepankar Choudhury (Organising Secretary), Prof. Santiram Chatterjee, (Convener, Technical Committee) and Prof. Prasenjit Basu (Convener, Technical Committee), Department of Civil Engineering, IIT Bombay co-ordinated the event.

SciPy India 2016:

Free and Open Source Software for Education (FOSSEE) organized SciPy India 2016 at IIT Bombay from December 10-11, 2016. SciPy India conference aimed at providing opportunities to spread the use of the Python programming language in the Scientific Computing community in
India. The objective of the conference was to combine education, engineering, and science with computing through the medium of Python. The conference featured a variety of workshops and invited talks. Prof. Prabhu Ramchandran, Department of Aerospace Engineering, IIT Bombay, Conference Chair of Scipy India 2016 co-ordinated the event.

**WRCB Clinical Day on Cancer Precision Medicine:**

The Department of Biosciences and Bioengineering, IIT Bombay organized a one-day in-house symposium, WRCB Clinical Day on “Cancer Precision Medicine” on December 5, 2016. Dr. Sanjeeva Srivastava, Convener (Department of Biosciences and Bioengineering) delivered an inaugural talk followed by an WRCB introduction by Dr. Pramod Wangikar, Professor-In-charge, WRCB.

**Sixth International Conference on Asian Current Research on Fluid Inclusions VI:**

The Department of Earth Sciences, IIT Bombay organized an International Conference on “Asian Current Research on Fluid Inclusions VI” (ACROFI VI) from November 22-27, 2016 to provide an international forum for exchange of latest research results and ideas between geoscientists from universities, government and industry from Asian countries and other nations focusing on studies of fluid and melt inclusions. Scientists from 11 countries participated in the event. The conference featured several oral and poster thematic sections.

**International Conference on Organic Synthesis (ICOS):**

21st International Conference on Organic Synthesis was held during December 11-16, 2016 at IIT Bombay. The International Conference on Organic Synthesis (ICOS), a biennial event, initiated in 1976 by IUPAC as a platform for the exhibition of new and upcoming topics in the field of organic chemistry, brings together a plethora of new ideas and more importantly catenates new scientific minds. Prof. Krishna P. Kaliappan, Department of Chemistry, IIT Bombay, Organizing Chair of ICOS 21 along with Dr. S. Chandrasekhar, Director, CSIR-IICT Hyderabad, Organizing Secretary ICOS 21 CSIR-IICT Hyderabad coordinated the event.

**International Conference on 12th Transportation Planning and Implementation Methodologies for Developing Countries:**

The 12th International Conference on “Transportation Planning and Implementation Methodologies for Developing Countries (TPMDC)” by Transportation Systems Engineering (TSE) Group of Civil Engineering Department, IIT Bombay was organized from December 19 – 21, 2016. This conference served as an ideal platform to share the findings on transportation related issues of the developing countries.

**3rd Indo-Austrian Symposium on Materials Engineering:**

3rd Indo-Austrian Symposium on ‘Advances in Materials Engineering’ (AME 2016) was jointly organized by IIT Boambay, Indian Institute of Metals (IIM) Mumbai Chapter and Nonferrous Technology Development Centre
(NFTDC) during December 19-20, 2016. The aim of this symposium was to address the challenges, where knowledge in materials engineering becomes an important tool to solve problems in the fields related to structural applications, protection of materials, energy storage and health care, primarily in India and Austria.

3rd International Conference on Emerging Electronics:

The 3rd International Conference on Emerging Electronics (ICEE 2016) was held at the IIT Bombay during December 27 – 30, 2016. ICEE 2016 was jointly organized by IIT Bombay and IISc Bangalore and co-sponsored by IEEE Electron Devices Society. The conference featured plenary and keynote talks from world renowned experts in diverse areas of electronic materials, devices and systems along with panel discussions, contributed presentations, and poster sessions involving experts from the government, industry and academia.

Computational and Experimental Studies of Microtubules and Microtubule based Motor Proteins:

A one-day international symposium supported by a mini-grant from Biophysical Society (USA), Department of Biotechnology (Government of India) and Department of Biosciences and Bioengineering, IIT Bombay was organized on December 14, 2016.

Conference on “Environmental Governance in the Post-Liberalization Phase in India:

The Department of Humanities and Social sciences of IIT Bombay organized a two-day national conference on “Environmental Governance in the Post-Liberalization Phase in India: Challenges for Sustainability and Social Justice” during January 23-24, 2017. This conference was funded by the Indian Council of Social Science Research (ICSSR), Delhi. The focus of the conference was to examine the constraints posed by the principles of liberalisation to environmental governance process and to discuss the ways in which the liberal economy which has become a part and parcel of Indian deny citizens, and particularly some of the most vulnerable communities, their equitable rights to ownership, access, use and distribution of resources.

Workshops:

A joint workshop by IIT Bombay and Curtin University, Australia was held at the Institute on May 9, 2016. The theme of the workshop was 'Smart Cities' and 'Energy Technologies'. The workshop was coordinated by Prof. Ronita Bardhan (for Smart Cities), Centre for Urban Science and Engineering and Prof. Sreenivas Seethamraju (for Energy Technologies), Department of Energy Science and Engineering.

