



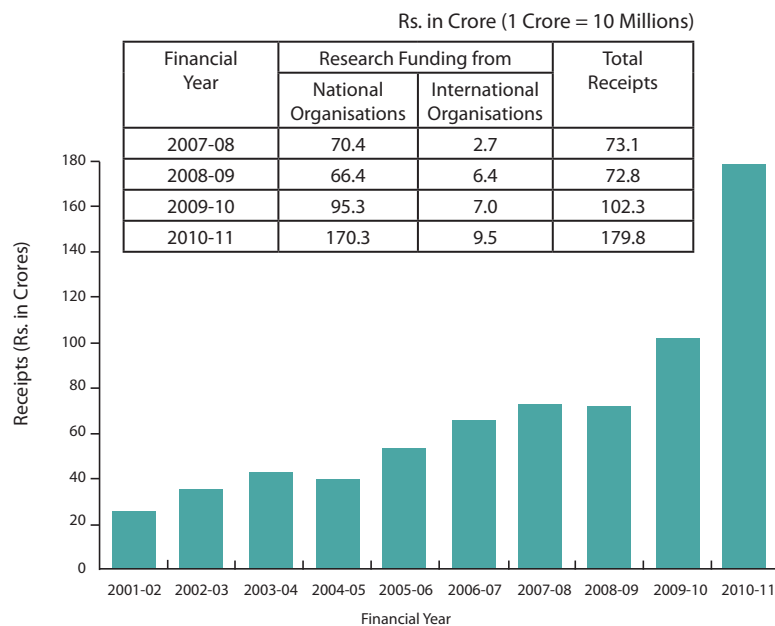
Indian Institute of Technology Bombay

Research & Development

IIT Bombay has seen significant growth in R & D funding, Ph.Ds, patents and publications in the last decade.

R & D Indicators

R & D Fund Growth



No. of Faculty (as on 31st May, 2011)	500
No. of PhD Degrees Awarded (in 2010)	179
No. of Post Graduate Degrees Awarded (in 2010)	849
No. of Under Graduate Degrees Awarded (in 2010)	663
No. of Publications (in 2010)	1226

Faculty Recognition

Shanti Swarup Bhatnagar Prize for Science and Technology	7
Padma Shri Award	1
Swarnajayanti Fellowship Award	8
Fellow, Indian Academy of Sciences, Bangalore	15
Fellow, Indian National Academy of Engineers, New Delhi	18
Fellow, The National Academy of Sciences, India (Allahabad)	22
Fellow, Indian National Science Academy, New Delhi	6

Intellectual Property

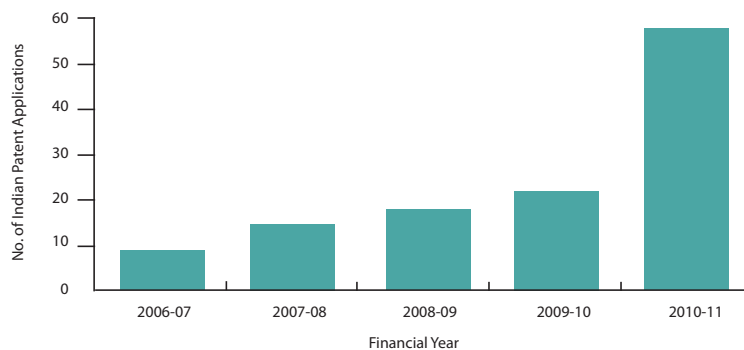
(From 1st January, 1997 to 31st May, 2011)

For the year 2010-11

Indian patent applications	202
Indian patents granted	68
Foreign patent applications (US, Europe, Japan & others)	49
Design Registrations	over 10

Indian Patent Applications	56
PCT Applications	10
US Applications	15
EU Application	1
Trademarks	3
Designs	6

