DIRECTOR’S REPORT

By

Prof. Devang V. Khakhar
Director, IIT Bombay
INTRODUCTION

Dr. R. A. Mashelkar, Dr. Anil Kakodkar, Chancellor Alan Finkel, 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 to the 52nd Convocation of the Indian Institute of Technology Bombay. We are indeed privileged to have with us, Dr. R. A. Mashelkar, National Research Professor and the President of Global Research Alliance as our Chief Guest today and I thank him for accepting our invitation.

Dr. Mashelkar has been the Director General of Council of Scientific and Industrial Research (CSIR) and also the President of Indian National Science Academy. His research in polymer science and engineering has won him many international laurels. He is a Fellow of Royal Society (FRS), Foreign Associate of US National Academy of Science as well as US National Academy of Engineering, Foreign Member, American Academy of Arts & Sciences, Fellow of Royal Academy of Engineering, U.K., Foreign Fellow of Australian Technological Science and Engineering Academy and Fellow of The World Academy of Science.

Dr. Mashelkar has been a member of Science Advisory Council to the Prime Minister (SAC-PM) set up by successive governments over the past three decades. Deeply connected with the innovation movement in India, Dr. Mashelkar is currently a member of National Innovation Council (NInC) and also the Chairman of National Innovation Foundation, Reliance Innovation Council, Thermax Innovation Council and Marico Innovation Foundation.
Recipient of Padmashri (1991), Padmabhushan (2000) and Padmavibhushan (2014), 31 Universities have honoured Dr. Mashelkar with honorary doctorates, which include Universities of London, Salford, Pretoria, Wisconsin and Delhi.

We are fortunate to have Padma Vibhushan Dr. Anil Kakodkar as the Chairman, Board of Governors of IIT Bombay. Dr. Kakodkar is a distinguished nuclear engineer who has contributed immensely to India’s nuclear programme as well as more recently to the higher technical education in the Country. He has served on the Board of Governors of IIT Bombay for more than a decade and the institute has benefited considerably from his guidance. And we look forward to his continuous support.

I am pleased to share with 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, and in the 56 years of its existence, more than 46,000 students have graduated from IIT Bombay. The alumni of the Institute have made their alma mater proud through their achievements and contributions in diverse fields and our engagements with them are steadily growing. Research 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. Today, I am happy to inform you that we have 572 faculty members on rolls – 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.

I am also happy to announce that the Institute has decided to confer the ‘Life Time Achievement Award 2013-14’ on Prof. Deepak Phatak, Department of Computer Science and Engineering for his services to IIT Bombay and he will be felicitated today.

The progress of the 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.

ACADEMIC PROGRAMME

IIT Bombay has taken several initiatives in restructuring and strengthening its academic programmes at undergraduate (UG) and postgraduate (PG) levels over the past year: M.Tech.+Ph.D. Dual Degree (DD) programme; M.Tech. in Civil Engineering with specialisation in Ocean Engineering; Four-year Bachelor of Science & a five-year Bachelor of Science and
Master of Science (DD) programme in Chemistry, in place of the five-year Integrated M.Sc. in Chemistry. Other new initiatives including the TDSL (Technology and Development – Supervised Learning) projects of CTARA have been made accessible to more students including PG students, Workshops of the Forum for Academic Culture on Teaching and Learning Methods have been organized; Larger number of courses are being made available in video and other modes; and attempts have been made to employ Flipped Classrooms and Peer based learning, at the Institute.

IIT Bombay continues to be the most sought-after destination for UG and PG studies and attracts the top performers in national examinations such as GATE, CEED, NET, JAM and JEE. Among 16 IITs in the country, 44 out of top 50 rankers and 58 of top 100 rankers in JEE 2014 have joined IIT Bombay and 9 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.

The characteristics of the student population at the Institute are undergoing a significant change in the recent times. The on-roll strength in 2009-2010 was 6359 students of which 2838 (45%) were UG and 3521 (55%) were PG. During 2013-2014, the on-roll strength has increased to 9207 of which 3900 are UG students and 5307 are PG students. With the existing programmes, the UG population saturated at 3900 (42%) in the academic year 2013-2014, while the PG population will saturate at 7601 (69%) during the year 2018-2019, with a total of 11062 students in the Institute. The Institute has responded pragmatically to the large increase in its intake by substantially reorienting itself academically, technologically and administratively and using it as a great opportunity to retain its leadership in engineering education.

The Ph.D. student strength has been steadily increasing. While we had 771 Ph.D. Students on roll in the academic year 2001-02, in the academic year 2011-12 the number rose to 1879, an increase of over 150% in a span of just 10 years. We are on course to achieve our target of 2775 Ph.D. students i.e. approx. 30% on roll among 11062 students in the academic year 2018-19. On the Ph.D. output front, as compared to 73 Ph.D. degrees awarded in 2001, the number of degrees awarded were 179, 175, 180, 181 & 227 in the years, 2009-2010, 2010-11, 2011-12, 2012-13 and 2013-14 respectively. An interesting aspect of our Ph.D output, observed in the recent years, is the fact that around 65% of the degrees are in the engineering disciplines. All students involved in research at the Institute are given an opportunity to interact with research community at the national and international level by providing funds to attend international conferences. Besides research scholars, few UG and PG students have also benefited from this scheme. The annual funding utilised by students has increased from Rs. 2,37,00,000/- last year to Rs. 4,05,89,800/- this year. With effect from April 1, 2013, the funding for participation in international conferences was enhanced to Rs. 1,00,000/- for North and South America; Rs. 90,000/- for Europe and Rs. 60,000/- for neighbouring countries. During the academic year
2013-14, 203 students were granted financial assistance for attending international Conferences as against 294 for the previous year.

This year five M. Tech. students and one M. Des. student were selected for the DAAD Scholarships 2014-15 under the Sandwich System for Master’s students compared to two M. Tech. students, selected last year (2013-14).

Cell for Human Values: The Cell was started in the year 2001 with an objective to bring out the values, ethical and societal dimension of Science & Technology education being imparted at the Institute. Three major activities carried out in the Cell include Computer Literacy Programme; Sangeetanand and Tabla; Drawing and Painting classes, where the latter two allowed IIT Bombay students to pursue their interest in classical music and fine arts. Around 1000 students, from underprivileged background, benefited from the Computer Literacy programme. The teaching was done by staff, NSS volunteers and other IIT Bombay students.

Student Mentor Programme: The Student Mentor Programme has been operating successfully for years. The programme provides a support structure for the undergraduates, targeted largely to the first and second year students, and is essentially managed by the senior students under the supervision of a faculty coordinator. This programme has been extended to mentor needy senior students at the department level. For undergraduates, whose academic performance does not meet the requirements for continuation in their programmes, a final chance for continuation in the form of the Academic Rehabilitation Programme (ARP) has been in effect since 2008-09. A Senate appointed committee prescribes a customised academic load and necessary support for ARP students. An ARP student is rehabilitated into her/his programme on successful completion. Academic probation, a feature similar to ARP for the postgraduates, gives a PG student a second chance to continue in the programme.

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 2009-2010. This year, 146 UG Teaching Assistants ( 61 in Spring Semester and 85 Autumn Semester) were appointed to assist the faculty in conducting the various UG courses.

Kontemplat (previously StuDe Club): This is an initiative under the Dean (AP) Office to set up programmes targeting a student’s overall development. The club conducts motivational seminars by eminent speakers and technical workshops, in addition to publishing its newsletter and maintaining a website.

In this Convocation, a total of 2256 degrees will be awarded. These include 216 Ph.D., 6 Dual Degree (M.Tech. + Ph.D.), 5 Dual Degree (M.Sc. + Ph.D.), 4 M.Sc by Research, 15 M.Phil., 619 M.Tech., 114 M.Mgmt., 57 M.Des., 227 five-year B.Tech. + M.Tech. Dual Degree, 15 PGDIIT, 14 five-year integrated M.Sc., 198 two-year M.Sc. and 528
B.Tech. Degrees. I am to announce that this year we will be granting 8 joint ph.D’s along with Monash University and Dr. Alan Finkel, Chancellor of Monash University is here to confer the degree in person.

This year, 27 Research Scholars have been selected for the ‘Award of Excellence in Ph.D. Thesis’ for the year 2014 as compared to 25 awards in the year 2013 and 20 awards in the year 2012.

RESEARCH AND DEVELOPMENT ACTIVITIES

Research and development activities at IIT Bombay are growing rapidly. During the last five years, R&D receipts grew at a compound annual growth rate (CAGR) of over 24 per cent. The R&D revenues for the FY 2013-14 is Rs.213.6 crores. Figure 1 shows the growth of research funds in the last few years. The drop in 2013-14 funding could be partly due to lower receipts on account of deferred release of funds from government sponsorships and due to higher receipts in 2012-13 on account of NME-ICT project releases.

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

1. Overview

During the year 2013-14, new R&D projects were initiated in all areas of science, engineering, management and social sciences, typically ranging from two to five years duration. These included short term consulting projects and longer 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</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Sanctioned outlay (Rs. in crores)</td>
</tr>
<tr>
<td>2011-12</td>
<td>210</td>
<td>182.0</td>
</tr>
<tr>
<td>2012-13</td>
<td>240</td>
<td>343.5</td>
</tr>
<tr>
<td>2013-14</td>
<td>225</td>
<td>285.2</td>
</tr>
</tbody>
</table>
External Grants for R&D

The total money received for R&D activity in 2013-14 was Rs.215.52 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 2013-14

<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>482</td>
<td>183.56</td>
</tr>
<tr>
<td>Consultancy Projects</td>
<td>570</td>
<td>30.03</td>
</tr>
<tr>
<td>Royalty</td>
<td>-</td>
<td>0.29</td>
</tr>
<tr>
<td>Equipment usage</td>
<td>-</td>
<td>1.64</td>
</tr>
<tr>
<td>Total</td>
<td>1052</td>
<td>215.52</td>
</tr>
</tbody>
</table>

The R&D work continues to be mainly supported by government entities (Figure 2 and Table 3). Table 4 indicates some of the major sponsors from industry.