IIT Bombay, National Chiao Tung University and National Taiwan University held a joint workshop on May 16 and 17, 2016. The theme of the workshop was 'Nanodevices'. The 2-day workshop was coordinated by Prof. Swaroop Ganguly, Department of Electrical Engineering and Prof. Aswani Yella, Department of Metallurgical Engineering and Materials Science.
A joint workshop by IIT Bombay and Samara State Aerospace University, Russia was held on May 25-26, 2016. The motive of the workshop was to find areas of joint research collaboration and build a good relationship between the two institutions for further enhancement in education and research. Prof. P. P. Date, Department of Mechanical Engineering co-ordinated the workshop.

**Workshop on Unmet Needs In Drug Delivery Technology:**

IIT Bombay jointly with Indian Drug Manufacturers’ Association & Organisation of Pharmaceutical Producers of India had organised a one-day workshop on ‘Unmet needs in drug delivery technology’ on February 25, 2017 at IIT Bombay campus. Dr. R. A. Mashelkar, National Research Professor (NCL) & Former Director General Council of Scientific & Industrial Research was the Guest of Honour on the occasion. Prof. Samir Mitragotri, N. R. Kamath Chair Professor at IIT Bombay, delivered the keynote address. The main objective of the workshop was to identify the gaps and challenges in drug delivery technologies, industry academia interaction and collaboration on potential commercializable technologies.

**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 titled “Correspondence in Hindi”, “Noting and Drafting in Hindi”, “Basic Hindi Translation” and “Hindi Typing Skill” etc. were conducted during the year for staff members of the Institute. The cell continues to send Hindi synonmys of the administrative terms through the Institute’s email (GPO). The Staff Handbook of the Institute was also translated into Hindi during the year.

This year 12 staff members of the Institute appeared for Hindi Typing Exam, conducted by the Hindi Teaching Scheme, Department of Official Language, Ministry of Home Affairs.

“Hindi Pakhawada” was celebrated during September 1-14, 2016, where competitions in essay writing, dictation, general knowledge and Hindi translation were organised for the students and the staff of the Institute. Hindi seminar-cum-Hindi Book exhibition was jointly organised by the Central Library and Hindi Cell on the occasion. Mrs. Sudha Arora, eminent writer, was the Chief Guest of the Hindi Diwas. The certificates and cash awards were distributed to the winners of the competition. Awards to Institute employees for significant contributions in Hindi implementation were conferred during the event.

Regular meetings of the Official language implementation Committee of the Institute were conducted during the year for improving the use of Hindi in official work.
STUDENT ACTIVITIES

Students at IIT Bombay explore their interests in a plethora of activities. There are excellent recreational facilities for sports, including gymnasiums, swimming pools, courts for tennis, basketball, volleyball, hockey, football and cricket, athletics tracks and many more. Along with studies, sports activities too are carried throughout the year. All the events are organized by a capable Institute Sports Council headed by General Secretary, with the able guidance of Sports Officers, Chairman Sports and Dean Students Affairs.

TECHFEST

IIT Bombay’s annual international science and technology festival called TechFest, is well established as Asia’s Largest Science and Technology festival patronized by UNESCO, UNICEF, SAYEN, CEE and Make In India. The event was held during December 16-18, 2016 and witnessed a footfall of more than 1.6 lakhs people comprising mainly of the youth from across the nation and an outreach of over 2500 colleges across India and over 500 overseas. The theme for this year’s edition of Techfest was ‘A Space Expedition’. Some of the activities organised as a part of Techfest 2016 are as follows:

Lecture series: A total of 20 lecture sessions were conducted during Techfest in a span of 3 days. These included 17 keynote speaker sessions, two panel discussions and one interview session. Prof. Urjit Yajnik & Prof. D B Phatak of IIT Bombay were the part of panel discussions on “The Discovery of Gravitational waves” & “Make In India” Initiative respectively. The interview session with Mr. Rakesh Sharma was moderated by Prof. Hemendra Arya of IIT Bombay. Interaction sessions with Mr. Rakesh Sharma, Prof. Peter Atkins, Shri A S Kiran Kumar, Prof. Kaushik Basu (N.R. Kamath Chair Professor, IIT Bombay) were also organised.

Exhibitions: is one of the distinguished sector of Techfest which provides an opportunity to see what the world has achieved and is trying to achieve through technology. The event, this year, witnessed more than 20 exhibits from countries across the world and from elite universities like EPFL, ETH Zurich, St. Petersburg, Michigan University etc. It also showcased some of the most impressive exhibits from India consisting of Indian Army, student innovations and Indian tech companies. ISRO also participated in the exhibitions showing the breakthroughs and latest technological advancements in the field of Indian space technology going along with the festival’s theme “A Space Expedition”. Over the 3 days of the festival, the exhibition hangar witnessed around 40,000 people.

Techconnect: After being discontinued for 2 years, Techconnect was re-started this year, with 43 exhibits showcased by more than 250 B.Tech/M.Tech students. Two companies from SINE along with 6 student bodies and 35 other exhibits from various laboratories and departments of the
Institute participated. Lecture by B. Ravi on “Scope and Importance of Medical Device Innovation in present day world” was also organised as a part of TechConnect, which was attended by around 200 visitors.

CURED: CURED (Can U Really Escape Diabetes?) was a PAN-India level initiative and biggest outreach campaign by Techfest IIT Bombay to evade diabetes. Diabetes health check camp was organised on September 25, 2016 in 20 cities across eight states of India. Guinness World Record for maximum number of health pledges card signed by people was attempted. A total of 65,000 patients were screened for diabetes on that particular day.

