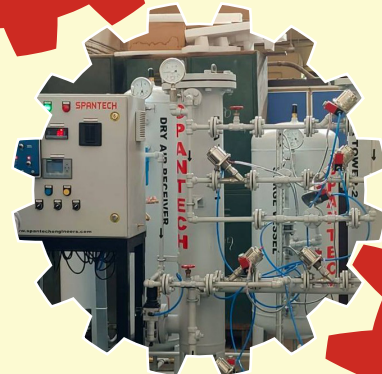


PARTNER WITH US

AUGUST 2021



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

Benefits of Partnership

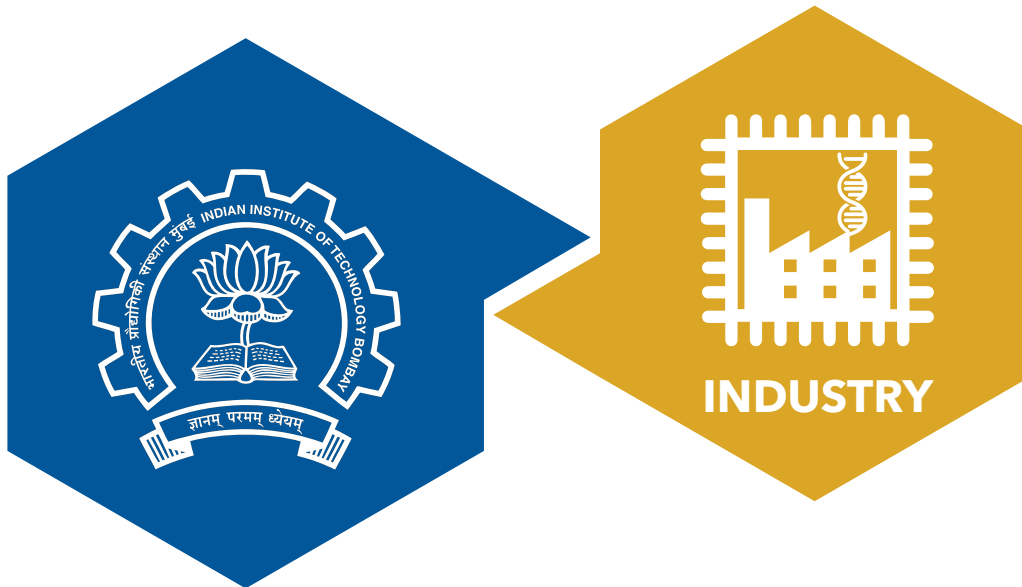
Sponsor
Laboratories,
Students

Solve
Specific
Problems

Train
Industry
Personnel

Carry Out
Industry
Relevant
Research

Form
Consortia



Deploy
IIT Bombay
IPs

Support Basic
Research for
Knowledge
Creation

Visits of
Scientists and
Engineers

High-Tech
Spinoffs

Human
Resource
Development



Director's Message

IIT Bombay is well known for its engagements in research, technology development, education, training and related activities in most areas of science, technology and design. Today, it is the principal hub of academic excellence in the country and is rated at par with some of the best institutions in the world. IIT Bombay attracts the brightest students in its academic programs and boasts of an excellent pool of very dedicated faculty members. It has been recently declared as an 'Institution of Eminence' by the Ministry of Human Resource Development, Government of India.

IIT Bombay has 27 academic units encompassing a range of disciplines that include traditional science and engineering, management, humanities, social sciences and design. 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 about 12,000 of which ~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.

