PARTNER WITH US

INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
Benefits of Partnership

- Sponsor Laboratories, students
- Seek to solve Specific Problems
- Train Industry Personnel
- Exploit Complementarity
- Carry Out Industry Relevant Research

- Deploy IPs
- Support Basic Research For Knowledge Creation
- Form Consortia Visits of Scientists and Engineers
- High-Tech Spinoffs
- Human Resource Development

INDUSTRY
Director’s Message

IIT Bombay engages in research, technology development, education, training and related activities in most areas of science and technology. Today, it is a centre of academic excellence in the country and is rated on par with some of the best institutions in the world.

IIT Bombay has 27 academic units encompassing a range of disciplines that include traditional science and engineering, management, humanities, social sciences and design. In addition, the Institute has consciously nurtured interdisciplinary areas such as industrial engineering and operation research, systems and control engineering, urban science and engineering, education technology and climate studies. Institute’s current student population is just over 10,000; of these, 60% are enrolled in post-graduate programs and provide a strong impetus to research activities. This is visible in various metrics of R&D such as number of publications, patents and funding.

IIT Bombay is mindful of the needs of society and country at large, and develops technologies / products that improve the quality of life for both urban and rural population. The Tata Centre for Technology and Design (TCTD) and Centre for Technology Alternatives for Rural Areas (CTARA) have made significant progress in developing technologies that cater to the needs of people at the bottom of the pyramid.

IIT Bombay has a thriving entrepreneurship ecosystem thanks to its very successful technology business incubator, SINE. The Entrepreneurship Cell and the recently started Desai Sethi Centre for Entrepreneurship are other entities that provide further support. The Institute has reaped rich dividends by promoting on-campus entrepreneurs and start-ups. Some of these start-ups have graduated and become role models in their respective domains.

IIT Bombay has ongoing interactions with a large number of industries & public sector organizations through a variety of modes that include providing solutions to specific problems through short term consultancy projects, medium to long term sponsored research projects, endowments, student sponsorship, etc. Continuing Education Program is another useful platform of academia-industry collaboration whereby IIT Bombay designs and imparts customized training programs to industry personnel based on their requirements. The Institute is committed to partnering with Industry in its endeavour to promote research that makes a difference.

Prof. Devang Khakhar
IIT Bombay Research Park

Facilitates establishment of an innovation hub inside IIT Bombay through industry-academia collaboration
Joint IIT Bombay-Industry Research & Development groups for stronger impact

info@iitbresearchpark.com
+91 22 2572 0292
www.respark.iitb.ac.in

Continuing Education Program

Assists working professionals in widening their knowledge base and improving their skills
Single point contact for all courses and industry specific programs

pic-cep@iitb.ac.in
cep@iitb.ac.in
Tel: +91 22 2576 7006/6199
www.cep.iitb.ac.in

Society for Innovation and Entrepreneurship (SINE)

SINE manages a technology business incubator at IIT Bombay
A platform to support technology start ups founded by IIT Bombay community or are based on IIT Bombay technologies

sine@sineiitb.org
Tel: +91 22 2576 7016
http://sineiitb.org
**Dean (Alumni and Corporate Relations)**

- Promotes and strengthens engagement with the Alumni and Corporations
- Manages utilisation and enhancement of the Institute’s endowments and gifts from well-wishers

**IIT Bombay Development & Relations Foundation (IITB-DRF)**

- Foster lifelong relationship with alumni, friends and organizations that results in goodwill and philanthropic engagement

**Dean (Research and Development)**

- Create and maintain an environment, including research infrastructure and support staff for R&D
- Facilitate collaboration, both within and outside the Institute
- Liaise with funding agencies and industry, provide support for MoUs and agreements
- Exploit IIT Bombay R&D through licensing and commercialization
- Provide administrative support for R&D

**Dean (Academic Programs)**

- Course curriculum, academic programs
- Student sponsorships and fellowships

**IIT Bombay Placement Office**

- Placement Office is responsible for campus placement, student internships at IIT Bombay
- It is well-equipped with excellent infrastructure to support every stage of the placement process

**Contact Information**

- **Dean (Alumni and Corporate Relations):**
  - dean.acr.office@iitb.ac.in
  - Tel: +91 22 2576 4889, 2576 7023
  - [www.iitb.ac.in/alumni/en/content/about acr office](http://www.iitb.ac.in/alumni/en/content/about acr office)

- **Dean (Research and Development):**
  - dean.rnd.office@iitb.ac.in, industry@ircc.iitb.ac.in
  - Tel: +91 22 25767039
  - [www.ircc.iitb.ac.in](http://www.ircc.iitb.ac.in)