IAMPOWER: With an aim to empower girls to become leaders in technology, innovators in Science, Technology, Engineering and Mathematics (STEM) and build their own future through exposure to computer science and technology, Techfest conducted the initiative IAmPower to support the young girls and women of India by involving them in STEM. As a part of the online awareness drive, video testimonials were taken from 11 female students of IIT Bombay.

International Coding Challenge: The coding hunt, which witnessed participation of over 15 countries organised by Techfest 2016-17, was attended by over 300 students from the Institute. Overall third and fourth position and cash prize worth Rs 30000 was bagged by two IIT Bombay 3rd Year Computer Science students Govind Lahoti and Rishabh Agarwal.

MOOD INDIGO

The annual cultural festival Mood Indigo, held during December 23-26, 2016, saw an overwhelming response from the youth of the country who came to IIT Bombay to witness the four-day extravaganza. The festival witnessed more than 220 events and saw a footfall of 1,39,000.

Proshows: The Litfest featured eminent personalities like Hon’ble Chief Minister of Maharashtra Mr. Devendra Fadnavis. The show also had noted journalist Mr. Arnab Goswami and hundreds of college students as part of his ‘Transform Maharashtra’ initiative.

The other speakers included Hon’ble Minister of State with Independent Charge for Power, Coal, New and Renewable Energy and Mines Mr. Piyush Goyal, Entrepreneur, filmmaker and author Mr. Varun Agarwal, Padma
Bhushan awardee Prabhu Chawla, and many more. Stand-up comedy shows saw crowds roar in laughter featuring big artists like Mr. Sorabh Pant and Mr. Navin Prabhakar. The theatre shows touched new heights with Mr. Saurabh Shukla bringing his famous play Barrf to the convocation hall apart from other famous shows like Daddy Cool etc. The International Music Festival had crowds pouring in for shows of Mame Khan, Arjun Kanungo etc. In addition, Mood Indigo 2016 featured lots of international artist groups from Turkey, Netherland, USA and France enthralling the audiences with their amazing performance. Inaugural events like MI Tour and Live Art Showcase were a huge success with the former offering a unique and assisted experience for visitors.

**Pronites:** Mood Indigo 2016 featured for the first time the International Nite in the gymkhana grounds. Crown The Empire - an American post-hard-core rock band who was the headliner for the night, created an electric and entertaining atmosphere for one and all in the crowd. Day 2 had the famous Karsh Kale collective provide a serene musical experience. Day 3 had world famous Italian duo of VINAI coming down to India to make the enthusiastic youthful crowd buzz in the EDM night. The festival ended with the best possible act of Shankar Ehsaan Loy, making perhaps the highest-ever gymkhana turnout ring to their old and new Bollywood tracks.

**Competitions:** While the flagship competitions in dance, music and dramas stayed the point of attraction, what captivated people’s minds were the novel competitions in various genres like journalism, digital arts and lifestyle. To add a cultural flavour to the festival, various competitions in the classical and folk arts genre were also introduced, which were highly appreciated by the judges as well as the participants. Entry of competitions in niche fields like improvisational theatre, rap, photography and folk dance increased participation by 20%. Under the “Live Your Passion” campaign, the participants received various incentives, which included airing of the finals of the competition on NDTV Prime, performances and exhibitions at prestigious stages like Kala Ghoda, Indian Arts Festival and summer internships in institutions like Anupam Kher’s Actor Prepares, Spic Macay, Ritam Banerjee, True School of Music etc. The competitions saw participation from over a thousand colleges panning across various cities like Mumbai, Delhi, Jaipur, Hyderabad and Bengaluru.

**Media:** The festival was extensively covered by various mainstream and regional media houses. Various news channels also featured the festival on television, including Romedy Now showing snippets of the humour show. In an attempt to explore the new mode of mass communication, social media, the organizers indulged in posting live updates via various social networking sites like Facebook, Twitter, Inshorts and Instagram. In addition, a 12 page newsletter was published in association with Bombay Times which was distributed in over 60,000 households in Mumbai. The Media Team also explored other avenues of publicity like outdoor hoardings and publicity in cinema houses. A barter deal across 10 cities helped increase the reach for Mood Indigo and IIT Bombay brand name.
Entrepreneurship Cell (E-Cell)

The E-Cell at IIT Bombay was founded with a vision to create an entrepreneurial ecosystem by enabling an easy and efficient interaction between students, faculty, aspiring and existing entrepreneurs, mentors and investors. E-Cell has worked to spread awareness and promote latent entrepreneurship spirit amongst people by conducting four major initiatives:

a) The Entrepreneurship and Business Club (EnB Club)

The EnB Club tried to foster the latent entrepreneur skills within all the IIT Bombay students by catering to the requirements of all the students having different levels of entrepreneurship skills. Several activities were conducted, some of which are:

**Speaker Sessions and Panel Discussions:** Various sessions such as 'Business Vs Entrepreneurship' panel discussion were held in which attendees were informed of the pros and cons of each of them. The Crowdfunding speaker session briefed about the various aspects of raising funds. A detailed discussion about crowd funding and their real grounds minutes were discussed.