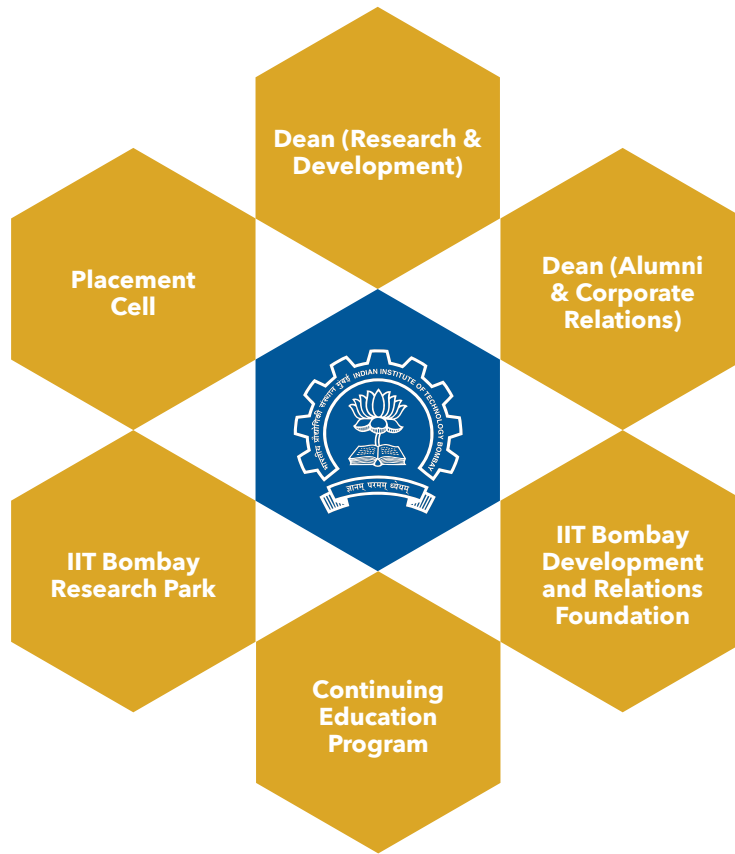
IIT Bombay is mindful of the needs of society and country at large, and develops technologies / products that improve the quality of life for both urban and rural population. Among others, Tata Centre for Technology and Design (TCTD) and Centre for Technology Alternatives for Rural Areas (CTARA) have 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 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 and public sector organisations 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 customised 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. Subhasis Chaudhuri

Industry Interfaces at IIT Bombay



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

Tel: +91 22 2572 0292

www.respark.iitb.ac.in

Continuing Education Program (CEP)

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

Tel: +91 22 2576 7006

www.cep.iitb.ac.in

Society for Innovation and Entrepreneurship (SINE)

SINE is the 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

www.sineiitb.org

Dean (Alumni and Corporate Relations)

Promote and strengthen engagement with the Alumni and Corporations
Manage utilisation and enhancement of the Institute's endowments and gifts from well-wishers



dean.acr.office@iitb.ac.in
Tel: +91 22 2576 7023
www.iitb.ac.in/alumni/en

IIT Bombay Development & Relations Foundation (IITB-DRF)

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



cdo@iitb.ac.in
Tel: +91 22 2576 4881
www.iitbdrf.org

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 commercialisation
Provide administrative support for R&D



dean.rnd.office@iitb.ac.in
Tel: + 91 22 25767039
www.ircc.iitb.ac.in

Dean (Academic Programs)

Course curriculum, academic programs
Student sponsorships and fellowships



dean.ap.office@iitb.ac.in
Tel: +91 22 2576 7049
www.iitb.ac.in/acad

IIT Bombay Placement Office

Responsible for campus placement, student internships at IIT Bombay
Excellent infrastructure and student volunteer teams to coordinate activities



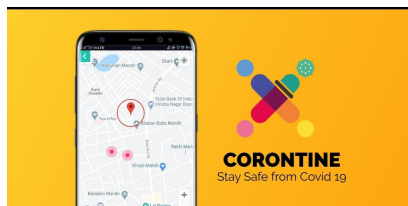
placementcell@iitb.ac.in
Tel: +91 22 22576 7092
www.placements.iitb.ac.in

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 streamlined 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.