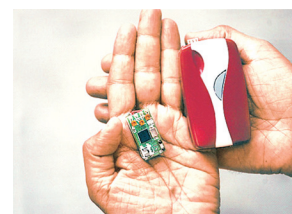
Patent Applications filed



Licensing activities - Representative Examples

Licensing of IP developed at IIT Bombay

- Board Games design
- CFD - Tutor
- Design analysis and simulation of batch distillation and pressure swing adsorption units
- Electro-Slag Refining Process
- Nano based epoxy coating
- Supercritical fluid extraction system design
- WebNC for product design and process planning for CNC machining
- V-trough concentrated module



Licensing through collaborative development

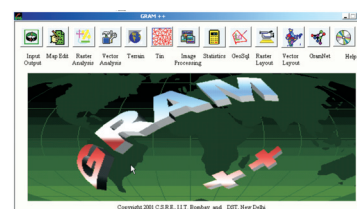
- Amplified Fluorescence Polymers as TNT sensors
- Asymmetric device applications in advanced CMOS technologies
- Design of ATM Enclosure – ASAN
- Fuel Additives-Thermal and Thermact technologies
- Laminated object manufacturing – rapid prototyping process
- Novel 3-in-1 heat pump for AC, hot water and potable chilled water
- Silicon locket for cardiac monitoring
- Steer-by-wire system for vehicle

Commercialisation through incubation

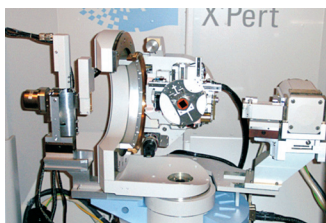
- InOpen Technologies Pvt. Ltd.
- Polymeric Sensors Pvt. Ltd.
- Sensi Bol Audio Technologies Pvt. Ltd.
- Vegayan Systems Pvt. Ltd.
- Vision Earthcare Pvt. Ltd.



For more technologies visit <http://www.iitb.ac.in/licensing>



R & D facilities



Texture & Orientation Imaging Microscopy



Scanning Probe Microscope



Physical Property Measurement System

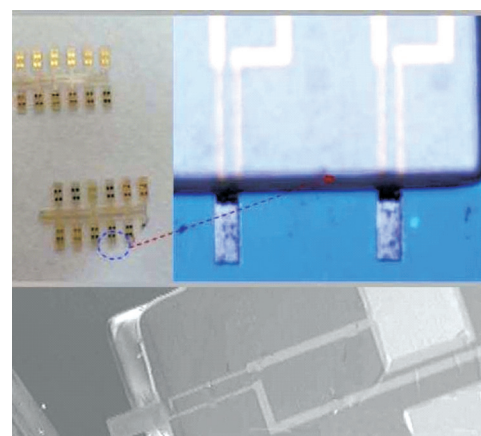
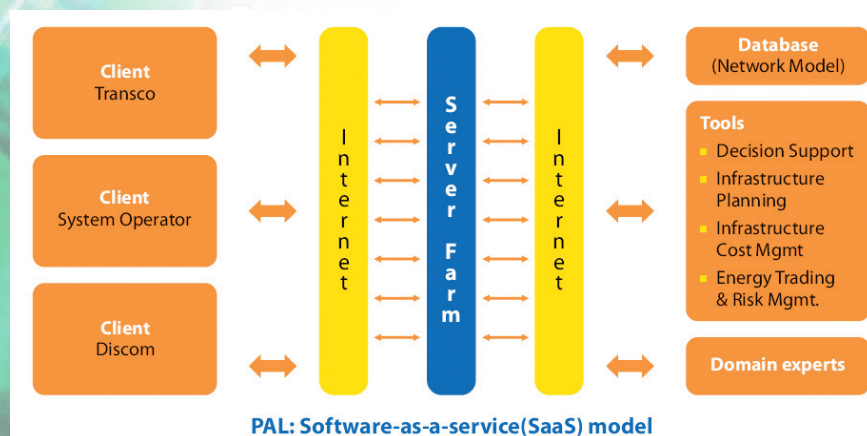


Geotechnical Centrifuge Studies Facility

- ^{40}Ar - ^{39}Ar Geo-thermochronology Facility
- Dielectric Broadband Spectrometer
- Electro-slag Refining Facility
- Gas Chromatograph High Resolution Mass Spectrometer
- NanoIndenter
- Single Crystal X- Ray Diffractometer facility