**Bootcamps and courses on Entrepreneurship:** Several boot camps and courses were conducted to cater to all the IIT Bombay students. Some of them were:

- A 5-hour long course by Ajeet Khurana was conducted with the motive of discussing grass rooted information on entrepreneurship
- A one-day course that covers all aspects of starting and running a company such as idea generation, business modelling, finance, legal aspects, marketing, funding and pitching was also conducted
- A 22-day long program, during which ideas are made startup worthy, with the help of extensive mentoring was held. Product Showcase, Idea Submission, Team Building Session, Offline Mentoring, Final Pitching round in front of investors were the different rounds that were conducted.

**Coffee Meetups:** A networking event for all Powai startups, VC’s, corporates, mentors. This helped building contacts and flow of ideas in an informal yet professional way.

b) National Entrepreneurship Challenge

This was launched with a vision to promote entrepreneurship amidst all the college campuses in India. Overall 150 entries have registered and had established E-Cells in their colleges.

**Eureka!** Eureka! has been independently recognized as Asia's largest Business Plan Competition by CNN and Thomson Reuters. Eureka provides a platform for potential ideas and early stage start-ups to evaluate their
plan in the risk-free environment of a competition. During the event, thirty five one-day long workshops aimed at imparting knowledge about entrepreneurship across major cities of India, catering to over 2800 students, via Business Model Canvas and hands-on experience with an average feedback of 4/5 were organised. Mentors were allotted to the selected participants for a span of 2 months with whom they could talk over phone. Offline mentors meet was conducted for them to consult mentors of all fields face-to-face and a lean startup workshop aimed at helping them to make a MVP was also conducted. A team of experts and judges selected the finalists through a transparent judging process. Business and social startups were awarded separately. Various other awards such as youth award etc. Were given.

**Enspace:** Two issues of Enspace were launched this year. Our inside and outside readership of Enspace as well as blogs increased by 100%.

**Enlighten:** An online learning platform to learn about entrepreneurship free of cost was launched. The portal also includes speaker sessions conducted by E-Cell since last 3 years along with various resources such as reading material to learn about entrepreneurship.

**The Entrepreneurship Summit:** The Entrepreneurship Summit is a confluence of visionary students, professionals or anyone who wishes to be one of those crazy rebels who will change the world, start his own business or fund a business and become a trend-setter. It is the annual flagship event of E-Cell, IIT Bombay. Various activities were conducted during this 2-day Summit. Some of them are:

- **Networking Arena:** We hosted a series of networking events where young entrepreneurs, investors and people from entrepreneurial background connect with each other. This year, the Networking Arena was divided into three sessions namely Investors Speed Dating, Idea Validation Arena and Quora Meetup. Networking Arena in E-Summit 2017 was a huge success with pre-registrations of over 170 participants in each session.

- **The Ten Minute Million:** One of the highlight events of The Entrepreneurship Summit, 2017 hosted a total of 8 startups (out of 130 entries) for a 5-minute pitching and 5 minutes Q & A session in front of a panel of 12 investors. Out of those 8 startups, 6 startups received an on-the-spot funding of 10 lakh INR.

- **StartupExpo:** It is a platform for innovative startups from all over the country to get in touch with thousands of its potential customers and investors. It also provides an opportunity for the attendees to learn about the new entrepreneurial techniques that these startups have used to become successful in their journey.

- **Internship Fair:** Job and Internship Fair was conducted for the students of IIT Bombay to help them get jobs and internships by directly communicating with the startups coming in, as per their
interests. Eight startups participated and were given a kiosk for the entire day for scheduling and conducting interviews.

- **Hackathon**: In this competition, participants had 24 hours to build a business plan, design and code it with help from a roster of mentors from various fields and expertise roster of top sponsors and access to top notch technical experts while they compete for a prize worth of INR 100000 to be given to the top 3 teams. The teams got the chance to pitch in front of Accel Partners, one of the leading Venture Capital (VC) firms in the world.

- **Lean Startup Workshop**: It was an intensive three-day workshop which teaches entrepreneurs and innovators how to build disruptive products using Lean Startup methodologies.

- **The Unconference**: In this event, attendees create the agenda so that all the discussions become relevant and engaging. The session topics are dynamic and decided at the event when participants propose topics they want to discuss and sign up for topics proposed by others. This event was envisioned to build communities, unleash initiatives and help solve problems.

- **Speaker Sessions and Panel Discussions**: A large number of speaker sessions were conducted with speakers from all the fields related to entrepreneurship. Attendees could learn from the experiences of the speakers and could look at the tangible aspect of their start-ups and ventures (some of the speakers were: Amit agarwal, Jeff Bulas, Paul Sloane, Jim Beach, Shraddha Sharma, Alan Mamedi, Gabor Veszi, Raj Jaiswa).

- **Workshops**: A wide multitude of workshops were conducted giving the attendees insights into all the aspects of running a startup and how to solve various issues and scale their startups as fast as possible. Some of the speakers were: Bootstrapping, Legal Issues, Entrepreneurial Finance, Business Model Canvas & Personal Branding.

- **Competitions**: Many competitions were conducted, each of them targeted to instill qualities in the participants that are fundamental for becoming a good entrepreneur and investor. Some of the competitions were: Crowd pitch, Apocalypse Management, Finance Case Study, Marketing Case Stud, National Bizquiz, Investor’s Hat Merger and acquisition.