Figure 2: Distribution of receipts from different agencies

Table 3: Main sponsors

<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>Department of Information Technology</td>
<td>42.96</td>
<td>23</td>
</tr>
<tr>
<td>Department of Science &amp; Technology</td>
<td>26.64</td>
<td>156</td>
</tr>
<tr>
<td>Ministry of Human Resources Development</td>
<td>19.57</td>
<td>8</td>
</tr>
<tr>
<td>Ministry of New And Renewable Energy</td>
<td>19.14</td>
<td>5</td>
</tr>
<tr>
<td>Steel Development Fund</td>
<td>11.89</td>
<td>1</td>
</tr>
<tr>
<td>Sir Dorabji Tata Trust</td>
<td>5.93</td>
<td>1</td>
</tr>
<tr>
<td>Agencies</td>
<td>Grant received (Rs. in crores)</td>
<td>Number of new / ongoing projects funded</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Ministry of Culture</td>
<td>5.50</td>
<td>1</td>
</tr>
<tr>
<td>Department of Biotechnology</td>
<td>5.09</td>
<td>31</td>
</tr>
<tr>
<td>Defence Research &amp; Development Organisation</td>
<td>4.75</td>
<td>20</td>
</tr>
<tr>
<td>Board of Research in Nuclear Sciences</td>
<td>2.69</td>
<td>27</td>
</tr>
<tr>
<td>Power Grid Corporation of India Limited</td>
<td>2.10</td>
<td>1</td>
</tr>
<tr>
<td>Indian Space Research Organisation/ Department Of Space</td>
<td>1.79</td>
<td>7</td>
</tr>
<tr>
<td>Council of Scientific and Industrial Research</td>
<td>1.62</td>
<td>26</td>
</tr>
<tr>
<td>Aeronautical Research &amp; Development Board</td>
<td>1.58</td>
<td>10</td>
</tr>
<tr>
<td>Hindustan Aeronautics Limited</td>
<td>1.50</td>
<td>1</td>
</tr>
<tr>
<td>Tata Consultancy Services Ltd., Mumbai</td>
<td>1.24</td>
<td>1</td>
</tr>
<tr>
<td>Rajiv Gandhi Science and Technology Commission</td>
<td>1.05</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 4: Sponsors from Industry and other organisations**

- Applied Materials Inc., USA
- Asian office of Aerospace Research and Development, USA
- CISCO, USA
- Hewlett Packard Co., USA
- Holcim Foundation for Sustainable Construction, Switzerland
- Intel Mobile Communications GmbH, Germany
- International Business Machines Corporation, USA
- LSI Corporation, USA
- NVIDIA Corporation, USA
- Petrofac International (UAE) LLC, UAE
- Riber SA, France
- Samsung Electronics Ltd. USA
- Siemens Power Generation Inc., USA
- Synopsys Inc., USA
- Volkswagen Ag, Germany
- Wadhwani Foundation, USA
- YAHOO Inc. USA
- Bharat Heavy Electricals Limited
- Bhilai Steel Plant
- Crompton Greaves Limited
- Cummins India Foundation
- GE India Technology Centre Pvt. Ltd
- Intel Technology India Pvt. Ltd.
- Maxim India Integrated Circuit Design Pvt. Ltd.
- New India Assurance Company Ltd.
- NRB Bearings Ltd.
- Oil & Natural Gas Corporation Limited
- Power Grid Corporation of India Limited
- Reliance Industries Ltd.
- Runwal Homes Pvt. Ltd.
- SAP Labs
- IndiaShakti Sustainable Energy Foundation
- State Bank of India
- Tata Consultancy Services Ltd.
- Tata Power Company Ltd.
- Tata Steel Ltd.
Some major sponsored projects initiated

- Localisation of solar energy through local assembly, sale and usage of one million solar study lamps by IIT Bombay
  Sanctioned outlay: Rs. 50 crores over two years
  Funding agency: PPP Model of funding
  - Rs. 18 Crores - Ministry of New and Renewable Energy
  - Rs. 20 Crores - Philanthropic partners - Tata Trust, State Govts. (Madhya Pradesh & Rajasthan)
  - Rs. 12 Crores - Students

- Biomedical Engineering and Technology Centre Incubation
  Funding agency: Rajiv Gandhi Science and Technology Commission
  Sanctioned outlay: Rs. 39.39 crores over five years

- Indian Nanoelectronics Users Programme (INUP) Phase – II
  Funding agency: Department of Information Technology
  Sanctioned outlay: Rs. 33.59 crores over five years

- Centre of Excellence in Steel Technology
  Funding agency: Ministry of Steel
  Sanctioned outlay: Rs. 33.06 crores over five years

- Nano Fabrication Prototyping facility for SMEs and Start-ups in the area of MEMS
  Funding agency: Department of Information Technology
  Sanctioned outlay: Rs. 23.85 crores over three years

- e-Yantra - Robot enhanced teaching in engineering colleges and schools (Phase-II)
  Funding agency: Ministry of Human Resource Development
  Sanctioned outlay: Rs. 17.09 crores over three years

- Synchrophasor Analytics for Electrical Transmission Systems
  Funding agency: Power Grid Corporation of India Limited
  Sanctioned outlay: Rs. 6.84 crores over two 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 retainership, expert advice, product / process / software development, analysis, evaluation, product design and limited testing.
Some consultancy projects initiated

• Algorithm Development for numerical protection relays
• Characterization of Cathode materials
• Coastal erosion protection works
• Design and development of textile dyeing unit
• Design of blast proof wall for LPG control room
• Design of new prototype for computer game
• Developing of automatic English text correction software
• Development of hybrid air conditioning system
• Development of open source tool kit for continuum mechanics
• Development of solar PV technology for agrarian applications
• Emission inventory and air quality model development for industrial city centres
• Feasibility analysis of anodes for application in marine conditions
• Leveraging editorial input through statistical relational learning for machine translation
• Mathematical analysis of measuring instruments and algorithms for corrections
• Metal injection moulding of coarse powders
• Motor cycle seat base polypropylene cracking
• Reliability analysis of HKMG devices for sub 20nm technology nodes
• Rewriting of legacy applications into optimized SQL
• Road safety audit study
• Sensors audit for locomotive applications
• Spatial statistics and characterization of microstructure
• Spray system for Neem based biopesticides
• Strain distribution based failure prediction and intelligent process study
• Studies on new transmission pricing for intra state transmission system
• Study (production and Distribution) of medical nutrition therapy
• Study of efficiency of control devices and stack smoke visibility
• Surge analysis of water supply system
• Synchrophasor analytics for transmission system

Internal Grants for R&D

The Institute provided internal funding for supporting faculty research and student activities. Grants of around Rs.9.6 crores were sanctioned for these activities, which included the following:

- Seed grant for initiation of research for new faculty
- Augmenting research resources of faculty recipients of research/ review paper/ Young Investigator awards
- Research internships and fellowships for Ph.D. student
- Student research/competition — projects such as Automotive Racing, Robot Design, Intelligent Ground Vehicle, Solar Decathlon and Underwater Vehicle
- Upgradation of central and national research facilities
- Leverage grants and bridge grants
- R&D Exhibitions

c) 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 and groups. Faculty Research Awards included Innovation in Science Pursuit for Inspired Research (INSPIRE) grant by DST in Chemical Engineering, Civil Engineering, Computer Science & Engineering, Electrical Engineering, Mathematics and Mechanical Engineering and IBM Award in Centre for Urban Science & Engineering and Electrical Engineering.

2. Licensing Activities

a) Technology Transfers:

We continue to receive royalties for different IPs licensed in the past. Some of the technologies licensed in this year are:

- Games Design
- Low energy successive approximation register analog to digital converter technique and circuit
- Potential bioactive organic compound
- Software for bid matching in power exchange

b) Dissemination/Outreach:

- IIT Bombay participated in the ‘Global R&D Summit 2013’ organised by Federation of Indian Chambers of Commerce and Industry (FICCI), New Delhi, during July 25-26, 2013. A large number of dignitaries, academics and general public visited the exhibition.
• ‘TechConnect 2014’ was organised during Techfest held at IIT Bombay, from January 3-5, 2014 to showcase R&D exhibits from different academic units and included demos and visits to labs and facilities. About 15,000 student and general public visited the exhibition.

3. Augmentation of Research Infrastructure

As a 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, procurement of 17 new equipments worth nearly Rs.34 crores were sanctioned during the last financial year. These facilities are either ‘Central Facilities’ which are made available to all at the Institute, or ‘Institute Facilities,’ which cater to specific needs of major users academic units, or ‘Department facilities,’ primarily used in teaching laboratory courses and for student projects. A list of the sanctioned facilities is given below:

**Central Facility**
- Conductive Atomic Force Microscope
- ESCA
- High resolution XRD system
- PPMS-VSM Magnetometer
- Universal Milling &Turning Machining Centre

**Institute Facility**
- Micromachining and Micro-metrology Facility
- MPMS SQUID with i-Quantum helium facility and Fiber Optic Sample Holder system
- Two SR research eye link 1000 eye -trackers
Department Facility

- 75GHz Vector network analyser
- Circular Dichroism Spectro polarimeter
- In-flight earthquake actuator with allied accessories for large beam centrifuge facility
- Lab-scale Autoclave & Universal Testing Machine
- Solvent Drying Systems
- Ultra High Pressure Liquid Chromatography
- Ultracentrifuge (very high speed centrifuge)
- Up-gradation of Shake Table Facility
- Vacuum Arc Melting with Suction casting and cold-water circulator and laboratory stripe roller

In addition, several equipment and facilities were procured through external grants some of which are listed below:

- Atomic layer deposition plasma system
- Automated electron probe micro-analyser
- Chemical mechanical polishing system
- Cryogenic probe station
- Gas turbine electrical generation system
- High performance clusters system
- High temperature thermal diffusivity and conductivity measuring system
- Integrated cryogen-free system for measurement of physical properties at low temperatures and high magnetic fields
- Integrated ultrafast laser system
- Mask aligner
- Molecular beam epitaxy for Nitride growth
- Multi-pocket electron-beam evaporator experimental vacuum coating system
- Solar simulator for PV Modules
- Spinning disc confocal microscope
- Sputtering system
- Thermal cycler and spectrophotometer
- Transient high speed optical absorption measurements
- Ultra high resolution scanning electron microscope
- X-Ray photoelectron spectrophotometer

4. Intellectual Property (IP) Protection Activities

During the year, 61 Indian patent applications were filed. The growth of patent filings in the last few years is given in Figure 3. Table 5 gives a list of all Indian and international IPR filings.
Two Indian patents and 11 US patents were granted during the year. In addition, one Indian Designs, three Trademark and one Copyright were registered during this period. Proactive efforts continued for licensing of these technologies, products and designs.

**Areas of IP filings included:** Antenna, Audio systems, Biomedical, Bioscience, Coal Gasification process, Compressor techniques, Device engineering, Fracture Engineering, Frequency modulation, Geo-synthetic, Heat and Mass Exchange, IC, Materials & Machinery, Nanoparticles, Optical Networks, Polymer, Power engineering, Signal processing, Soil engineering, Solar power & photovoltaic systems, Synthesis, Thin films 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 690 abstracts were reviewed.
out of which about 60 were shortlisted for a possible filing of patent applications. Five patent applications filings have been initiated so far.

Nearly 200 agreements were reviewed or negotiated during the year – including those for research collaboration, licensing, non-disclosure agreements, student sponsorships, consortia formation, endowment, etc. – with industries, organisations, universities and government, both national and international.