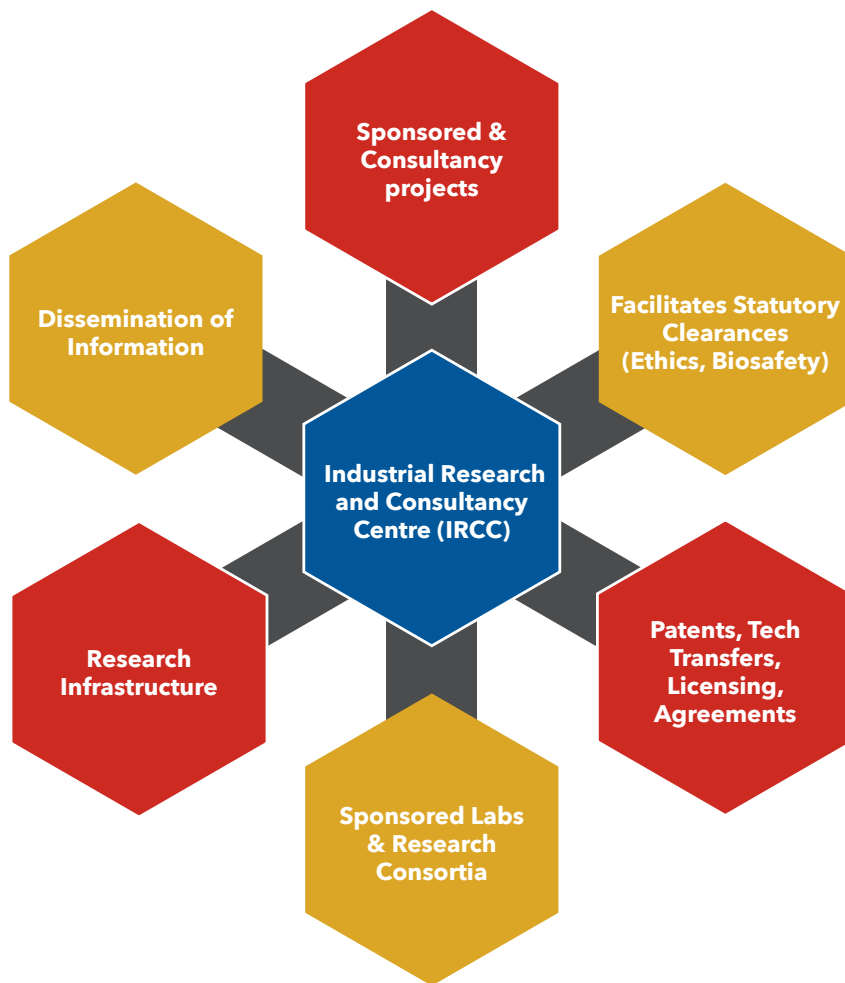
Indigenous system to produce oxygen from nitrogen generator



App for contact tracing



reBreather: Breathing device to enhance lifetime of O_2 cylinders



Consultancy Projects

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

Sponsored R&D Projects

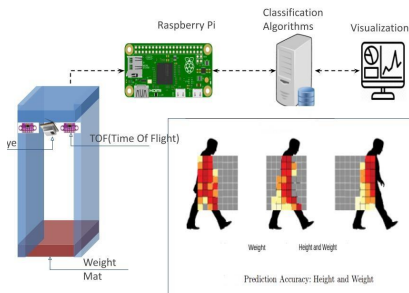
- Long term projects for new knowledge generation in current, emerging and futuristic areas
- Deliverables may include IP generation, manpower development and publications