- **IIT Bombay Placement Office:**
  - placementcell@iitb.ac.in, placement@iitb.ac.in
  - Tel: +91 22 25767083, +91 22 2572 0421 /4601/3586/5586
  - [http://placements.iitb.ac.in/](http://placements.iitb.ac.in/)
R&D Projects at IIT Bombay

Industrial Research and Consultancy Centre (IRCC) at the office of the Dean (R&D) is the nodal unit responsible for managing and coordinating all activities related to research and development at the Institute. It has set up simplified processes for financial, manpower and intellectual property management. IRCC has also initiated many schemes for incentivising and supporting researchers. It facilitates interactions with various external agencies for funding and licensing activities.

Consultancy Projects
- Short term projects to solve specific problems of industry
- Scope of work and deliverables are well defined

Sponsored R&D Projects
- Long term projects for new knowledge generation in current, emerging and futuristic areas
- Deliverables may include IP generation, manpower development and publications
Research Cell for collaborative projects

- Fairly long term research collaboration in broadly defined areas of mutual interest to industry and IIT Bombay
- Multiple research projects to be executed by IIT Bombay faculty with industry feedback
- Industry can define problem statements, collaborate on the projects, receive ownership for IPs and commercially exploit new technologies

Some examples of collaborative research

<table>
<thead>
<tr>
<th>Smart infrastructure</th>
<th>Synthetic Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable energy systems</td>
<td>Data analytics</td>
</tr>
<tr>
<td>Power system analysis</td>
<td>Corrosion studies</td>
</tr>
<tr>
<td>Biomedical devices</td>
<td>Cloud communications</td>
</tr>
<tr>
<td>Environmental impact assessment</td>
<td>Internet of things</td>
</tr>
<tr>
<td>Modeling and simulation</td>
<td>Rural technology</td>
</tr>
<tr>
<td>Structural characterization</td>
<td>Photovoltaics</td>
</tr>
<tr>
<td>Energy storage device</td>
<td>Information and communication technology</td>
</tr>
<tr>
<td>Structural reliability</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>Steel technology</td>
<td>Sensors</td>
</tr>
<tr>
<td>Bio-systems engineering</td>
<td>Remote sensing and GIS</td>
</tr>
<tr>
<td>Communication network</td>
<td>Signal processing</td>
</tr>
<tr>
<td>Computer Aided Design &amp; Manufacturing</td>
<td>Machining and machine tool design</td>
</tr>
<tr>
<td>Device and circuit performance</td>
<td>Air Conditioning and Refrigeration</td>
</tr>
<tr>
<td>Polymers</td>
<td>Catalysis</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>Nanotechnology</td>
</tr>
<tr>
<td>Materials</td>
<td>Ergonomics</td>
</tr>
<tr>
<td>Financial Engineering</td>
<td>Project Management</td>
</tr>
</tbody>
</table>
Sponsored Research Laboratories at IIT Bombay

A Research facility/laboratory sponsored by an industry in an area of interest, helping build the infrastructure at IIT Bombay.

Such facilities and laboratories will be shared with the sponsoring industry and may also be open to others on a case-to-case basis.

1. Forbes Marshall Energy Efficient Lab — a resource centre to enable implementation of industrial energy efficiency and collaborative research.
2. Cummins Engine Research Facility — Integration of new engine and renewable fuels technologies.
3. Yahoo! Hadoop cluster lab— to conduct research on search based technologies
4. Applied Materials Manufacturing Laboratory to promote research in nanoelectronics, nano-manufacturing and solar photovoltaic technology
5. Parimal and Pramod Chaudhari Laboratory for cell culture funded by Praj Industries, Pune for drug discovery, nanotechnology and microfluidics applications.
Models for IP sharing at IIT Bombay

Collaborative development and licensing

- Joint ownership of IP
- First option for exclusive licensing
- IP ownership to industry on mutually agreed terms

Licensing of IP generated in the Institute

- IP generated through academic / unrestricted sponsored research
- Can be exclusive or non-exclusive license (preferred)
- Assign IP on mutually agreeable terms

Incubation / entrepreneurship

- Technology Business Incubator for commercialising IITB IP Society for Innovation and Entrepreneurship (SINE), 2004
- Faculty, students and alumni as incubatees
- Business plan accepted for incubation
- License to use IITB IP
Consortia and Centres of Excellence at IIT Bombay

- Partner with IITB through a consortia for mutual benefit of all stakeholders
- Enables pooling resources for research in emerging areas
- Industry - Academia - Government consortia also possible