- **Investor’s Conclave**: The aim of this initiative was to foster networking among investors and startups. The startups were mentored on how to pitch and how their ideas will be judged when they give their first pitch to an angel investor. The participation in this edition was around 35 investors and 20 startups.
c) Student’s Technical Activity Body (STAB)

The student technical activities in the institute saw a huge growth in 2016-17 spearheaded by the move towards technical resource group formation under various clubs, expansion of Tinkerers’ Lab, a successful summer programme (Institute Technical Summer Projects), the Tech and RnD exposition and the introduction of the position of General Secretary for Technical Affairs position in this year’s gymkhana elections. Some of the new initiative of this year were as follows:

- **Expansion of Tinkerers’ Lab** from the earlier 800 sq ft to 2500 sq ft. A lot of new, state-of- the-art equipment was bought with generous contributions from the 1966 and 1975 alumni batches.

- **Involvement of hostel councils in technical activities** saw a two-fold increase in the number of events and participation. The technical hobby clubs and the hostel technical councils worked together to make sure a plethora of events were conducted in hostels. Technical rooms of 4 hostels were revamped with help from STAB.

- **Institute Technical Summer Projects (ITSP)** was completed successfully by 40 teams wherein freshers worked on their own ingenious ideas over 2 months in the summers of 2016.

- **Summer of Science (SoS)**, a new initiative by the Maths and Physics Club, saw senior students volunteer to mentor juniors to help them learn something new in the summers of 2016 through reading papers, journals and online courses. The topics ranged from astrophysics to cosmology to the general theory of relativity and had 7 reports submitted. Summer of Science ’17 saw 40 reading projects and a 5-fold increase in the number of mentors.

- **Seasons of Code (SoC)**, a new initiative by the Web and Coding Club, saw juniors take up projects floated by senior students. The senior students personally mentored the students. This programme boasts of 8 completed projects and a collaboration with FOSSEE, IIT Bombay for the year 2017.

- **Enthuse**, a platform for students to interact with professors in hostel lounges and mess to know about ongoing research in various departments, was revived. Three Enthuse sessions were conducted this year parallely across 5 hostels. This was done in collaboration with the Dean (RnD) and the UG Academic Council.

- **BioEngineering Club** was a new club formalised and run actively this year.

- **Group discussions, Reflections, BioBytes**: This year saw the move towards an unprecedented number of group discussion with each hobby club conducting one group discussion a fortnight. Reflections was an initiative by the Web and Coding Club bringing senior students together to discuss about projects they have
worked on and discuss them in layman terms. BioBytes was a discussion group formed with the help of the BioEngineering Club and Maths and Physics Club.

- **The Tech and RnD Exposition**, which used to be conducted previously along with the Student Alumni Meet was conducted independently as a standalone event along with the UG Academic Council. This event saw 30 undergraduate projects along with 6 projects from technical teams being displayed over a period of 2 days.

This year, continuing with the trend from last year, saw an exponential increase in the number of activities. There was a two-fold increase in the number of events. Hostel technical councils were revived. Many innovative projects were developed and showcased.

**PLACEMENT**

The Placements season for the academic year 2016-17 began with campus interviews conducted in two phases. Preparations for these phases and associated activities stated in July 2016. The first phase of IIT Bombay’s campus placement in December 2016 witnessed participation of more than 225 companies and the second phase saw more than 50 companies resulting in 114 job offers in total, including the pre-placement offers. Students from Bachelor of Technology (B.Tech), Master of Science (M.Sc.), Dual Degree (D.D), Master of Technology (M.Tech), Master of Design (M.Des), Master of Philosophy (M.Phil) and Doctor of Philosophy (PhD) programs in various fields of engineering, science and technology, design and humanities participated in the placement process. There were a total of 1718 students registered for campus placements in 2016-17 which includes PhD and M.Des students.

Student registration for campus placements opened in August 2016 with the customary introduction to the placement process by the Professor-in-charge and student placement team. Companies were invited from July 2016 onwards to fill up online “Job Announcement Forms” which opened to students registered for placements from early October. Pre-placement talks by some companies, provided an avenue for interaction and familiarisation of students with recruiting organisations and their work profile as a run up to formal placements. Companies were increasingly being asked to make only electronic presentations rather than on-campus talks, especially if they have visited IIT Bombay over the past few years. The company interview process for the first phase began on December 1, 2016 with a break on December 4 for scheduled CAT exam. A small number of eligible students did not actively participate in the placement process due to other career choices.

December 1, 2016, the first day of formal placements, saw 33 companies, representing some of the most coveted jobs in global industry vie for students. An unprecedented 158 jobs were offered on that day reconfirming the commitment of top recruiters to IIT Bombay graduates. Placement season 2016-17 also had the formal placement process for
Industrial Design Centre (IDC) conducted separately in May 2017 to better synchronize with the academic calendar for final year students. While the placement season eventually saw recruiters from the entire spectrum of the industry, the initial part of the season was dominated by firms from sectors like engineering and manufacturing, computer software and hardware, data analytics, management consulting, finance/banking, and FMCG. Most of these firms are world leaders in their respective domains. Some of the major start-ups as recruiters turned up but the budding start-ups were avoided this year since offers from the previous year start-ups were delayed/revoked.

**Student Preparations**

As in previous years, a key focus of the Placement Office was to prepare the students for placement and internships. A large number of preparatory activities were conducted this year for the graduating students, including refresher lectures on various technical subjects. In addition, preparatory programmes to enhance communication skills, interview skills and group dynamics were also organised. Talks with the alumni working in diverse sectors were also organized to orient the students to different job requirements. Around 1330 preparatory sessions were organised by the Placement Office. Senior and experienced alumni from the corporate sector were available at the Placement Office during December 2016 to counsel and advise students in need.