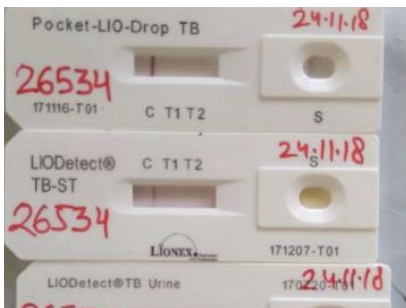
Laparoscopy instrument

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



Smart energy management systems



Affordable rapid tuberculosis tests



Pollution monitoring system

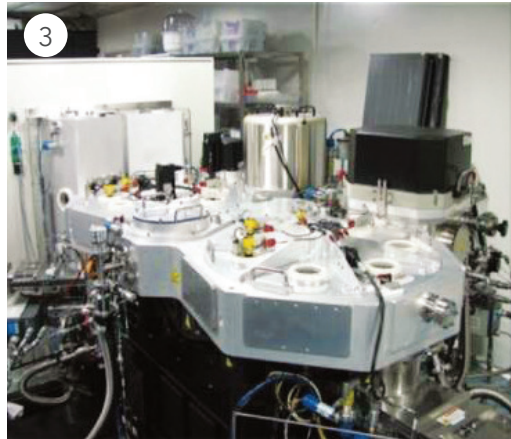
Some examples of collaborative research

Smart infrastructure	Synthetic chemistry
Renewable energy systems	Data analytics
Power system analysis	Corrosion studies
Biomedical devices	Cloud communications
Environmental impact assessment	Internet of things
Modeling and simulation	Rural technology
Structural characterisation	Photovoltaics
Energy storage device	Information and communication technology
Structural reliability	Artificial Intelligence
Steel technology	Sensors
Bio-systems engineering	Remote sensing and GIS
Communication network	Signal processing
Computer Aided Design & Manufacturing	Machining and machine tool design
Device and circuit performance	Air Conditioning and Refrigeration
Polymers	Catalysis
Semiconductors	Nanotechnology
Materials	Ergonomics
Financial engineering	Project management

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. **Applied Materials Manufacturing Laboratory** to promote research in nanoelectronics, nano-manufacturing and solar photovoltaic technology
4. **Parimal and Pramod Chaudhari Laboratory** for cell culture funded by Praj Industries, Pune for drug discovery, nanotechnology and microfluidics applications
5. **Srijati - TI Innovation Laboratory** for academic and research in analog IC applications, power management and embedded systems

Models for IP commercialisation at IIT Bombay

Collaborative development and licensing

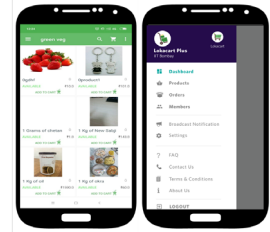
- Joint ownership of IP
- First option for exclusive licensing
- IP ownership to industry on mutually agreed terms



Smart ultrasonic water meter



Additives for better fuel efficiency



Lokart: Farm 2 Fork

Licensing of IP generated in the Institute

- IP generated through academic / unrestricted sponsored research
- Exclusive or non-exclusive license (preferred) offered to interested Industries



Safe formulations for hand and body sanitizers



Beagle-Z handheld explosive detector



Tapestry pooling for COVID-19 testing

Incubation / Entrepreneurship

- Through Society for Innovation and Entrepreneurship (SINE), the technology business incubator of IIT Bombay
- IIT Bombay IP taken up in the start-up companies, promoted by faculty, students and alumni
- IP licensed to incubatee companies

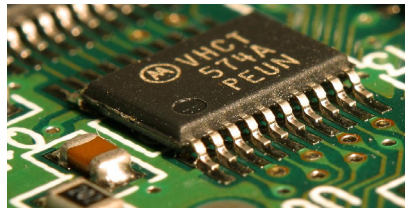


Consortia and Centres of Excellence at IIT Bombay

Centre for Machine Intelligence and Data Science

Centre for Machine Intelligence and Data Science (C-MInDS)

set up to nurture talent pool in artificial intelligence, Data Science, and related areas in different application domains



Nanoelectronics Network for Research and Application (NNetRA)

an initiative by Ministry of Electronics & Information Technology (MeitY) to push the frontiers of nanoelectronics through basic research in this field; to engage in nano electronic device and system



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 (SERIUS)

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



National Centre for Photovoltaic Research and Education (NCPRE)

Provides R&D and educational support for India's ambitious 100GW solar mission

Funded by Ministry of New & Renewable Energy, GoI



NCETIS
National Center of Excellence in
Technology for Internal Security
Indian Institute of Technology Bombay