5. Focused Initiatives
Several initiatives have been taken to further promote and facilitate R&D activities, especially among students. Some of them are:

a. Enhancing industry partnership
There have been continued interactions with industries, both national and international, to explore collaboration opportunities in research. Tata Consultancy Services (TCS) and IIT Bombay signed an MoU on May 16, 2013 to form a TCS-IITB Research Cell in the Institute. The Cell aims to undertake research in the areas of Computers Science & Engineering and Electrical Engineering, among other areas. A total outlay of Rs. 10 Crores for a period of five years was sanctioned. Eight research projects and one student initiative have been approved in this financial year.

Few Industry visits:
BASF, BCIL, C-DOT, DHI, Efkon, Epcos (India), Havells, HEC, Infosys, InnAccel, J&J, Konecranes, NTT Data (Japan), Pidilite, TCS, Tech Mahindra, Thales (France).

A proposal on Centre of Excellence in Emerging Manufacturing Technologies (CoEEMT) was jointly submitted by IIT Bombay and several industry partners to the Department of Heavy Industry, Government of India to promote collaboration between IIT and the manufacturing sector, specially the MMEs and SMEs. The objective is to address technology issues persisting with the Indian Capital Goods Sector. Some of the industry partners in the proposal include L&T, Thermax Ltd., EWAC Alloys Ltd., BHEL, Textile Machinery Manufacturer’s Association (India), Godrej and Boyce Mfg. Co. Ltd., among others.

A high level brainstorming session with industry on ‘Building Indian Capabilities in Strategic Technologies & Manufacturing’ was organised jointly by Confederation of Indian Industry (CII) and IIT Bombay, in November 2013. The sectors for deliberations included aerospace, biotechnology, nanotechnology, IT, renewable energy. It was decided that CII would form smaller groups of domain areas and take the discussion forward.

A meeting with Mr. Alexander Stubb, Ministry of European Affairs and Foreign Trade and Finnish Business delegation was held at IIT Bombay in October 2013 to promote R&D interactions between Finnish companies and IIT Bombay.
b. Consortia/Partnership

Healthcare Consortium:

An overview of the healthcare consortium activities was presented to the MHRD in October, 2013. The activities of Healthcare Consortium included:

- A joint workshop was organised by Tata Centre, MIT and IIT Bombay in the last week of January 2014, which was attended by the students of the Institute and clinicians from Hinduja. The workshop provided pointers to clinicians on identifying needs and translating them into low cost and non-invasive diagnostics, in association with the student teams.

- Dr. Rajiv Sarin, Director, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), Mumbai gave a talk on ‘Challenges in T2 Translational Research: Bench to Bedside to Community!’ on July 26, 2013.

- Dr. Farokh Wadia, HN Reliance Hospital delivered a talk on ‘Clinical needs in the area of paediatric orthopaedics’ on February 28, 2014.

c. Award received

* Prof. Samir Maji’s research on p53 amyloid formation, funded by the healthcare seed grant initiative, has earned him the ‘Young Researcher Award’ from the Lady Tata Memorial Trust.

* Periodical visit to ACTREC for IIT Bombay researchers was initiated during this year.

d. Incentives for R&D

Rewards for research excellence, technology development efforts, research/review publications, and industry impact were given in the year as earlier (Table 6). Recognition included cash awards and research grants and arranging institute-wide dissemination through lectures and electronic media.

<table>
<thead>
<tr>
<th>Awards</th>
<th>Names of Recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Paper Award</td>
<td>Prof. S.K. Maiti, Department of Mechanical Engineering</td>
</tr>
<tr>
<td></td>
<td>Prof. Anuradda Ganesh, Department of Energy Science and Engineering</td>
</tr>
<tr>
<td></td>
<td>Prof. Anirban Sain, Department of Physics</td>
</tr>
<tr>
<td></td>
<td>Prof. M. Ravikanth, Department of Chemistry</td>
</tr>
<tr>
<td>Review Paper Award</td>
<td>Prof. Chebrolu Pulla Rao, Department of Chemistry</td>
</tr>
<tr>
<td></td>
<td>Prof. P. I. Pradeepkumar, Department of Chemistry</td>
</tr>
</tbody>
</table>
e. Dissemination/Outreach

A workshop on ‘Central Facilities’ was held on September 4, 2013, where the 13 Conveners of central facilities made presentations on technical specifications and capabilities, the types of experiments carried out and the usage. About 100 faculty members and students attended the workshop.

Lectures by domain experts (institute faculty and outside experts) on the work of winners of the Nobel Prize 2013 were organised at the Institute on October 31, 2013.

f. Review of IRCC Seed Grant

Seed grant review was initiated and recipients (Faculty members) of IRCC Seed Grant during the year 2005-06 made presentations to IIT Bombay academic community on January 22, 2014. Around 15 faculty members made presentations on the objectives of the projects undertaken, research output, R&D personnel trained, publications, patents applications filed & granted, awards & recognition received and so on.

g. Ensuring safety

Keeping in mind the importance of safety, a video on ‘Fire Safety in laboratories’ has been recently prepared and will be soon circulated to IIT Bombay academic community.
h. Online processes

Automation of activities related to project management, central facility and project staff recruitment (online application and selection) continued. Modules have been created for access to H10A Hall Manager. In addition, FAQs for various processes and existing processes and modules have been updated.

i. Manpower

The number of project staff involved in various projects as on March 31, 2014 is 1037. Of them, 543 joined during the financial year 2013-14.

OUTREACH PROGRAMMES

The Continuing Education Programme (CEP), Quality Improvement Programme (QIP) and the Curriculum Development Programme (CDP) continued to attract wide interest from industry, academia and our own faculty during 2013-14.

The CEP courses of IIT Bombay are aimed primarily at working professionals, though in the last couple of years students have also been admitted to specialized training programmes. The courses on Urban Drainage Management, Human Computer Interaction, Energy Management, Technology Innovation Using Triz, Elements of Chemical Engineering, Executive Programme in Management, Leadership Development Centre, Dynamics and Control in State-Space (DCSS), Expo CD and Expo PDI, etc., have all been well received by the industry.

The highly popular QIP courses of the Institute, are fully funded by the All India Council for Technical Education (AICTE) and are generally meant for teachers working in various degree level engineering institutions, keen to upgrade their knowledge and skills. In order to provide participating teachers an opportunity to interact with industry professionals, special efforts have been made to permit a few industry participants as part of the QIP courses, in the normal CEP mode, which has been much appreciated by all.

The certificate course on “Piping Engineering” has reached another milestone and has crossed its 64th edition in 2013. About 10000 engineers have registered in the last 24 years. Online version of the course started in July 2009, has attracted registration from about 500 participants from across the globe, which is expected to grow further.

In terms of the overall performance of CEP & QIP during 2013-14, a total of 160 CEP courses were conducted with about 3500 participants, generating a revenue of around Rs.7.29 crores. Under QIP category, four M.Tech. and 13 Ph.D. students of engineering were admitted. In addition, five teachers were inducted into Ph.D. programme under the Advance Admission Scheme. Further, 12 short-term courses (STC), sponsored by the AICTE, were conducted and were attended by 307 college teachers. Lastly, one book was completed and one new book-writing proposal was sanctioned under the Curriculum Development Programme (CDP) of QIP.
INTERNATIONAL RELATIONS

International relations have assumed a greater significance for the Institute in recent times. It was our privilege to host heads and deputy heads of states last year including Mr. Joe Biden, Vice President of USA, who met and interacted with some of our students, on July 25, 2013. The Governor General of Canada, His Excellency the Right Honourable David Johnston and other delegates visited IIT Bombay on February 28, 2014. The Governor General shared his views on “Driving Economic growth through Innovation,” on the occasion. He also visited the Industrial Design Centre and Society for Innovation and Entrepreneurship (SINE) on campus and interacted with students and faculty members. Mr. Vicente Fox, former President of Mexico also visited the Institute on February 12, 2014 and met the Institute functionaries. He moreover delivered a TechniGraphicS Lecture on “Contributions of IITs to India and the world: An international perspective.”

The reputation built over the years, has helped IIT Bombay 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 pupils or as exchange students.

Our reputation and efforts are enabling us to collaborate with leading universities and institutions at various levels. During the year, IIT Bombay signed 20 MoUs with various foreign universities and received governmental and ministerial delegations, from countries across the globe, for exploring areas of collaboration and cooperation.

MoUs with Foreign Universities

- Extension of MoU with Technical University of Munchen, Germany
- ETH Zurich, Switzerland
- The University of Queensland, Australia
- Student Exchange Agreement with KTH Royal Institute of Technology, Sweden
- Deakin University, Australia
- Technical University of Mombasa, Kenya
- Dhofar University, Sultanate of Oman
- The Institut National Des Sciences Appliquees De Lyon, France
- The Korea Advanced Institute of Science & Technology, Republic of Korea
• Nosov Magnitogorsk State Technical University, Russia
• The Cooper Union for the Advancement of Science and Art, USA
• Bilateral MoU with Technical University of Denmark, Denmark
• Kyungpook National University, Republic of Korea
• The University of Massachusetts Amherst, USA
• Simon Fraser University, Canada
• The National Commission for Scientific and Technological Research (CONICYT)
• The University of Notre Dame, US
• Extension of MoU with Kyushu University, Japan
• Extension of MoU with National University of Singapore, Singapore
• State University of New York at Binghamton

MoUs with Other Institutions
• French Language Tutors in India Programme 2014-15 with Embassy of France, New Delhi
• University of Delhi
• PSG Institute of Advanced Studies, Coimbatore

Visits of Major International Delegations
• Canadian delegation led by Mr. Simon Kennedy, Deputy Minister of International Trade, Canada
• Swedish delegation lead by Mr. Johan Britz, State Secretary, Coordination Secretariat, Prime Minister’s Office
• A group of 100 students from UK, organized by UK India Education and Research Initiative (UKIERI)
• Prof. Mark Welland, Vice Chancellor and Prof. Ashwin Seshia from University of Cambridge
• Prof. Josphat K.Z. Mwatelah, Vice Chancellor from Technical University of Mombasa
• Dr. Hassan Said Kashoob, Vice Chancellor, Dr. Heba Ahmed Hassan, Dean, College of Engineering, Dr. Syed Ahsan Jamil, Dean, College of Commerce and Business Administration and Dr. Israr Ul Hasan, Acting Director for Research from Dhofar University
• Mr. Alon Ushpiz, Ambassador of Israel and Mr. Jonathan Miller, Consul General of Israel
• US delegation led by Prof. Munson, Dean of Engineering, University of Michigan
• Ms. Holly Luffman, Assistant Director of the Centre for International Experience and Ms. Lucy Fromowitz, Assistant Vice President for Student Life from University of Toronto
• A Chinese delegation led by Mr. Zhou hongyu, Hubei Provincial International Academic Exchange Center
• Dr. Kumble R. Subbaswamy, Chancellor, Prof. Jack Ahern, Vice Provost of International Programs and Prof. Om Parkash (Dhankher), Professor in Plant Biotechnology from University of Massachusetts, USA
• Canadian delegation led by Mr. Richard Bale, Consul General, Govt. of Canada
• Dr. Ana Santos Koehn, Director, International Center and Prof. Liqiu Meng, Vice President from Technische Universitat Munchen (TUM), Germany
• Rev. John I. Jenkins, President, J. Nicholas Entrikin, Vice President, John Affleck-Graves, Executive Vice President, William Lies, Vice President, Jonathan Noble, Assistant Provost and Ms. Anita Garg from University of Notre Dame, US
• Mr. Richard Bale, Consul General, Govt. of Canada, Prof. Andrew Petter, President, Simon Fraser University, Mr. Philip Steenkamp, Vice President, External Relations, SFU, Dr. Mario Pinto, Vice President, Research, SFU and two British Columbia Govt. Representatives
• A Quebec delegation lead by Dr. Alain Olivier, Director & Consul, Quebec Government Office

Also, several individuals visited IIT Bombay as representatives of their respective universities.
International Students

A total of 55 international students from Australia, Bangladesh, Canada, Denmark, Ethiopia, France, Germany, Iran, Malaysia, Nepal, Netherlands, Pakistan, Singapore, Spain, Sweden, Switzerland, and USA joined the Institute for course work/project work/post graduate studies.