**Engineering and Technology**

IIT Bombay students continue to demonstrate strong commitment to their core educational background in their choice of employment. Majority of students opted for science, engineering and technology-oriented jobs with the recruiting companies operating in various sectors of the economy. Placement session 2016-17 witnessed the presence of 88 core engineering organisations especially the Public Sector Units (PSUs), offering 345 jobs.

**IT/ Software**

IIT Bombay students known for programming skills have continued to attract recruiters through campus placement over the past several years. Challenging global scenario and the increasing competition amongst the IT companies did not impact the job opportunities in this sector which resulted in 184 job offers by 64 companies.

**Financial Services**

The financial service sector was a major recruiter this year too. Many of the top global companies in financial sector visited the campus. The Fin-Tech sector noticed a rush among top-level as well as mid-level companies to recruit the brightest and the best from the campus. 25 companies from these sectors offered 130 jobs to students. The rapid ongoing digitization of financial services sector in India also resulted in
strong presence of Indian financial firms in a sector traditionally dominated by multinationals at IIT Bombay.

**Data Analytics**

The reputation of superior analytical and reasoning skill of IIT Bombay graduates continued to draw recruiters from the rapidly growing field of data analytics. There were 113 job offers from 44 organisations making this one of the biggest recruiters after engineering and information technology. This trend seems to have taken strong roots at IIT Bombay.

**Consulting Sphere**

Over 24 leading consulting firms, including several global leaders, visited IIT Bombay for campus placement this year. These organisations work with large corporations across the world and help them resolve complex business problems. Management Consulting companies carry a reputation of being very selective in their choice of campuses and follow extremely high standards in their recruitment process. Over 89 offers were made in the consulting sector including management consulting.

**Research & Development**

With the economy increasingly striving for high-end products and services, a larger number of companies now develop products on the forefront of technology. IIT Bombay saw an increase in the number of organisations hiring fresh graduates in the research and development sector. A total of 32 R&D organisations offered 118 positions this year.

**Education**

IIT Bombay continues to provide faculty to several educational institutions through campus placement over the past several years. 11 organisations selected 47 students, including some with doctoral degree, who have been offered jobs in public and private educational institutions through campus placement.

**Conclusion**

The successful campus placement session in 2016-17 clearly demonstrates the demand of IIT Bombay graduates among the top recruiters in various segments of the economy. A majority of our past recruiters held their faith in the abilities of our students and came to recruit in large numbers. This year, several new organisations visited the Institute for the first time, and the Institute looks forward to fostering long-term relationship with all these organisations in near future. The year saw several important headwinds in the business climate of Indian and International companies due to global events which impacted the placement process in the interim period. Internal factors such as selection trends and strict criteria for participating companies, and restricted participation of start-up companies were some reasons for fall in demand.
Program-wise statistics:

Over the years there has been a gradual increase in the registered students count. The numbers below narrate the participation according to the programs with their respective selections.

<table>
<thead>
<tr>
<th>Academic Programme</th>
<th>Registered</th>
<th>Participated</th>
<th>Placed</th>
<th>Percent placed</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Tech</td>
<td>544</td>
<td>467</td>
<td>394</td>
<td>54.37</td>
</tr>
<tr>
<td>Dual Degree (B.Tech+M.Tech)</td>
<td>247</td>
<td>230</td>
<td>189</td>
<td>82.17</td>
</tr>
<tr>
<td>M.Tech(2 Yr.)</td>
<td>542</td>
<td>493</td>
<td>396</td>
<td>80.32</td>
</tr>
<tr>
<td>5-yr M.Sc.</td>
<td>16</td>
<td>15</td>
<td>10</td>
<td>66.67</td>
</tr>
<tr>
<td>2-yr M.Sc.</td>
<td>147</td>
<td>99</td>
<td>67</td>
<td>67.68</td>
</tr>
<tr>
<td>M.Des</td>
<td>62</td>
<td>61</td>
<td>25</td>
<td>40.98</td>
</tr>
<tr>
<td>Other Programmes</td>
<td>160</td>
<td>153</td>
<td>33</td>
<td>21.57</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1718</strong></td>
<td><strong>1518</strong></td>
<td><strong>1114</strong></td>
<td><strong>73.39</strong></td>
</tr>
</tbody>
</table>


Note: Participated count excludes de-registered students who opt for higher studies & have other career options and hence de-register themselves from the placement process.

Figure 1: Programme-wise Placement (%)

Note: All registered students do not necessarily participate actively in campus placements. Some may have alternate plans like higher education, research scholar etc. But still they register for campus placements. It is also important to note that students are also get placed through channels other than campus placements.
In addition to the above mentioned numbers 1 M.Phil and 26 PhD students were also placed in the campus placement process.

For M.Sc., M.Sc.+M.Tech and PhD students, higher studies and post-doctoral work can be a priority.

**Sector-wise Selection**

Sectors like Core Engineering & Technology, Research & Development, Analytics and IT/Software saw good selections this year which were inclined to the industry trends.