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



Centre of Excellence in Steel Technology

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



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 Telecommunication, GoI



Parimal & Pramod Chaudhari Centre for Learning & Teaching

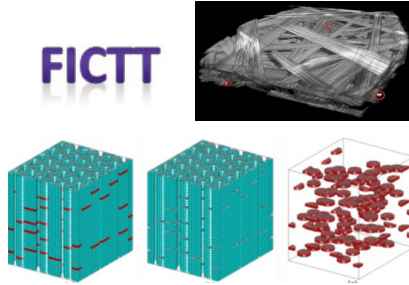
To facilitate and support pedagogy by promoting innovation, evidence-based practices and collaboration



Tata Centre for Technology and Design (TCTD)

Aims to develop solutions to challenges faced by resource constrained communities

Supported by Tata Trusts



Focus Incubation Centre in Technical Textiles (FICTT)

Initiative funded by Ministry of Textiles, Govt to serve as a translational platform

To work towards disruptive innovation in the field of technical textiles



Biomedical Engineering and Technology (Incubation) Centre BETIC

Integrated facilities for design, analysis, prototyping and testing of medical devices

Funded by DST & Govt of Maharashtra

Industry - Academia Partnership at IIT Bombay

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

Few examples:

- R&D partnership with industry to nurture talent pool in artificial intelligence and data science through C-MInDS
- IITB, EIL and PSU oil companies partner for capacity building through CoE in Oil, Gas & Energy
- Partnership between banking industry and IITB through Bank of Baroda Innovation Centre
- IITB and Ripple, a fintech company partner through CoE for Blockchain Research
- Industry affiliate program in the area of photovoltaics through NCPRE
- R&D collaboration in the area of propulsion technology through CoPT
- Industry partnership in aerospace innovation and research through NCAIR
- IITB, TCS and TCE consortia to offer software services for the power sector, to realise sectorial and organisational efficiencies
- Partnership between academia, hospitals and Industries in the healthcare domain through Healthcare Research Consortium
- Membership for R&D collaboration at CoEST in the area of steel technology
- Corporate affiliate program for research and technology development in bioengineering through Wadhvani Research Center for Bioengineering (WRCB)
- Research and outreach in AI, ML, Decision Sciences and Optimization through Technocraft Centre for Applied Artificial Intelligence (TCA2I)
- Collaboration in clinical applications, healthcare data management, healthcare analytics, healthcare AI/ML, consumer health, public health and public policy through Koita Centre for Digital Health