Student Exchange Programme

IIT Bombay students also went to other institutions as a part of student exchange programmes.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>University</th>
<th>No. of students/ Programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dongguk University, Korea</td>
<td>One M.Des. Student from Industrial Design Centre</td>
</tr>
<tr>
<td>2</td>
<td>University of Toronto, Canada</td>
<td>Two Dual Degree (DD), 2nd year student from Electrical Engineering and one B.Tech. (3rd year) student from Metallurgical Engg. &amp; Materials Science</td>
</tr>
<tr>
<td>3</td>
<td>Nanyang Technological University, Singapore</td>
<td>One DD student from Civil, one B.Tech. student from Civil Engineering, two B.Tech. students from Electrical Engineering, and one B.Tech. student from Mechanical Engineering</td>
</tr>
<tr>
<td>4</td>
<td>National University of Singapore</td>
<td>One DD student from Metallurgical Engg. &amp; Materials Science, two DD students from Mechanical Engineering, one B.Tech. student from Mechanical Engineering, one B.Tech. student from Chemical Engineering and one B.Tech student from Civil Engineering</td>
</tr>
<tr>
<td>5</td>
<td>University of South Australia</td>
<td>One DD student from Electrical Engineering</td>
</tr>
<tr>
<td>6</td>
<td>Universitat Politecnica de Valencia, Spain</td>
<td>One B.Tech. student from Electrical Engineering and one from Aerospace Engineering</td>
</tr>
<tr>
<td>7</td>
<td>ETH Zurich, Switzerland</td>
<td>One B.Tech. student from Mechanical Engineering and one DD student from Electrical Engineering</td>
</tr>
<tr>
<td>8</td>
<td>Northeastern University, USA</td>
<td>One DD student from Mechanical Engineering</td>
</tr>
<tr>
<td>9</td>
<td>Ecole Centrale Paris, France</td>
<td>One DD student from Energy Science and Engineering</td>
</tr>
<tr>
<td>10</td>
<td>University of South Australia</td>
<td>One B.Tech. student from Electrical Engineering</td>
</tr>
<tr>
<td>11</td>
<td>Tallinn University of Technology, Estonia</td>
<td>One B.Tech. student from Mechanical Engineering</td>
</tr>
<tr>
<td>12</td>
<td>Ecole Centrale De Nantes, France</td>
<td>One DD student from Mechanical Engineering</td>
</tr>
</tbody>
</table>
The Institute also organized foreign language courses in French, Japanese, German, and Chinese for its students and staff.

**EMINTE Project under the Erasmus Mundus Programme**

IIT Bombay has secured funding for a EMINTE project under the Erasmus Mundus Programme. EMINTE is an Erasmus Mundus Partnership project funded by the European commission that aims to promote institutional cooperation and mobility activities between European and Indian higher education institutions (HEIs), largely by encouraging exchange of people, knowledge and skills. The major tool is a scholarship scheme, consisting of approx. 107 scholarships. Lund University, Sweden, is the lead university and there are other European and Indian universities partnering in this project.

**EUPHRATES Project under the Erasmus Mundus Programme**

EUPHRATES is an Erasmus Mundus Partnership (Action 2, Lot 13 Agreement) project funded by the European commission. The project provides scholarships for the mobility of students at undergraduate, master, doctoral and post-doctoral level as well as for university staff in academic or administrative positions. Universidade de Santiago de Compostela, Spain, is the lead university. There are other European and Indian universities who are also partnering in this project and have signed a Consortium Agreement to facilitate it.

**Global Tech Student’s Competition**

Following the success of the first student competition “Building the Tower of Babylon: What on Earth is Sustainability?”, GlobalTech organised the second student competition focusing on portable power generation. The competition was initiated by Dr John O. Dabiri (Caltech) and coordinated by the Energy Research Institute at NTU.
The task was to design, build and demonstrate a power generator that can create electricity from a renewable source (e.g. solar, wind, biomass) and store it for later use. The IIT Bombay team won the competition.

**European Roadshow 2014**

An information session for the Delegation of European Union to India (New Delhi) was organised on February 19, 2014. Representatives from consulates of various countries had presented the different mechanisms for research collaborations between India and Europe, as well as higher education opportunities open to Indian students in Europe.

**IITB-NUS Joint Research Workshop – ENERGY 2014**

In collaboration with the National University of Singapore (NUS), the Institute organized the first IITB–NUS joint research workshop (ENERGY 2014) on February 24-15, 2014, with the idea of promoting and strengthening the collaborative research and joint PhD programme. The theme of the workshop was ‘Energy conversion and storage’ and it consisted of invited lecturers from faculty of both the Institutions, as well as posters presentation from Masters and PhD students of 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 Institute requires substantial financial resources for continued modernization of facilities. Although the Government of India continues to be the primary source of funds for the Institute, the Office of Dean ACR performs the important task of raising additional resources from the alumni and other well-wishers of the IIT Bombay.
This year a sum of Rs. 19 crores was received by the Institute through donations – Rs.13.5 crores from the alumni and Rs.5.5 crores from corporations. The major corporate donors, among others, were Applied Materials Inc., Bharat Forge Ltd., DS Foundation and Boeing. The major activities for which these donations were received are as under:

**Institute Development Fund:** This fund primarily caters to the needs of the institute, such as 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.

**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. Each Named Chair is supported by an endowment created from a donation to the institute. At present, more than 20 named Chairs are endowed by the donors along with the Institute Chairs.

**Hostel Development:** The Hostel Alumni Team Stewardship (HATS) is an important alumni-driven initiative that aims to channel the affinity and affection that many alumni have for their former hostels. This activity is run exclusively through the alumni support and contributions. The key goals of HATS are as follows: (a) Improve hostel infrastructure and facilities, (b) Assist the current and retired mess workers, (c) Increase interaction between the alumni and students, (d) Empower students to improve their living conditions under the aegis of Make Hostel My Home (MHMH), and (e) Organize hostel-level reunions in each hostel on the Alumni Day.

**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 2013-14, 149 scholarships of varying amounts were granted.

(b) Awards and Prizes: As every year, 50 awards and prizes of varying amounts and forms (certificates, medals, etc.) were given away during 2013-14.
**Major Events:**

(a) **Alumni Day:** The Alumni Day, celebrated on December 29, 2013, 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 Award. Their names are:

- Mr. Ruyintan Mehta, B.Tech. (1970), Chemical Engineering
- Mr. Sameer Katdare, B.Tech. (1975), Chemical Engineering
- Mr. Dhananjay Saheba, B.Tech. (1977), Electrical Engineering
- Dr. Amol Gokhale, B.Tech. (1978), Metallurgical Engineering and Materials Science
- Mr. Paresh Vora, B.Tech. (1981), Electrical Engineering
- Mr. Ajay Bhagwat, B.Tech. (1985), Electrical Engineering

The Silver Jubilee Batch of 1988 expressed their desire to help attract young faculty, support retired faculty and provide additional financial assistance for underprivileged students through their Legacy Project and handed over a ceremonial cheque of Rs. 2 crores, on the occasion.

The Golden Jubilee batch (1963) and the Decennial batch (2003) also addressed the meet. The ‘Make Hostel My Home’ project was also unveiled during the function and was launched in January 2014 under the auspices of HATS.

(b) **Foundation Day:** The Foundation Day of the Institute was celebrated on March 10, 2014. During the function, 10 alumni were honoured with the Distinguished Alumnus Award and four alumni with the Young Alumni Achievers Award. 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 fields of work and are below 40 years of age.
The recipients of the Distinguished Alumnus Award are as follows:

Dr. Ing. Anil Anwikar, B. Tech. (1964), Civil Engineering
Mr. Veerappa Baligar, B.Tech. (1978), Civil Engineering
Mr. Ashish Kumar Chauhan, B.Tech. (1989), Mechanical Engineering
Mr. Toos Daruvala, B.Tech. (1977), Electrical Engineering
Dr. Shyam Dighe, B.Tech. (1974), Chemical Engineering
Dr. Rajesh Gokhale, M.Sc. (1990), Biotechnology
Mr. Ram Kelkar, B.Tech. (1980), Electrical Engineering
Dr. Kasim Mookhtiar, M.Sc. (1980), Chemistry
Mr. Suresh Shenoy, B.Tech. (1972), Metallurgical Engineering
Mr. Deepak Vaidya, B.Tech. (1970), Chemical Engineering

The following were presented with the Young Alumni Achievers Award:

Dr. Sundar Iyer, B.Tech. (1998), Computer Science & Engineering
Mr. Mayank Bawa, B.Tech. (1999), Computer Science & Engineering
Dr. Rohit Karnik, B.Tech. (2002), Mechanical Engineering
Mr. Bhavish Aggarwal, B.Tech. (2008), Computer Science & Engineering

(c) Meeting of Deans of Alumni/ External Relations of all old IITs (IITs established prior to 2008): A meeting of Deans of Alumni/ External Relations of all old IITs (established prior to 2008) was held during August 23-24, 2013 with an intention to hold strategic discussions about alumni relations and to bring uniformity in the approach of various IITs, learn from experiences of each other and to develop common standards. The meeting was addressed by Prof. Devang Khakhar, Director, and Prof. H.S. Pandalai, Deputy Director (FEA), IIT Bombay. Mr. Mark Dollhopf, Executive Director, Association of Yale Alumni and Kathy Edersheim were special guests for the meeting. Strategic Discussions were held on issues like Alumni Engagement, Development Office, Internal Engagement/Communications & IIT-wide initiatives.