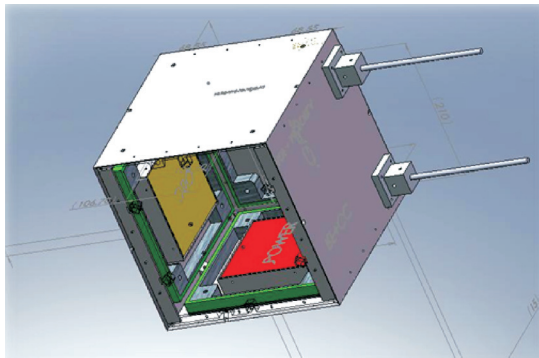
Research Centres / Consortia

- Centre for Aerospace System Design & Engineering
- Centre for Excellence in Nanoelectronics and Indian Nano Users Programme
- Centre for Formal Design & Verification of Software
- National Centre for Aerospace Innovation and Research
- National Centre for Photovoltaic Research and Education
- National Mission on Education through Information and Technology
- National Solar Thermal Research, Testing and Simulation Facility
- Tata Teleservices-IITB Centre for Excellence in Telecommunications
- Geospatial Information Science and Engineering Lab.
- Power Anser Laboratory for Developing Knowledge Based IT Solutions for Electric Power Systems
- VLSI Research Consortium
- IIT Bombay- Indira Gandhi Centre for Atomic Research (IGCAR) Research Cell
- ISRO- IIT Bombay Research Cell
- Interdisciplinary research efforts in Healthcare, Combustion and Water
- Climate Change Research Centre
- Rural Technology Action Groups
- Research Designs & Standards Organisation – IIT Bombay Research Cell
- Interdisciplinary research centre for security



Student Research Initiatives - An Example

Pratham – IITB student satellite project



About 40 students from several departments are involved
 Weight ~ 10 kg, Size: 26 × 26 × 26 cm, Orbit: 10:30
 polar sun-synchronous, 817 km altitude
 Payload : Total Electron Count using Faraday rotation, 2
 downlinks, No uplink, fully autonomous,
 4 months mission life.
 ISRO collaboration for hardware and launch.

Biosynth Project



30 member student team. On campus 300 L batch
 biodiesel plant for providing hands-on plant-scale
 experience to students by working on developing a
 process for synthesis of biodiesel from waste vegetable
 oil. Achieves the multiple aims of a research and
 teaching project coupled with a green energy initiative

Research Partners

Industry funding during FY 2010-11: ₹ 22.2 Crores

- No. of industries interacted : 323
- Average industry funding : ₹ 7 Lakhs

Indian Industry:

No. 301, Total Receipts: ₹ 16.4 Crores
 Amines & Plasticizers Limited, Tata Teleservices Limited, Chhaganlal Khimji & Co. Private Limited,
 Dow Chemical International Private Limited, Larsen & Toubro Limited, Mech World Eco, National
 Securities Depository Limited, Nokia India Private Limited, Bangalore, Reliance Infrastructure
 Limited,

International Organisations:

No. : 38, Total Receipts: ₹ 9.5 Crores
 Applied Materials Inc., USA, Holcim Foundation for Sustainable Construction, Switzerland,
 International Business Machines Corporation, USA, McDonnell International Scholars Academy,
 USA, Monash University, Australia, Semi Conductor Research Corporation, USA, Siemens Power
 Generation Inc. USA, University of Manchester, Xerox Corporation, USA

Research that makes a difference

IIT Bombay is now looking beyond traditional R & D metrics of publications, patents, funding and is putting efforts to promote research that makes a difference. An internal brainstorming exercise involving various stakeholders (faculty, students & staff) identified several initiatives to set the R & D Agenda.

Some R & D initiatives undertaken/proposed are

- Attract best students to research
- Show case / Publicize R & D achievements
- Encourage Collaborative Research
- Enhance Patenting & Technology Transfer
- Western Regional Research Pool



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