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

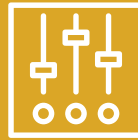


Pure Sciences & Mathematics

Chemistry, Physics, Mathematics, Applied statistics, Biosciences



Nanotechnology & Biomedical engineering



Systems and Control

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



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



Design

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



Policy studies



Healthcare Informatics



Geology & Geophysics



Entrepreneurship

Imparts a structured training to aspiring student entrepreneurs



Climate studies

Fundamental understanding and problem-centred analysis of climate change

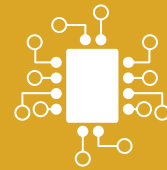


Energy



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



Environmental Science



Geoinformatics and Natural Resources Engineering



Humanities and Social Sciences; Economics



Urban Engineering

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



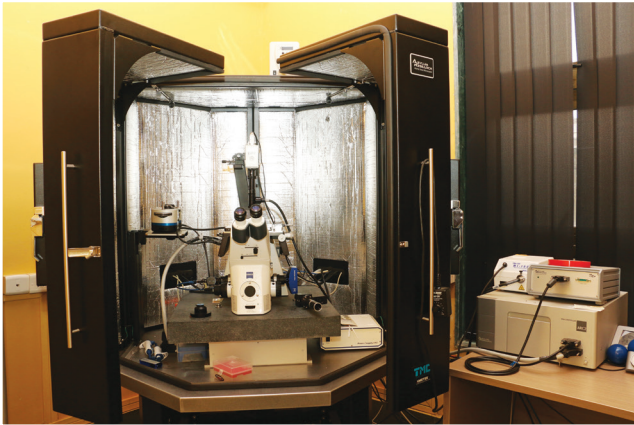
Liberal Arts, Sciences & Engineering



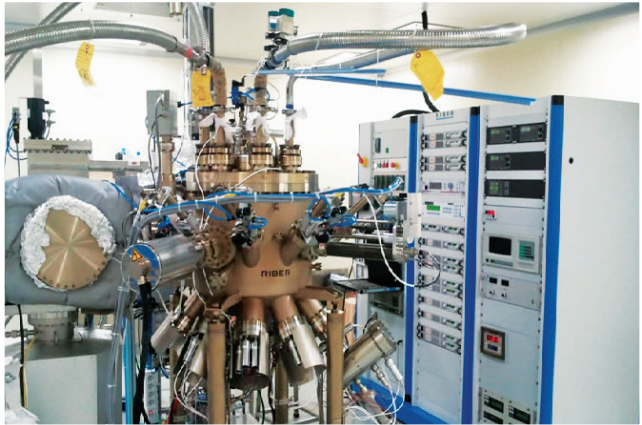
Management

Research Infrastructure at IIT Bombay

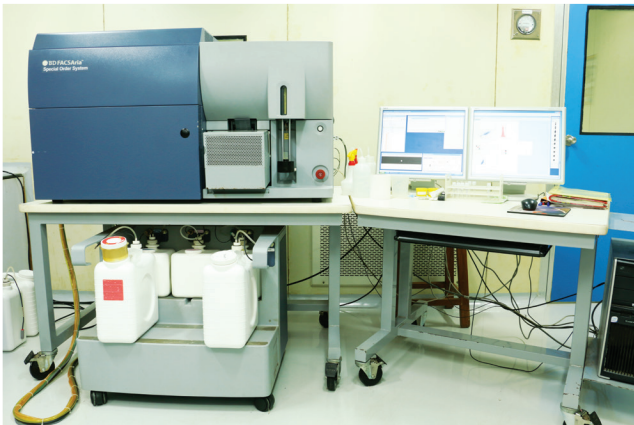
The institute provides high end infrastructure facilities and laboratories to support research activities. These facilities are open to external agencies as well.