**Table 2: Placement detail by type of organisation:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Sector</th>
<th>Number of Organizations</th>
<th>Number of Offers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Engineering &amp; Technology</td>
<td>88</td>
<td>345</td>
</tr>
<tr>
<td>2</td>
<td>IT/Software</td>
<td>64</td>
<td>184</td>
</tr>
<tr>
<td>3</td>
<td>Finance</td>
<td>25</td>
<td>130</td>
</tr>
<tr>
<td>4</td>
<td>Analytics</td>
<td>44</td>
<td>113</td>
</tr>
<tr>
<td>5</td>
<td>Consulting</td>
<td>24</td>
<td>89</td>
</tr>
<tr>
<td>6</td>
<td>Research and Development</td>
<td>32</td>
<td>118</td>
</tr>
<tr>
<td>7</td>
<td>Education</td>
<td>11</td>
<td>47</td>
</tr>
<tr>
<td>8</td>
<td>FMCG</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>9</td>
<td>Public Sector Undertaking</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>10</td>
<td>Others</td>
<td>16</td>
<td>43</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>316</strong></td>
<td><strong>1114</strong></td>
</tr>
</tbody>
</table>

**Category-wise Offers**

The job profiles offered by recruiting organisations are divided into various categories based on the gross compensation packages as listed below. Factors other than compensation package like job profile, past association of recruiting organisation etc. May sometimes be considered to alter the category.
Table 3: Placement detail as per salary offered:

<table>
<thead>
<tr>
<th>Range of Gross Salary (in Lakh Rupees per annum)</th>
<th>Number of Organisations</th>
<th>Number of OffersReceived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 13</td>
<td>69</td>
<td>250</td>
</tr>
<tr>
<td>Between 11 to 13</td>
<td>42</td>
<td>153</td>
</tr>
<tr>
<td>Between 9.25 to 11</td>
<td>45</td>
<td>166</td>
</tr>
<tr>
<td>Between 7.5 to 9.25</td>
<td>66</td>
<td>202</td>
</tr>
<tr>
<td>Between 6 to 7.5</td>
<td>63</td>
<td>206</td>
</tr>
<tr>
<td>Between 5 to 6</td>
<td>27</td>
<td>94</td>
</tr>
<tr>
<td>Less than 5</td>
<td>16</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>1114</td>
</tr>
</tbody>
</table>

Average Compensation, International Offers & PPROs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Gross Salary (in LPA*)</td>
<td>11.41</td>
</tr>
<tr>
<td>Average CTC (in LPA*)</td>
<td>13.38</td>
</tr>
<tr>
<td>Total Number of International Offers</td>
<td>67</td>
</tr>
<tr>
<td>Total Number of Pre-Placement Offers</td>
<td>59</td>
</tr>
</tbody>
</table>

*LPA = Lakhs Per Annum

Year-wise Placement Comparison

Despite of the challenging market situations over the years, IIT Bombay managed to maintain good interest amongst the recruiting firms in the job market.

Table 4: Comparison of students placed in 2013-14 vs 2014-15 vs 2015-16 vs 2016-17

<table>
<thead>
<tr>
<th>Program</th>
<th>2013-14</th>
<th>2014-15</th>
<th>2015-16</th>
<th>2016-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Tech</td>
<td>365</td>
<td>396</td>
<td>397</td>
<td>394</td>
</tr>
<tr>
<td>Dual Degree (B.Tech + M.Tech)</td>
<td>193</td>
<td>216</td>
<td>185</td>
<td>189</td>
</tr>
<tr>
<td>M.Tech</td>
<td>387</td>
<td>402</td>
<td>429</td>
<td>396</td>
</tr>
<tr>
<td>Total</td>
<td>945</td>
<td>1014</td>
<td>1011</td>
<td>979</td>
</tr>
</tbody>
</table>
Sector vs. Department Offers

B.Tech and M.Tech maintained almost the same demand amongst various companies.

Table 5: Sector-wise statistics for different degree courses.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Sector</th>
<th>B.Tech</th>
<th>Dual Degree</th>
<th>M.Tech</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analytics</td>
<td>32</td>
<td>23</td>
<td>34</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Consulting</td>
<td>48</td>
<td>28</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Education</td>
<td>-</td>
<td>2</td>
<td>7</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>Engineering &amp; Technology</td>
<td>90</td>
<td>48</td>
<td>183</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>Finance</td>
<td>81</td>
<td>44</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>FMCG</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Public Sector Undertaking</td>
<td>13</td>
<td>-</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Research &amp; Development</td>
<td>37</td>
<td>11</td>
<td>49</td>
<td>21</td>
</tr>
<tr>
<td>9</td>
<td>IT/Software</td>
<td>73</td>
<td>19</td>
<td>79</td>
<td>13</td>
</tr>
<tr>
<td>10</td>
<td>Others</td>
<td>15</td>
<td>6</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>394</td>
<td>189</td>
<td>396</td>
<td>135</td>
</tr>
</tbody>
</table>

Engineering & Technology, Finance and IT/Software were amongst the top hiring sectors for the B.Tech.
Core Engineering & Technology, R&D and IT/Software saw good selections for the Dual Degree students.

Core Engineering and R&D came up with the highest selections from these sectors.

Internship Report

The Internship Session 2016-2017 witnessed 1107 offers from over 650 organisations. There were 120 Pre-Placement Offers (PPO) made to students for final placement based on their performance during internships in 2015-16, of which 59 were accepted by students.
The internship season started in July 2016 and continued till May 30, 2017. The students in the 2nd and 3rd years of Bachelor of Technology (B.Tech.), 5-year and 2-year Master of Science (M.Sc.) and 5-year Dual Degree (D.D.) programmes in various departments participated in the internship process.