Centre of Excellence in Steel Technology (COEST)
For R&D in steel technology and creation of high quality manpower for the industry
Funded by Ministry of Steel, GoI

Centre of Excellence in Nanotechnology
To design, fabrication, characterization of traditional CMOS Nano-electronics, novel material based devices, micromechanical systems, BIO_MEMS etc
Funded by Ministry of telecom, GoI

National Centre for Aerospace Innovation and Research (NCAIR)
Aims to provide economically viable, sustainable solutions to Indian aerospace manufacturers
Founding members DST, IITB, Boeing, HAL, NAL

Solar Energy Research Institute for India and the United States (SERIIUS)
To accelerate development of solar electric technologies
Identify and quantify the critical technical, economic and policy issues for solar energy development and deployment in India

Power Anser Lab
Addresses the need for power sector to realize sectorial and organizational efficiencies by performing knowledge engineering
Joint initiative of IITB, TCS and TCE

Focus Incubation Centre in Technical Textiles (FICTT)
Initiative funded by Min. of Textiles to serve as a translational platform
To work towards disruptive innovation in the field of technical textiles
Centre of Propulsion Technology (CoPT)
Achieve self-sufficiency in propulsion technologies.
Funded by DRDO

Biomedical Engineering and Technology (Incubation) Centre BETiC
Integrated facilities for design, analysis, prototyping and testing of medical devices
Funded by State Govt of Maharashtra and DST, Govt

National Centre for Photovoltaic Research and Education (NCPRE)
Provides R&D and educational support for India’s ambitious 100GW solar mission
Funded by Min of Renewable Energy, Govt

National Solar Thermal Power Testing Research and Simulation Facility
A grid-connected 1MWe solar thermal power plant designed, installed and commissioned near New Delhi

Tata Centre for Technology and Design (TCTD)
Aims to develop solutions to challenges faced by resource constrained communities
Supported by Tata Trusts

Shenoy Innovation Studio
To create a paradigm shift in design, conducts industry workshops and facilitates in-house innovation

National Centre of Excellence in Technology for Internal Security (NCETIS)
Takes up activities towards developing indigenous technology and self-sufficiency in the areas of Electronics Systems Design and Engineering for the strategic sector of internal security

CoPT

Centre of Propulsion Technology (CoPT)
Achieve self-sufficiency in propulsion technologies.
Funded by DRDO

TTSL IITB Centre of Excellence in Telecommunication (TICET)
Capacity building, design and fabrication, advisory support to industry
Joint initiative of IITB, Tata Teleservices, Dept of Telecom, Govt

Healthcare Research Consortium
Academia, hospitals and industries have come together to provide resources and expertise to projects enhancing healthcare through technical assistance
Academic Disciplines at IIT Bombay

Engineering
Mechanical, Civil, Electrical, Computer science, Aerospace, Metallurgy and materials science, Chemical

Education Technology
Research and education in the area of technologies to promote the learning-teaching process.

Nanotechnology & Biomedical engineering

Systems and Control
Nonlinear control, robotics, embedded systems, coordination of autonomous vehicles, combinatorics, modelling and optimization of stochastic processes.

Pure Sciences & Mathematics
Chemistry, Physics, Mathematics, Applied statistics, Biosciences

Design
Industrial design, Visual communication, Animation, Interaction design, Mobility and vehicle design

Policy studies

Industrial Engineering and Operations Research (IEOR)
A blend of theory, modelling and application, draws from traditional as well as modern areas of operations research, together with a systems view derived from long-standing principles of industrial engineering
Climate studies
Fundamental understanding and problem-centred analysis of climate change

Entrepreneurship
Imparts a structured training to aspiring student entrepreneurs

Urban Engineering
Research, teaching and skilled manpower development with the primary mandate of improving urban quality of life

Rural Technology
Perspectives, policies, and practices pertaining to technology, development, and the interrelationship between the two in the rural context

Geology & Geophysics

Energy

Environmental Science

Geoinformatics and Natural Resources Engineering

Management

Humanities and Social Sciences
Research Infrastructure at IIT Bombay

The institute provides high end infrastructure facilities and laboratories to support research activities. These facilities are open to external agencies as well.