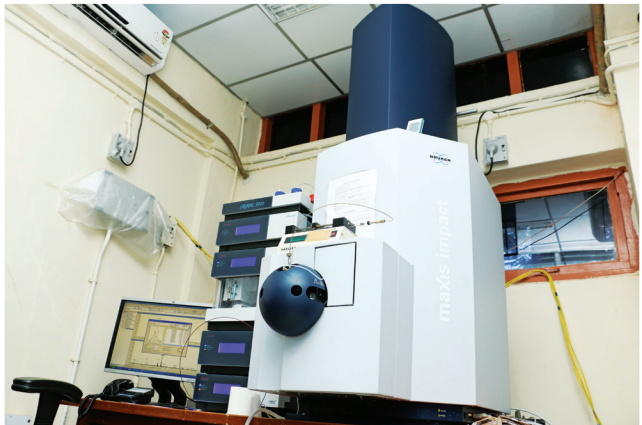
Bio-Atomic Force Microscope



Molecular Beam Epitaxial Growth System



Fluorescence Activated Cell Sorting



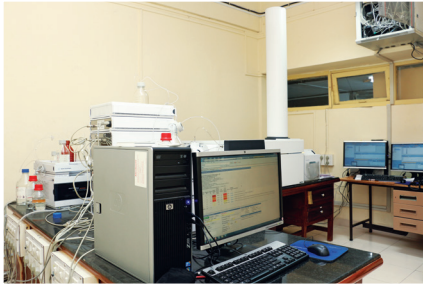
High Resolution Mass Spectrometer



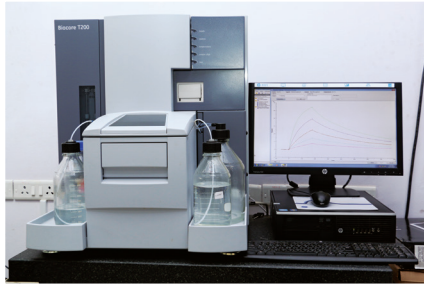
High Resolution XRD System



Environmental Scanning Electron Microscope



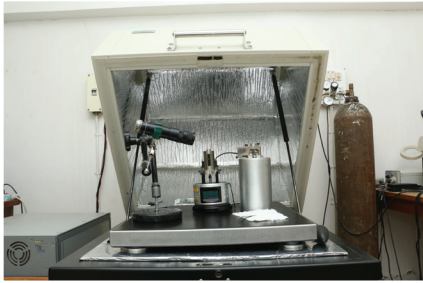
High Resolution Liquid Chromatography



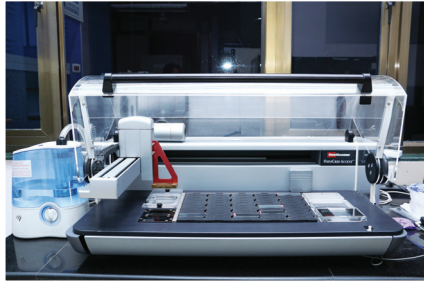
Surface Plasmon Resonance



Multi Frequency Electron Paramagnetic Resonance Spectroscopy



Scanning Probe Microscopy Facility



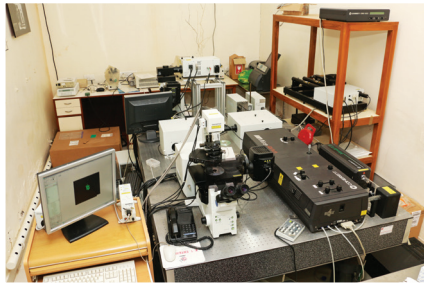
Microarrayer



Cryo High Resolution Transmission



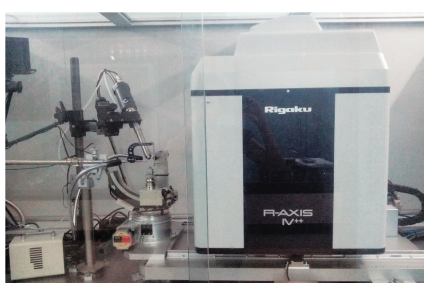
Field Emission Gun Based TEM



Confocal Microscope Facility

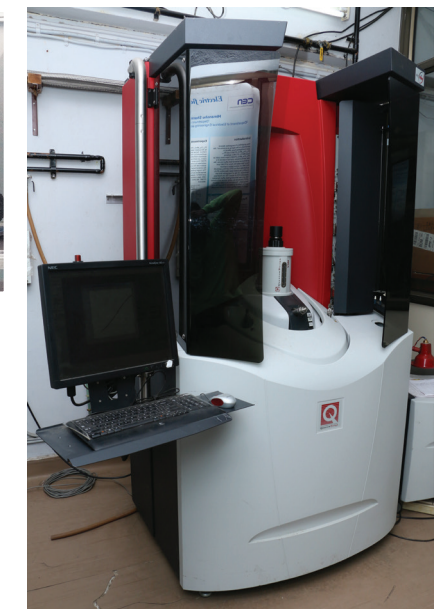


Nuclear Magnetic Resonance



Protein Crystallography

MALDI-TOF

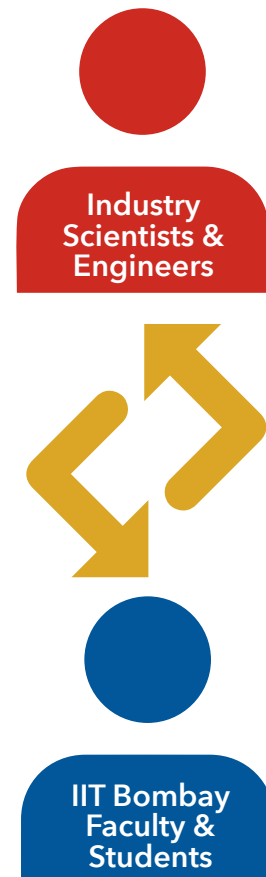


SQUID Vibrating Sample Magnetometer



IIT Bombay students on a visit to United Phosphorous Ltd.