(d) Student Alumni Meet: Started in 2011, Student Alumni Meet (SAM) is a flagship event of the Student Alumni Relations Cell (SARC), which acts as a platform to facilitate Student-Alumni interactions and enable students to avail the benefits of IIT Bombay’s pool of experienced alumni. Last year, SAM witnessed the participation of 150 alumni who visited the campus and interacted with the current students.

(e) Inauguration of Parimal & Pramod Chaudhari Cell Culture Laboratory: The Parimal & Pramod Chaudhari Cell Culture Laboratory was inaugurated at the Department of Biosciences & Bioengineering on October 3, 2013. The funding for the lab was provided by Mrs. Parimal Chaudhari and Mr. Pramod Chaudhari, Distinguished Alumnus and Founder & Chairman of Praj Industries, who also inaugurated the lab. The areas of research, where this facility could prove to be beneficial include host pathogen interactions, Alzheimers and Parkisons diseases, Cell Biology, Malaria, mechnobiology, microfluids, tissue engineering, immunology, nanotechnology and nano-medicine, among others.
(f) **Inauguration of Tinkerers’ Lab:** Tinkerers’ Lab, the fully equipped, non-academic student technical laboratory at IIT Bombay, was inaugurated on January 4, 2014. The lab has been set up with an intention of promoting experimentation, creativity and innovation among students. It will be kept open 24x7 and will be completely managed by the students. Funded by the batch of 1975, the lab was set up under the aegis of Students’ Technical Activities Body, which is a student run body under the Student Gymkhana.

(g) **Desai Sethi Centre for Entrepreneurship Announced:** In a major leap towards encouraging entrepreneurship spirit among its students, the intention to establish an Entrepreneurship Centre was announced on February 1, 2014. The Centre is being set up with a funding from Syntel Co-founders Distinguished Alumnus Mr. Bharat Desai and Ms. Neerja Sethi, under the aegis of The Desai Sethi Foundation. The new Centre, which will be named ‘IIT Bombay Desai Sethi Centre for Entrepreneurship’, will foster entrepreneurship and technology innovation through new programmes for education and research, multi-disciplinary courses, research laboratories and partnerships.

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

**Girish Sant Memorial Lecture:** The 2nd Girish Sant Memorial Lecture was delivered on September 18, 2013, by Dr. Harish Hande, Founder and Managing Director SELCO India, Bangalore. The title of the lecture was “Poverty Reduction and Sustainable Energy – is there a link?”.

**Indira Foundation Distinguished Lecture:** The 1st Indira Foundation Distinguished Lecture was delivered on September 23, 2013, by Prof. George Church, Professor of Genetics at Harvard Medical School & Director of NIH Center for Excellence in Genomic Science & Director of...
PersonalGenomes.org. The title of the lecture was “Biologically Inspired Engineering”.

Professor C.V. Seshadri Lecture Series: A lecture in memory of Prof C.V. Seshadri was delivered on November 12, 2013 by Prof. Ashok Bhaskarwar from the Department of Chemical Engineering, Indian Institute of Technology Delhi. The title of the lecture was: “On Research and Researchers”.

TechniGraphics Lectures: TechniGraphics Lectures were delivered by Bharat Ratna Prof. CNR Rao on “Doing Science in India: A story of agony and ecstasy” and Mr. Vicente Fox. Former President of Mexico, on “Contributions of IITs to India & the world: An international perspective” on January 3 and February 12, 2014 respectively.

Professor K.C. Khillar Lecture Series – The Professor K.C. Khillar Memorial lecture was delivered by Dr. Ashok Lele of Polymer Science and Engineering Division of National Chemical Laboratory, Pune, on April 1, 2013. The title of the lecture was: “From Macromolecular Structure to Polymer Processing: Bridging length and time scales”.

IITB-Westinghouse Lecture: The 3rd IITB-Westinghouse Lecture was delivered on March 27, 2014 by Dr. Chaitanyamoy Ganguly, who was the Head of Radiometallurgy Division, BARC (1986-95) and Director of the Central Glass and Ceramic Research Institute (CGCRI), Kolkata (1995-98). He was promoted to ‘Distinguished Scientist’ in 2002. The title of the lecture was: “Atoms for Prosperity: Uranium Resource & Fuel Cycle - Geopolitics and Safeguards”.

FACULTY AFFAIRS

During the year, 22 faculty members on regular basis and five on contract basis were appointed. The number of full-time faculty members on the roll of the institute has risen to 572 comprising 252 Professors, 120 Associate Professors, 182 Assistant Professors, and 18 Assistant Professors (Contractual Basis). In addition, there are 27 adjunct faculty members on the roll. Around 15 faculty members retired – ten of whom were re-employed and three resigned.

The institute provided financial assistance to 217 faculty members for participating in international conferences. In addition, 161 faculty members travelled abroad for attending international conferences using external funding and 16 faculty members 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. Deepak B. Phatak, Department of Computer Science and Engineering, has been awarded the prestigious ‘Padma Shri’ by the Government of India, for his distinguished service to the nation in the field of Science and Engineering.

Prof. Abhay Karandikar, Department of Electrical Engineering, has been selected for the prestigious ‘VASVIK Award 2010’ in the category of Electrical and Electronics Sciences and Technology.

Prof. Amit Agarwal, Department of Mechanical Engineering, has been selected by the Indian Society of Heat and Mass Transfer for the prestigious K.N. Seetharamu Medal and the Prize for Excellence in Research 2013 in recognition of his research in the area of Heat and Mass Transfer.

Prof. Ashwin Gumaste, Department of Computer Science and Engineering, has been conferred Swarnajayanti Fellowship for the year 2013, in the Engineering Science discipline.

Prof. B. Krishna Mohan, Centre for Studies in Resources Engineering, has been awarded National Geospatial Award for Excellence for his contribution in Geoinformatics Research and Capacity Building given by Indian Society of Remote Sensing.

Prof. K.P. Kaliappan, Department of Chemistry, has been inducted into the Advisory Board of the renowned RSC Journal “Organic & Biomolecular Chemistry”.

Prof. Prakriti Tayalia, Department of Bioscience and Bioengineering, has won the Innovative Young Biotechnologist Award (IYBA) for the year 2013 given by Department of Bio-Technology of Government of India.

Prof. Ramagopal Rao, Department of Electrical Engineering, has been awarded the Infosys Prize 2013.

Prof. Rohit Srivastava, Department of Biosciences and Bioengineering, has been bestowed upon the ‘Senior IYBA Award’ by DBT.

Prof. Rohit Srivastava, Department of Bioscience and Bioengineering has been selected for the prestigious ‘Tata Innovation Fellowship’ from DBT.

Prof. Sambasivarao Kotha, Department of Chemistry, has been invited to join the International Advisory Board of European Journal of Organic Chemistry (EurJOC).

Prof. Santanu Bandyopadhyay, Department of Energy Science and Engineering, has been awarded the ‘Education Leadership Award’.

Prof. Shilpa Ranade, Industrial Design Centre, has won this year’s FICCI FRAMES Award for best feature film, for her film titled “Gopi Gawaiyaa Bagha Bajaiyaa”
**Prof. Souvik Mahapatra**, Department of Electrical Engineering, has been awarded the IBM Faculty Award for 2013.

**Prof. V. Jothiprakash**, Department of Civil Engineering, has been selected for the ‘R.J. Garde Research Award’ for the year 2013.

**INFRASTRUCTURE DEVELOPMENT**

Infrastructure augmentation has remained a major theme with Rs. 367 crores worth work executed over the period 2008-13. This year too the impetus to enhance the infrastructure manifold has been maintained.

The infrastructure projects that were completed during the year include ‘Student Hostel-15’ (of 1000-capacity), ‘IITB-Applied Materials Research Laboratory of 500 sqm’ and ‘Type II-B buildings’ (56 Flats). Some other projects, namely, ‘Hostel 16’ (1000 - capacity) and ‘Computer Centre’ (10000 sqm) building are also nearing completion.

In addition, various projects including the ‘Guest House’ expansion with 100 rooms and 50 utility apartments, ‘Ladies Hostel’ (790 rooms), state-of-the-art sports facilities (10000 sqm), construction of a light weight structure for the 'K.V. School' and 'IITB-Monash Research Academy' (5350 sqm) and reconstruction of ‘Entrance Gates’, renovation of the Central Library, 84 existing ‘C-Type quarters’, are at various stages of construction.

A wide array of projects are at various stages of design and tender like the DESE/ CCESE building (18100 sqm) National Centre for Mathematics (6200 sqm), H1 building (5000 sqm) with 60 flats for staff, 30 flats of A type (8400 sqm), SINE/IDC, construction of Steel Centre, Technology development Centres like NCAIR, Biomed Equipment Centre, Central Animal Facility, and Central Stores/ Estate Office are slated for execution in the coming years, and will create about Rs. 936 crores of assets.

**CENTRAL LIBRARY**

IIT Bombay’s Central Library is user-focused, innovative, and excellence-driven. It manages knowledge, both in print and digital formats, ensures seamless discovery and access to these scholarly resources, and provides faculty, students, and staff with professional support to find, evaluate, manage, and use such resources. It provides high-quality ambiance for both reflective and collaborative work and study.

The library collection of about 4.43 lakh items was used by more than 11,000 members and others who made 3,54,560 visits to the library during the year. In addition, over two million downloads were made from the collection of over 40000 e-journals, e-books, and databases. The library homepage - a single window to all its resources and services and a popular interface between users and the library – was updated during the year. The institutional repository of IITB publications which now has over 14,000 records also attracted more than 91,047 hits during the year.
The library extensively uses social media (Facebook and Twitter) for improved communication and interaction and has created a blog to post current and interesting information and news items.

Collection building - a core activity of the library - has been undergoing a transformation. From print-only environment where all our acquisitions were in hard copy format, it has shifted to print-and-online and to online-only formats. The library currently subscribes to over 80 per cent of its journals in online-only format. It also acquired 814 e-books during the year, though most of the books are still preferred in print-only format. The library added over 3500 items including books, journals, theses, reports, standards, pamphlets and other reading material during the year. Its collection can be accessed through Online-Public-Access Catalogue, which received 3,27,964 hits during the year.

The library also rendered services like reference and consultation, document delivery, arranging material from other libraries through inter-library loan, allowing needy students to borrow textbooks from the book bank and organizing user education programmes to enhance awareness about various resources and services of the library. The library allows self check-out of books as well as online renewal of borrowed books. It handled over two lakh loan transactions of books and other documents for its members during the year. It also offers services to industry and corporates, IITB alumni and engineering (educational) institutions, and has earned over Rs.40 lakhs for the services rendered.

The Central Library supports electronic submission of theses and dissertations by the postgraduate and doctoral students. It maintains a full-text database of over 10000 items submitted since 1999-2000 on Intranet. During the year, 922 M.Tech. dissertations and 198 Ph.D. theses were submitted online.

The renovation of the library building including addition of a new floor is nearing completion. The renovated library building will reflect the current trends in ICT and the changing needs of library staff, students and faculty in the use of library resources and services.