Bio-Atomic Force Microscope

CISCA 4

Fluorescence Activated Cell sortin

High Resolution Mass Spectrometer

High Resolution XRD System

Environmental Scanning Electron Microscope
Exchange Visits

IITB Faculty & Students

Industry Scientists & Engineers

IITB faculty at industry
Sabbatical-Like visit
• May, June, December
• Primarily for ice-breaking:
  • interact with R&D staff
  • Seminar/lecture
  • Site tour
• Not for consultancy
Other types of visits
• Any time of the year
• Customize
  • Frequency of visit
  • Duration of visit
  • Scope of work

Industry personnel at IITB
• Frequency / duration flexible
• NDA prior to visit
• Industry responsibility
• Health / accident insurance
• Salary / remuneration
• Accommodation / transport

Student Internship
• Credit-based internship
• In a core industry
• Faculty mentor from IITB
• Not Credit based
Industry Sponsorships and Fellowships at IIT Bombay

Sponsor PhD and Masters Program Students

- Objective is to jointly promote research & manpower development
- Industry can sponsor students to work in an area of its interest
- Sponsorship includes monthly stipend (amount not less than that given by Government of India funding agencies) and a contingency grant.
- Industry may define project scope
- Flexible IP norms

Prime Minister Fellowship

- Scholarship from GoI as per norms
- Additional matching amount from partnering industry
- Duration of the Fellowship is four years
- Up to 100 new Fellowships are provided every year

2+1 Year MTech model:

<table>
<thead>
<tr>
<th>Year</th>
<th>Course Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year -1</td>
<td>Course Work</td>
</tr>
<tr>
<td>Year -2</td>
<td>MTech project working on a research problem identified by Industry; Student will graduate with MTech degree</td>
</tr>
<tr>
<td>Year -3</td>
<td>Continue to complete project work at IITB or field</td>
</tr>
</tbody>
</table>

Industry Sponsorship / Fellowship

<table>
<thead>
<tr>
<th>Program</th>
<th>Duration</th>
<th>Amount (in INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Doctoral Fellow</td>
<td>Variable</td>
<td>55,000 - 85,000 per month ( + HRA as applicable)</td>
</tr>
<tr>
<td>PhD</td>
<td>5 years</td>
<td>23,00,000 + HRA as applicable ( as per Visvesvaraya PhD Scheme)</td>
</tr>
<tr>
<td>MTech (2+1 Year Model)</td>
<td>2 years (Year 2 &amp; 3)</td>
<td>13,00,000 (higher funding for Year -3 due to out of campus expenses)</td>
</tr>
<tr>
<td>Masters</td>
<td>2 years</td>
<td>7,00,000</td>
</tr>
</tbody>
</table>

Industry Sponsored Chair Professorship

- Kamlnayan Bajaj Chair
- D. L. Shah Chair
- HAL R&D Chair
- Praj Industries Chair
- Shailesh Mehta Chair
- Bajaj Group Chair
- Forbes Marshall Chair
- L&T Chair
- Romesh Wadhwani Chair
- TATA Chair
## IIT Bombay At A Glance

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic units</td>
<td>27</td>
</tr>
<tr>
<td>Research centres</td>
<td>21</td>
</tr>
<tr>
<td>Faculty</td>
<td>~630 full time faculty</td>
</tr>
<tr>
<td></td>
<td>~100 adjunct and visiting faculty</td>
</tr>
<tr>
<td>Students</td>
<td>~10,000 (3000 PhD)</td>
</tr>
<tr>
<td>Postdoctoral fellows</td>
<td>~120</td>
</tr>
<tr>
<td>Project staff (Research)</td>
<td>~1400</td>
</tr>
<tr>
<td>Total R&amp;D receipts for FY 2016-17</td>
<td>~INR 360 Cr</td>
</tr>
<tr>
<td>Patents, trademarks, copyright applications</td>
<td>~100</td>
</tr>
<tr>
<td>filed in 2016</td>
<td></td>
</tr>
<tr>
<td>Technology transfers / deployment so far</td>
<td>~150</td>
</tr>
<tr>
<td>Total degrees awarded in 2016</td>
<td>2515</td>
</tr>
<tr>
<td>PhD degrees awarded in Interim Convocation</td>
<td>157</td>
</tr>
<tr>
<td>(Feb 2017)</td>
<td></td>
</tr>
<tr>
<td>PhD degrees awarded in 2016</td>
<td>325</td>
</tr>
<tr>
<td>Research publications since inception</td>
<td>22,800</td>
</tr>
<tr>
<td>Research publications in 2016</td>
<td>~1800</td>
</tr>
<tr>
<td>Citations for publications since inception</td>
<td>~253,700</td>
</tr>
<tr>
<td>Companies incubated since inception of SINE</td>
<td>~100</td>
</tr>
<tr>
<td>No. of industries currently collaborating with IITB</td>
<td>450</td>
</tr>
<tr>
<td>No. of ongoing industry projects</td>
<td>680</td>
</tr>
</tbody>
</table>