Table 6: Department-wise Internship Data 2014-15, 2015-16, and 2016-17:

<table>
<thead>
<tr>
<th>Department</th>
<th>Number of Internships 2014-15</th>
<th>Number of Internships 2015-16</th>
<th>Number of Internships 2016-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace</td>
<td>65</td>
<td>48</td>
<td>39</td>
</tr>
<tr>
<td>Chemical</td>
<td>129</td>
<td>117</td>
<td>158</td>
</tr>
<tr>
<td>Chemistry</td>
<td>21</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>Civil</td>
<td>99</td>
<td>95</td>
<td>98</td>
</tr>
<tr>
<td>Computer Science</td>
<td>157</td>
<td>201</td>
<td>187</td>
</tr>
<tr>
<td>Electrical</td>
<td>189</td>
<td>167</td>
<td>182</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>41</td>
<td>33</td>
<td>30</td>
</tr>
<tr>
<td>Energy Science</td>
<td>35</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>Mechanical</td>
<td>152</td>
<td>162</td>
<td>164</td>
</tr>
<tr>
<td>Metallurgy (MEMS)</td>
<td>101</td>
<td>112</td>
<td>117</td>
</tr>
<tr>
<td>Others</td>
<td>45</td>
<td>53</td>
<td>77</td>
</tr>
<tr>
<td>Total</td>
<td>1034</td>
<td>1047</td>
<td>1107</td>
</tr>
</tbody>
</table>

Figure 6: Department-wise selections year-wise
### Summer vs. Winter Internship Offers:

<table>
<thead>
<tr>
<th>Total Number of Internships</th>
<th>Summer Internships</th>
<th>Winter Internships</th>
</tr>
</thead>
<tbody>
<tr>
<td>1107</td>
<td>895</td>
<td>212</td>
</tr>
</tbody>
</table>

### Companies vs. Universities Internship Offers

<table>
<thead>
<tr>
<th>Total Number of Internships</th>
<th>Company Internships</th>
<th>University Internships</th>
</tr>
</thead>
<tbody>
<tr>
<td>1107</td>
<td>917</td>
<td>190</td>
</tr>
</tbody>
</table>

### Country-wise Offers

**Table 7: Country-wise offers from universities.**

The best Foreign Universities across the globe have a huge demand of IIT Bombay students.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Internship Offers</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>39</td>
</tr>
<tr>
<td>UAE</td>
<td>1</td>
</tr>
<tr>
<td>Singapore</td>
<td>8</td>
</tr>
<tr>
<td>India</td>
<td>16</td>
</tr>
<tr>
<td>Australia</td>
<td>17</td>
</tr>
<tr>
<td>Canada</td>
<td>8</td>
</tr>
<tr>
<td>UK</td>
<td>22</td>
</tr>
<tr>
<td>Germany</td>
<td>28</td>
</tr>
<tr>
<td>Italy</td>
<td>1</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>5</td>
</tr>
<tr>
<td>Portugal</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>1</td>
</tr>
<tr>
<td>China</td>
<td>5</td>
</tr>
<tr>
<td>France</td>
<td>12</td>
</tr>
<tr>
<td>Austria</td>
<td>6</td>
</tr>
<tr>
<td>Switzerland</td>
<td>6</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3</td>
</tr>
<tr>
<td>Japan</td>
<td>3</td>
</tr>
<tr>
<td>Taiwan</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
</tr>
</tbody>
</table>
Table 8. Country-wise offers from companies

There has been a positive trend in international companies hiring IIT Bombay students as interns. Japan has been at the top in the list.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Internship Offers</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>899</td>
</tr>
<tr>
<td>Japan</td>
<td>12</td>
</tr>
<tr>
<td>USA</td>
<td>2</td>
</tr>
<tr>
<td>China</td>
<td>3</td>
</tr>
<tr>
<td>Dubai</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>917</td>
</tr>
</tbody>
</table>

CONCLUDING REMARKS

I feel pride and joy to see so many bright individuals graduating from IIT Bombay, transformed by their stay at the Institute and ready to face the challenges of the world.

On behalf of the Institute, I offer my warmest congratulations to all the graduating students who will receive their degrees today. Congratulations to proud parents and family members of the graduating students on this happy day. We acknowledge all the sacrifices you have made to see your wards achieve this success.

Dear students, the education you have received at IIT Bombay is comparable to the best in the world. You are now ready to take on greater challenges and overcome them. I know that each one of you will excel and we all look forward to the significant contributions you will make in the years ahead. These are exciting times to begin a career, given the immense opportunities provided by the changes taking place in all sectors and the challenges facing the world. What you have learned in the Institute is only a foundation. Continue to develop your knowledge and skills and always keep in mind how you can help society and the nation through your work.

Integrity, merit, excellence and freedom of thought are the values at the core of the success of the Institute and its alumni. I hope you will cherish and uphold these values in the years ahead.

Although you will graduate and leave the Institute today, please remember that alumni are important stakeholders of the Institute and we cherish our links with them. As fresh alumni, I urge you to maintain strong ties with your alma mater and participate in the future growth and evolution of IIT Bombay. On behalf of the Institute, I wish you all the success in your future endeavours. Let the motto of IIT Bombay “Gyanam Paramam Dheyam” be your guiding light!

Jai Hind!