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. The following activities were undertaken during last year:

# The network connectivity to the new students’ hostels (Hostel 10A and 15) has been completed.
# The total Internet bandwidth for campus users have been increased from 2580 Mbps to 3250 Mbps. For optimum utilisation of internet, following has been implemented:

- 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 APNIC.
- Web access is through proxy and “direct access” where a legitimate user authenticates the IP address.
- Separate web access accounts for users, other than employees, at residences.
- Transport layer security has been purchased via digital certificate from GeoTrust.

About 700 WiFi access points have been deployed on campus to cover large part of the academic area, Guest Houses and Central Library.

## High Performance Computing Facility

The old computing cluster CORONA continue to function as before with 130 user accounts. Given the space constraint, the cluster continues to be housed in the premise of the Chemistry Department. The cluster ‘Spacetime Supercomputing’ facility consisting of 380 nodes built using the Intel quad core processors has been operational on the ground floor of the old Computer Science and Engineering Department building.

The installation of Building Management System (BMS) for the Spacetime HPCC facility has been undertaken to bring complete automation of the peripheral equipment. It is expected that the DG-Set together with the automation offered by BMS will provide a better and smoother operation of the HPCC facility in terms of reducing the possibility of hardware failures and data being lost due to unexpected power failures. Enhancement of data storage facility is being undertaken, to improve the SAN device performance and to address the increasing number of research groups using the Spacetime resources.

## 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 also participated in the 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.

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 also been in operation.

Software packages meant for scientific and technical computation such as ANSYS, MATLAB, MATHEMATICA, MAPLE, Dytran / NasTran / Partan, Tecplot and Libraries from Numerical Algorithm Groups (NAG), AutoCAD, Labview, OriginLab 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 800 PCs deployed in the various Administrative sections of the Institute, which has eliminated the spread of computer virus on computers to a great extent.

The Computer Centre continues to play a secondary role by providing technical support to run the IP-based Security Surveillance Systems for the Security Section. The verifocal fixed direction IP (10/100 BaseT ethernet interface) cameras ‘for indoor use only’ (25 nos) have been installed at the entry points of various departments, Main Building and Convocation Hall to monitor and record human activities as well as object movements. Similarly verifocal fixed direction IP-based Day and Night cameras (10 nos) with IP66 certified ‘for outdoor use only’ installed at the Main Gate, Y-Point Gate, and Lakeside Gate continue to monitor and record the inward and outward traffic movements of the campus.

PTZ IP Surveillance cameras (5 nos) having automatic Pan, Tilt, Zoom for 24/7 operation, PTZ control over network. minimum 270 degree Pan with auto flip and 180 degree tilt, Day and Night functionality with 0.5 lux in color, minimum 18x optical zoom, 12x digital zoom have been installed at the Guest House, Hostel 12 & 13, QIP Building and Ananta to keep an eye over the fencing of the campus.

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 few IP telephones (Voice over IP) using the computer network of the Institute.
Projects for the Near Future

Expansion planned for WiFi access: Steps are being taken towards smooth integration of all communications services (phones, cellular, TV and Internet). Process for providing additional 400 wireless access points for the academic for “blanket coverage”, 200 specialised APs (access points) for the classrooms, and 300 wireless access points in the common areas of hostels and open areas in cooperation with 4G service providers, have been planned for near future.

The HPC roadmap: Current infrastructure is about six 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 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.

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 promotion of entrepreneurship 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.

SINE has so far incubated 54 companies. This year SINE hosted 15 companies, of which two have graduated and one exited. Of the current companies, two have received investments from Venture Capital/Angel investments. The existing companies are from various technologies such as education, cleantech, mechatronics, audio technologies, nanotechnology, engineering software, web security, geometric simulation for foundries, and marketing solutions for retail network.

With a view to expanding its incubation activity, SINE is focusing on promoting pre-incubation and enabling virtual incubation outside Mumbai. SINE launched I-ASCEND, a joint flagship entrepreneurship forum formed with IIT Bombay Alumni Association (IITBAA) on April 19, 2014. This will
help to tap into the talent pool of the alumni network for mentoring, partnering, funding support for start-ups. SINE is also part of the initiative of the IIT Bombay 2002 alumni batch’s legacy project to help support student based innovative ideas and projects towards prototype development and proof-of-concept. SINE has been operationally self-sufficient since inception.

CENTRE FOR DISTANCE ENGINEERING EDUCATION PROGRAMME (CDEEP)

During the year, CDEEP recorded 15 semester-long courses of IIT Bombay, covering 11 disciplines. Many institutions, teachers and students are using these courses, which are available to them even offline. CDEEP provided 161 recorded courses to individuals at a small fee. It has an archive of 282 IIT Bombay coded courses. It also provided access to its recorded courses, through web, to 115 participants by charging Rs. 1000 per course.

CDEEP recorded around 88 events on campus including 51st Convocation, 55th Foundation Day, Institute Colloquiums, talks by distinguished speakers and so on. CDEEP team worked on specific improvements in the visible quality on the courses available through web. Now the display of courses/events available through web bears a much improved look.

CDEEP has a total of 75 institutions connected as Remote Centers (RCs), including the two which joined during the year. It also supports several MHRD projects.

INSTITUTE EVENTS

51st Convocation

The 51st Convocation of the IIT Bombay was held on August 10, 2013. **Shri S. Ramadorai, Vice-Chairman, Tata Consultancy Services**, was the Chief Guest and delivered the Convocation Address. **The Degree of Doctor of Science (Honoris Causa)** was conferred on Dr. Ashoke Sen, Professor at the Harishchandra Research Institute (HRI), Allahabad, for his seminal contributions to fundamental physics, especially String theory, and for bringing worldwide recognition for research being carried out in India. **The Degree of Doctor of Literature (Honoris Causa)** was conferred on Dr. Kaushik Basu, Professor of Economics and Carl Marks Professor of International Studies, Department of Economics, Cornell University, for his outstanding contribution in theoretical economics both as a researcher and as a teacher, and for his significant contribution as a policy maker in India.
55th Foundation Day

IIT Bombay celebrated its 55th Foundation Day on March 10, 2014. Prof. Spenta R. Wadia, Distinguished Professor and Director International Centre for Theoretical Sciences of TIFR, was the Chief Guest. As mentioned earlier, the Institute honoured 10 of its alumni with the Distinguished Alumnus Award-2014 and four with the Young Alum Achiever Award-2014. The “Prof. S.C. Bhattacharya Award for Excellence in Pure Sciences–2013” was conferred on Prof. Sudhir R. Ghorpade, Department of Mathematics, and The “Prof. H.H. Mathur Award for Excellence in Research in Applied Sciences–2013” was presented to Prof. Soumen Chakrabarti, Department of Computer Science and Engineering.

Teacher’s Day

The 55th “Teacher’s Day” was celebrated on September 5, 2013. Prof. M.S. Ananth, Former Director, IIT Madras and Visiting Professor, IISc, Bangalore, was the Chief Guest. The “Excellence in Teaching Award–2013”, “IRCC Research & Industrial Consultancy Award– 2012” and the “Dr. P. K. Patwardhan Technology Development Award-2012” were presented on the occasion.

Vanamahotsav 2013 was celebrated on August 24, 2013. Saplings were planted at the Hill Slope across pipeline, near Hostel-4 subway, at the IIT Bombay campus.

Centre for Urban Science and Engineering

A new centre, Centre for Urban Science and Engineering was inaugurated by the Hon’ble Chief Minister of Maharashtra, Shri Prithviraj Chavan at IIT Bombay on September 30, 2013.

1MW Solar PV Power Plant

IIT Bombay, installed a 1MWp (1 MW peak PV power) distributed rooftop Solar PV Power Plant on the roofs of its academic buildings. The Solar power Plant was inaugurated by Dr. Satish Agnihotri, Secretary, Ministry of New & Renewable Energy, Govt. of India, on January 28, 2014.

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. Aibing Yu, School of Materials Science and Engineering, The University of New South Wales, Australia, spoke on “Computational Particle Science and Technology”, at an Institute Lecture on April 22, 2013.

Prof. Sir Michael Pepper, FRS, Department of Electronic and Electrical Engineering, London Centre for Nanotechnology, University College London,
UK, spoke on “Semiconductor Nanoelectronics – the Engineering of Physics”, at the Cockcroft - Walton Lecture under the Institute Lecture series on May 2, 2013. The lecture was supported by Institute of Physics, UK, and Indian Physics Association under bilateral exchange of lecturers.

**Dr. Jennifer Smith**, Dean of the College of Arts and Sciences, Washington University, US, spoke on “The Role of Climate in Human Migration in the Archaeological Past: Case studies from Paleolithic Egypt”, at an Institute Lecture on June 5, 2013.

**Dr. Rajiv Sarin**, Director, Advanced Centre for Treatment Research & Education in Cancer, Tata Memorial Centre, Mumbai, spoke on “Challenges in T2 Translational Research: Bench to Bedside to Community!” at an Institute Colloquium, July 26, 2013.

**Prof. K.R. Sreenivasan**, President, Polytechnic Institute of New York University, Dean of Engineering, New York University, spoke on “Convection in the Sun” at an Institute Lecture, July 15, 2013.


**Prof. Tani E. Barlow**, T.T. and W.F. Chao Professor of Asian History and Director, Chao Center for Asian Studies, William Marsh Rice University, USA, spoke on “China in the world, the world in China” at an Institute Colloquium on August 13, 2013.

**Professor Sir Mark Welland**, Nanoscience Centre, University of Cambridge, UK, spoke on “Nanoscience and Human Disease” at an Institute Colloquium on August 22, 2013.

**Mr. Rajat M. Nag**, Managing Director General, Asian Development Bank, Manila, spoke on “Sustainable Growth: The challenges for emerging economies in balancing the economic growth aspirations with inclusive and green growth” at an Institute Colloquium on September 2, 2013.

**Prof. Inder Verma**, Laboratory of Genetics, American Cancer Society Professor of Molecular Biology, Irwin and Joan Jacobs Chair in Exemplary Life Science, Salk Institute for Biological Studies, USA spoke on “Cancer Stem Cells: Reprogramming, Dedifferentiation and Transdifferentiation” at an Institute Colloquium on October 28, 2013.

**Prof. Eric Mazur**, Harvard University, Cambridge, MA, spoke on “Interactive Teaching, Flipped Classrooms and Peer Instruction” at the Institute Colloquium on November 11, 2013.

**Sir David King, FRS**, The British Foreign Secretary’s Special Representative on Climate Change, and Former Chief Scientific Advisor, UK Government, spoke on “The Economics of Climate Change” on December 5, 2013.

**Prof. James Schwaber**, Director and Professor, Daniel Baugh Institute for Functional Genomics and Computational Biology, Pennsylvania, spoke
on “What is it to be Conscious?” at an Institute lecture on December 20, 2013.