Exchange Visits



IIT Bombay 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
- Customise
 - » Frequency of visit
 - » Duration of visit
 - » Scope of work

Industry personnel at IIT Bombay

- 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 IIT Bombay
- Non-credit based

Industry Sponsorships and Fellowships at IIT Bombay

Sponsored PhD and Masters Program

- Objective is to jointly promote research and 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:

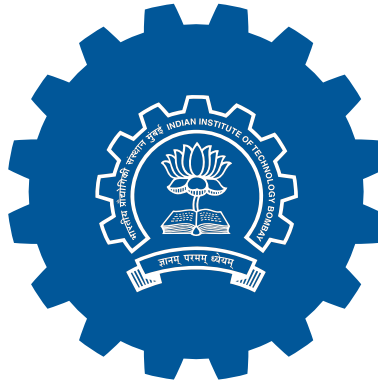
Year 1	Course Work
Year 2	MTech project working on a research problem identified by Industry; Student will graduate with MTech degree
Year 3	Continue to complete project work at IITB or field

Industry Sponsored Chair Professorship

Bank of Baroda Chair
KamalNayan 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 Wadhvani Chair
TATA Chair

Industry Sponsorship / Fellowship

Program	Duration	Amount (in ₹)
Post-Doctoral Fellow	Variable	55,000 - 85,000 per month (+ HRA as applicable)
PhD	5 years	23,00,000 + HRA as applicable (as per Visvesvaraya PhD Scheme)
MTech (2+1 Year Model)	2 years (Year 2 & 3)	13,00,000 (higher funding for Year 3 due to out of campus expenses)
Masters	2 years	7,00,000



JOHN DEERE



Mercedes-Benz



IIT Bombay at a Glance

Academic units	27
Research centres	25
Full time faculty	~700
Adjunct & visiting faculty	~150
Total Students	12,005
Undergraduate students	5020
Postgraduate students	6985 (PhD: 3,534)
Postdoctoral fellows	~350
Research project staff	~1500
R&D Funding for FY 2020-21	₹285.83 Cr
Patents, trademarks, copyrights filed in 2021	71
Technology transfers / deployment so far	~170
Total degrees awarded in 2021	2501 (PhD: 381)
Research publications since inception	~36,000
Research publications in 2020	2260
- Journal publications	1894
- Conference proceedings	366
Companies incubated since inception of SINE	~180

No. of industries currently
collaborating with IIT Bombay

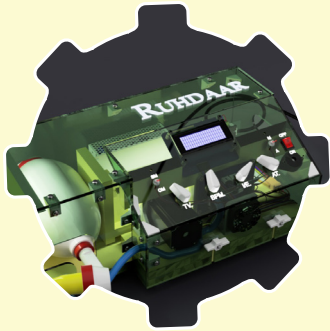
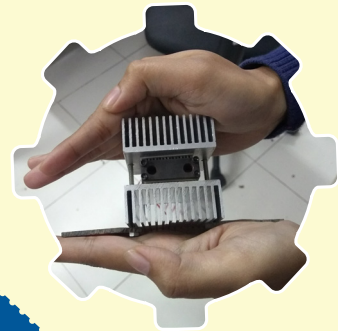
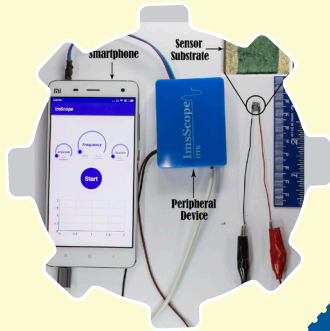
500+

No. of ongoing industry projects

700+



MoU signing with ExxonMobil



Dean (Research & Development)
Industrial Research and Consultancy Centre
(IRCC)

Indian Institute of Technology Bombay
Powai, Mumbai - 400076, INDIA
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www.ircc.iitb.ac.in

AUGUST 2021