Prof. M. Ram Murty, Queen’s Research Chair Professor of Mathematics and Philosophy, Queen’s University, Canada, spoke on “Ramanujan and the Zeta Function” at an Institute Colloquium on January 8, 2014.

Prof. Robert G. Griffin, Director, Francis Bitter Magnet Laboratory and Department of Chemistry, MIT, Cambridge University, USA, spoke on “Atomic Resolution Structures of Amyloid Peptides, Proteins and Fibrils” at an Institute lecture on January 31, 2014.

Dr. Phyllis M. Wise, Chancellor, University of Illinois at Urbana Champaign, United States, spoke on “Medical Research and Information Technology: New Initiatives at University of Illinois at Urbana Champaign” at an Institute Colloquium on March 26, 2014.

The Department of Mathematics and ATCM jointly organised the “ATCM+TIME 2013” - sixth national conference on Technology and Innovations in Math Education, December 7-11, 2013.


Industrial Design Centre organised Dandi Marchers Sculptures’ Workshop, November 7-24 and December 7-22, 2013.


A three-day national Workshop on GPU Programming & Applications (GPA-2014) organised by CUDA Center of Excellence (CCOE), in association with NVIDIA Corporation, USA, was held during February 24-26, 2014 at IIT Bombay campus.

HINDI CELL

Hindi Cell is actively engaged in providing support for implementation of Hindi in the Institute. The Institute’s circulars, registers, forms, visiting cards, signboards, and degree certificates are prepared in bilingual form. The use of Hindi in the Institute’s email system (GPO) has also increased.

“Hindi Pakhawada” was celebrated in the month of September, where competitions in essay writing, story writing and Hindi translation were organised. Awards to institute employees for significant contributions in Hindi implementation were conferred during the event.

The Central Library also organised a Hindi Book exhibition within its premises. Institute’s students forum “Vaani” jointly with Hindi Cell organised “Kavya Sandhya” as well.
STUDENT ACTIVITIES

The 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, basket ball, volleyball, hockey, football and cricket, athletics tracks, and many more. Along with studies, sports activities too are carried throughout the year, with the Inter-IIT Sports meet in December. 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.

National Sports Organisation (NSO): The new batch of 602 undergraduate students was enrolled for the Senate-mandated NSO activity.

Inter-hostel General Championship (GC): Inter-hostel matches for 19 sports including all team and individual sports. Hostel-4 won back the Boys General Championship trophy after a span of three years and Hostel-10 won the Girls’ General Championship.


Sports Mentorship Programme: IIT Bombay initiated a Sports Mentorship Programme which encourages the participation and learning of students in sports by providing accomplished players a platform to coach and mentor. There were 16 mentors that covered teaching in multiple sports.

PG Sports: There was a substantial increase in the number of participants in the Inter-Departmental PG Sports which was held over the year. This programme is aimed at generating enthusiasm and encouraging participation of PG students in sports and general fitness.

Games: Chess Club, The DARK KNIGHT was formed this year with a large number of popular events held across the year. IIT Bombay students participated in tournaments held in Mumbai and other nearby cities for Chess and Carom.

Cultural Activities

Paathshaala: All cultural activities were brought under a single umbrella branded as Paathshaala thus ensuring that these could be publicised and organised in a coherent manner and that people could maximise this opportunity for learning most cultural forms that they might be interested in.
**Summer School of Cult (SSoC):** Summer vacations provide an ideal opportunity for students who stay back on campus to cultivate their interests in areas beyond just academics. Classes offered in multiple genres including Music, Dance, Film and Fine Arts generated good response.

**Initiatives:**

- **IITB’s Got Talent:** ‘IITB’s Got Talent’ was a talent hunt contest organised for IITB students to showcase their talent in various ‘unconventional’ art forms that otherwise do not fall under any category defined in culturals at the institute.

- **NSO Culturals:** NSO Culturals was approved in Fine Arts and Dramatics.

- **IITB Radio:** A live IIT Bombay web radio was initiated to give updates and entertainment to IIT Students through an interesting medium. This saw around 200 views per show, with the total of 3 shows happening in the year.

- **Professional Exposure:** “Live your Passion” was introduced this year for the first time which aimed at giving professional exposure and showcase platform to the winners of the GCs. This further motivated the students by giving them an invaluable incentive for performing well.

- **ROOTS:** An Indian Arts festival, ROOTS was organized in association with SPIC MACAY. A new Roots council was proposed this year to strengthen the foundation of classical arts in the institute. SPICMACAY Concerts and ‘Virasat’ were organised spanning a week including the first ever, overnight concert.

- **The Performing Arts Festival (PAF)**
This year, PAF saw a close competition, ultimately leading to a tie at the top position. The overall PAF season was overwhelming experience for both the performers as well as participants.

- **General Championship (GC)**
The Hostel-3 bagged the GCI championship. This year Cultural GCs saw a huge participation. Two new GCs were introduced this year: Design GC and AD-making GC, which saw fairly good participation, enthusiasm and quality.

- **National Service Scheme (NSS) Activities**
The main aim of NSS is to sensitise students about various social issues and encourage them to address and solve these issues. The body is divided in four departments addressing various issues, viz. Educational Outreach, Events, Green Campus Initiative and Vikas. NSS organised field trip to Yusuf Meharalli Centre, Disability awareness workshops, Disability access Audit, Interactive talks, and “I am kalam” Documentary screening, during the year.

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NSS collaborated with various NGO’s to take education to underprivileged students. Various activities such as cloth donation, paper bag making, blog writing, Scientific toy making and so on, were also organized on Campus. The group members also participated in Vanmahotsav and other tree plantation activities.

**National Cadet Corps (NCC)**

In the year 2013-14, 77 Cadets (75 Boys & 02 Girls) from IIT Bombay and 45 Boys & 15 Girls Cadets from IIT Campus School & Jr. College enrolled for NCC. The NCC Cadets took part in social service activities such as ‘Drink and Drive Campaign’ and helped in creating better awareness on the same. The 10-day annual training camp was also held, where about 155 cadets participated in firing, obstacle activities, daily parades etc. as well as in extracurricular activities such as dance, drama and music.

**TECHFEST**

Techfest 2014, IIT Bombay’s annual international science and technology festival, celebrated its 16th anniversary this year. The event was supported by the embassies and cultural institutions of UK, Australia, France, Canada, Sri Lanka, Israel, Hungary, Poland, Switzerland, Germany and Italy. A rise of 44% in student participation was witnessed this year. Some of the activities organised as a part of Techfest 2014 are as follows:

**Competitions**

Techfest saw over 30,000 students participating in 22 competitions, including three international competitions. With the incentive of prizes worth Rs. 30 lakhs, competitions have constantly been a source of learning and experience for the students from various parts of the world.

**Inter IIT Tech Meet:** This pan-IIT competition held in Mumbai this year was executed by Techfest. Around 100 participants from 12 IITs participated in three competitions making the event a huge success and triggering Inter IIT Tech meet culture for future years.

**I SMOKE:** A student campaign against smoking with participation from more than 80 colleges in over 15 major cities of India. It was acknowledged by the LIMCA Book which registered the highest number of doodles received (over 23,000) as a record for any social campaign. A mobile application was made to make the user aware of the causes and treatments to cancer.

**Launch of Reliance 4G in India:** Techfest 2014 introduced the most advanced form of mobile telecommunications technology in India. Very high speed internet service was available for more than 3 months exclusively in the campus of IIT Bombay.

**Lecture Series:** The key speakers this year included Bharat Ratna Dr. C.N.R. Rao, Pranav Mistry - Director of Research in Samsung, Kiran Bedi;
Nobel Laureate Dr. R. K. Pachauri, Stephen Wolfram, Michael Sandel, Rajat Sharma, Developer of Photoshop - S. Narayanan and many more.

**Exhibitions:** 23 international exhibits, some of them from universities such as ETH Zurich, EPFL, Osaka, Cambridge, RMIT etc. were at display including BINA 48, world’s most advanced social robot.

**Synchronization with Institute Bodies:** Techfest collaborated with STAB and Cultural Council for organising Inter-IIT Tech Meet and Techfest International Model United Nations (TIMUN) respectively. Over 280 delegates, some of them from Singapore, Bangladesh and Afghanistan and 310 participants made TIMUN 2014 one of the biggest MUN in India.

**Ozone:** ‘Ozone’ – an on-the-spot zone – was a big crowd-puller. International street artists, adventure games, creative workshops and a wall artist from Poland were huge attractions in Techfest. Ozone Workshops were also conducted.

**Technoholix:** Night shows by performers at 2004 Athens Olympics, 2010 FIFA World Cup and other artists were mesmerizing experiences for people of all ages and interests.

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**MOOD INDIGO**

The annual cultural festival Mood Indigo held during December 20-23, 2013, witnessed a lot of structural changes and inclusion of additional national and global genres, making the festival more hospitable and enjoyable for the participants. The fest saw invitations sent across to 2000 colleges and a footfall of 1,04,000, last year.

**Competitions:** Competitions extended their domain to previously unexplored avenue of Digital Arts. National Debate was revamped in collaboration with Institute Cultural Council bringing international adjudicators to the festival for the first time. Attractive incentives were given to the competitions winners under the “Live Your Passion” campaign which included Internship under Neeta Lulla, Performances at NCPA, Prithvi Theatre, etc. Multicity was explored by taking a few competitions to Delhi, Pune, Kolkata, Guwahati, Bangalore and Guwahati.

**Media:** The coverage of Mood I substantially increased in both mainstream and regional papers due to dedicated efforts. A 12 page newsletter was prepared and distributed with the help of Bombay Times enlisting all the highlighting events. BEST Bus shelters at strategic locations were used to portray unique events. Mood Indigo App was also created, which included all the new updates of the festival and the results of the various competitions.

**Popular and Cultural Events:** A blend of popular and cultural/experience based events included interactive sessions with Aamir Khan, S. Hussain Zaidi, Mir Ranjan Negi et al. The performances included folk music of Ireland, France and Germany. Comedy as a genre was explored under the title of “Humour Fest” that included stand up and comedy acts. EDM
music was introduced for the first time as a concert and was well received by the crowd. World’s top rated drummer, Mike Portnoy performed for the first time in India during the Livewire Nite. A Guinness World Record was also made during the festival in collaboration with Oreo.

**Entrepreneurship Cell (E-Cell)**

The E-Cell at IITB was founded around 15 years ago, 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 brought in a new era of entrepreneurship in the Institute and has contributed towards an increase in the number of start-ups by students and alumni, in the recent times. The major initiatives of E-Cell were:

**Eureka:** Organized annually, it is the Asia’s largest Business Plan competition that encourages people from across the globe to flesh out their ideas and form global enterprises that combine technology, vision and business acumen. Eureka received over 6000 registrations and around 150 teams from the institute participated. Mentoring sessions by experts were held over a period of two months and the final pitching was held during the Entrepreneurship Summit 2014. The winners received huge cash prize and an opportunity to go to Stanford University for entrepreneurship camp. Eureka through the years has produced several successful startups.

**Entrepreneurship and Business Club (EnB Club)**

The vision of the EnB Club is to create a platform of entrepreneurship enthusiasts where students, faculty and professionals can interact on a regular basis for discussions, brainstorming sessions, informal sessions and networking. The team is dedicated to enhancing the learning experience of those students who are curious about entrepreneurship and to providing an action-oriented road map for those looking to launch a start-up.

**Entrepreneurship Summit:** The Entrepreneurship Summit is an initiative by E-Cell, IIT Bombay, to serve as a platform for bringing together budding entrepreneurs, investors and other major contributors to the entrepreneurial ecosystem. E-Summit 2014 witnessed renowned speakers from various domains of the entrepreneurial ecosystem, who shared their own life experiences, including Syntel Co-Founder Bharat Desai, Jim Beach, Tim Malbon, Sachin Bansal, Rana Kapoor, Mukund Mudras, Alok Kejriwal, Celina Jaitly et al.

**National Entrepreneurship Challenge (NEC):** This is a competition created with the vision to promote entrepreneurship amidst all the college campuses in India. In the first year of its inception it got a huge response and over 150 colleges participated. NEC involved completing series of structured tasks divided into Awareness, Idea generation, Club activities and Stand up for Society aiming to make a steady progress towards
establishing an e-cell in the respective colleges. Several other competitions, workshops and panel discussions were held during E-Summit.

**Student’s Technical Activity Body (STAB)**
As mentioned earlier, fully-equipped centralized technical lab ‘Tinkerer’s Lab’, was setup in two phases using the funding obtained from alumni of 1975 batch, during the year. An electronic notice board has been setup within the Campus to reduce the paper wastage. Tum Tum Tracker (TTT) is also ready for implementation to ease commuting woes of students. Some of the major events organised by STAB were:

**Inter-IIT Tech:** The technical version of Inter-IIT was hosted by IIT Bombay during January 2-4, 2014, with more than 10 IIT’s sending their representatives for three different events viz., ‘Social Impact’, ‘Software Development’ and ‘Messier Marathon’.

**MIT Media Labs:** A week-long workshop on health care was organised, where 25-30 students participated to come up with 20 prototypes.

**Industrial Learning Program:** About 10 industrial projects were floated in collaboration with the Academic Council and Placement Cell to provide opportunities to apply the theoretical knowledge.

**Institute Summer Technical Projects:** It is a platform to help the students (especially freshmen) develop a prototype of their idea during the summer with required mentorship, guidance, lab facilities and funds. As a result of strong mentorship program, weekly review meetings and discussion forum, 97 projects were completed involving 300 students.

**General Championship:** The weightage of technical activities was increased from 20 to 30 per cent to get more attention. The number of low-prep GC’s were increased to encourage the participation from hostels. General Championships were held in the field of: Electronics, Logic, Aeromodelling, Robotics, Coding, Rocket on Spot, M n P and Astronomy & ARC. Several other initiatives were taken to increase participation.

**Online Presence and Newsletter:** A new and better website was created, integrating with the TechID. A technical newsletter ‘LIGHTSABER’ was launched this year, which covers the major technical activities within the institute.

**PLACEMENT**
Even though 2013-14 was characterized by economic uncertainties in India and abroad, IIT Bombay entered the 2013-14 placement season with confidence, largely due to its quality of students and strong corporate relations. The first phase of IIT Bombay’s campus placement in December 2013 saw participation from around 257 companies that offered 895 jobs.
Up to June 2014, a total of 316 organisations took part in campus placement and offered over 1042 jobs. The final year students – doing B.Tech., M.Sc. Dual Degree, M.Tech., M.Des., M.Phil., and Ph.D. programmes in various fields of engineering, science and technology, design and humanities – participated in the placement process. A total of 1621 students registered for campus placements in 2013-14, which was the largest number ever.

The process began in July 2013 with sending an invitation to companies to visit the Institute for pre-placement talks and provide their job announcements. The company interview process began on December 1, 2013, the first day of formal placements, which saw 37 firms representing some of the most well known organisations in the global industry vying for our students. An unprecedented number of 182 jobs were offered on the day, reconfirming the commitment of top recruiters to the IIT Bombay graduates.

**Engineering and Technology**

Our 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 companies operating in various sectors of the economy.

**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 119 job offers from 32 organisations making it one of the biggest recruiters after engineering and information technology.

**Consulting Sphere**

Over 28 leading management consulting firms, including several global leaders, visited IIT Bombay for recruitments. These companies are known to be highly selective and follow a rigorous recruitment process. Over 89 offers were made in this sector.

**Financial Services**

The financial service sector was a major recruiter this year as well. In appreciation of the analytical and quantitative analysis capabilities of our students, many top global companies in financial sector visited the Campus and made over 70 offers.

**Research & Development**

Due to an ever-growing demand for high-end products and services, a larger number of companies now develop products on the forefront of technology. This has perhaps led to an increase in the number of organisations hiring fresh graduates in the R&D sector. A total of 18 R&D organisations offered 42 positions this year.
Education

IIT Bombay continues to provide faculty to several educational institutions through campus placement. Over 55 students, including some with doctoral degree, have been offered jobs in public and private educational institutions through campus placement.

Diverse Recruiters

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, management consulting, finance/banking, and FMCG. Most of these firms are world leaders in their respective domains.

Preparing well-rounded students

This year a key focus of the Placement Office was to prepare the students for placement. 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 planned to orient the students to different job requirements. Around 700 preparatory sessions were organised by the Placement Office.

Conclusion

The highly successful student placement in 2012-2013 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, and we look forward to fostering long-term relationship with all these organisations.

Program-wise placement data 2013-2014:

<table>
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<tr>
<th>Academic Programme</th>
<th>Registered</th>
<th>Placed*</th>
<th>% Placed</th>
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<td>B.Tech.</td>
<td>503</td>
<td>365</td>
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<tr>
<td>Dual Degree (B.Tech.+M.Tech.)</td>
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<td>M.Tech.</td>
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</tr>
</tbody>
</table>
(* All registered students do not necessarily participate actively in campus placements. Some eligible students may have alternate plans like higher education etc. but still register for campus placements.)

**Placement detail by type of organisation:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Sector</th>
<th>Number of Organisations</th>
<th>Number of Offers Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analytics</td>
<td>32</td>
<td>119</td>
</tr>
<tr>
<td>2</td>
<td>Consulting</td>
<td>28</td>
<td>89</td>
</tr>
<tr>
<td>3</td>
<td>Education</td>
<td>14</td>
<td>55</td>
</tr>
<tr>
<td>4</td>
<td>Engineering and Technology</td>
<td>76</td>
<td>324</td>
</tr>
<tr>
<td>5</td>
<td>Finance</td>
<td>17</td>
<td>71</td>
</tr>
<tr>
<td>6</td>
<td>FMCG</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Public Sector/Government</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>8</td>
<td>Research &amp; Development</td>
<td>18</td>
<td>42</td>
</tr>
<tr>
<td>9</td>
<td>Services</td>
<td>11</td>
<td>53</td>
</tr>
<tr>
<td>10</td>
<td>Software, IT</td>
<td>65</td>
<td>262</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>273</strong></td>
<td><strong>1067</strong></td>
</tr>
</tbody>
</table>

**Placement detail by range of salary offered:**

<table>
<thead>
<tr>
<th>Range of Gross Salary (in Lakh Rupees per annum)</th>
<th>Number of Organisations</th>
<th>Number of Offers Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 11</td>
<td>65</td>
<td>344</td>
</tr>
<tr>
<td>Between 9.5 to 11</td>
<td>43</td>
<td>161</td>
</tr>
<tr>
<td>Between 8 to 9.5</td>
<td>33</td>
<td>107</td>
</tr>
<tr>
<td>Between 6.5 to 8</td>
<td>38</td>
<td>162</td>
</tr>
<tr>
<td>Between 5 to 6.5</td>
<td>64</td>
<td>200</td>
</tr>
<tr>
<td>Less than 5</td>
<td>30</td>
<td>93</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>273</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>
**Internship Report 2013-14**

The academic year 2013-2014, was the second year in which Placement Office handled student internships. The year saw 921 internship offers from around 650 organisations. There were 88 Pre-Placement Offers (PPO) made to students for final placement based on their internships last year, of which 60 were accepted by students.

The internship season started in July 2013 and continued till mid of May. The students in the 3rd and 2nd years of Bachelor of Technology (B.Tech.), 5-year Master of Science (M.Sc.) and Dual Degree (D.D.) programmes in various departments participated in the internship process.

**Department-wise Internship Data (2012-2013 data in brackets):**

<table>
<thead>
<tr>
<th>Department</th>
<th>Number of Internships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace</td>
<td>66(53)</td>
</tr>
<tr>
<td>Chemical</td>
<td>143(151)</td>
</tr>
<tr>
<td>Civil</td>
<td>90(102)</td>
</tr>
<tr>
<td>Computer Science</td>
<td>154(169)</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>22(15)</td>
</tr>
<tr>
<td>Electrical</td>
<td>138(140)</td>
</tr>
<tr>
<td>Energy Science</td>
<td>30(40)</td>
</tr>
<tr>
<td>Mechanical</td>
<td>168(137)</td>
</tr>
<tr>
<td>Metallurgy</td>
<td>77(90)</td>
</tr>
<tr>
<td>Chemistry</td>
<td>24(12)</td>
</tr>
</tbody>
</table>

**Summer vs. Winter Internships:**

<table>
<thead>
<tr>
<th>Total Number of Internships</th>
<th>Winter Internships</th>
<th>Summer Internships</th>
</tr>
</thead>
<tbody>
<tr>
<td>921</td>
<td>684</td>
<td>237</td>
</tr>
</tbody>
</table>

**Companies vs. Universities**

<table>
<thead>
<tr>
<th>Total Number of Internships</th>
<th>Company Internships</th>
<th>University Internships</th>
</tr>
</thead>
<tbody>
<tr>
<td>921</td>
<td>802</td>
<td>119</td>
</tr>
</tbody>
</table>
Country-wise offers from Universities:

<table>
<thead>
<tr>
<th>Country</th>
<th>No. Of Universities</th>
<th>No. of Interns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>USA</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>Canada</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>UAE</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Australia</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Austria</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>France</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Singapore</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>UK</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Israel</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Italy</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Taiwan</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Japan</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ireland</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>India</td>
<td>4</td>
<td>11</td>
</tr>
</tbody>
</table>
| Total         | 51                 | 119           

Comparison of Internship Offers
2013-14 vs. 2012-13 vs. 2011-12
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. 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 the 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 success in your future endeavours. Let the motto of IIT Bombay “Gyanam Paramam Dheyam” be your guiding light!

Jai Hind!