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## Introduction

### The IITs were built with a vision to provide technical personnel of international calibre, who would act as leaders in technology in independent India.

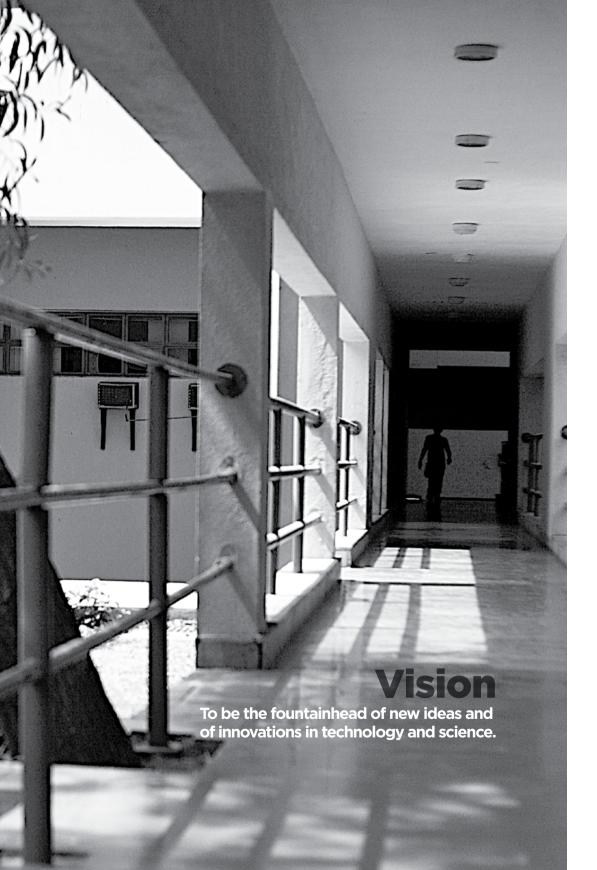
IIT Bombay, the second IIT to be set up (in 1958), was the first to be set up with foreign assistance. The funds came from UNESCO in the form of Rouble funds from Soviet Union. In 1961 the Parliament decreed IITs as 'Institutes of National Importance'. Since then, IITB has grown from strength to strength to emerge as one of the top technical universities in the world.

#### **ABOUT IIT BOMBAY**

Established in 1958, IIT Bombay has a total of 14 Academic Departments, 10 Centres, two Schools and three Interdisciplinary Programmes. It is recognised worldwide as a leader in the field of engineering education and research. It is reputed for the quality of its faculty and the outstanding calibre of students graduating from its undergraduate and postgraduate programmes.

Over the last five decades, more than 34,000 engineers and scientists have graduated from the institute. It is noted for its strong research groups in varied areas of science and technology that are making substantial contributions to national projects. Educational programmes here extend beyond the physical sciences and engineering into social sciences like English, Philosophy, Sociology, Economics and Psychology, including the recent School of Management. Over the years, the institute has also created a niche for its innovative short-term courses through continuing education and distance education programmes.

IITB enrolled 652 undergraduates, 1,102 postgraduate students and employed 495 faculty members in 2008-09. In 2008, a total of 1,605 degrees were awarded, which represents an 8.2% increase in the total number of degrees awarded in the previous

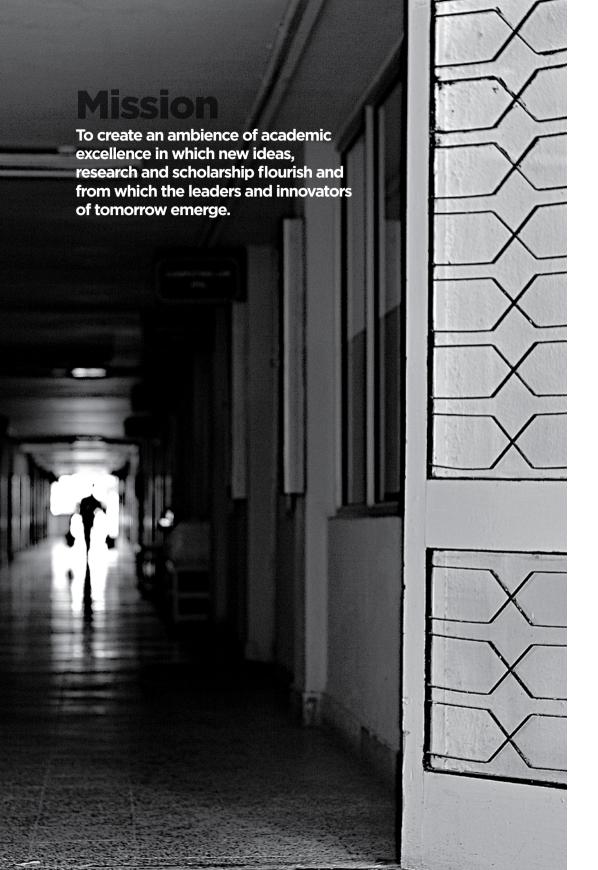


year (1,483). Of these, 200 were Ph.D, 658 were M. Tech, 53 were M.Mgt, 44 were M.Des, 15 were M.Phil, 116 were M.Sc and 511 were B.Tech students.

Nine Shanti Swaroop Bhatnagar awardees, 31 INAE (Indian National Academy of Engineering) awardees, two INAE Young Engineer awardees, 17 INSA (Indian National Science Academy) awardees, one Young Scientist awardee, 21 NAS (National Academy of Sciences) awardees, 19 IAS (Indian Academy of Sciences) awardees and seven Swarnajayanti fellows are currently or have previously been affiliated with the institute.

Residents at IIT Bombay have the twin advantage of being located at the financial capital of India while enjoying the serene environs of the campus located at Powai, situated in the northern suburbs of Mumbai, in Western India. It is a fully residential institution, with all its students staying on campus. They are accommodated in 13 hostels with in-house dining and excellent amenities for sports and other recreational facilities.

An island of dappled green, the campus at Powai is nestled amongst hills and flanked by the Powai and Vihar lakes. It is special both in terms of its physical beauty and location — a place where you could be away from the world, yet still be a part of it. Education and research are the twin pillars of this institute and the ambience is one in which new ideas and creativity can flourish.



#### **ADMINISTRATION AND OPERATION**

IIT Bombay is an autonomous institute and a deemed university. It is governed by a Board of Governors with its Chairman nominated by the Visitor (the President of India). It is guided by the IIT Council — a common apex body for all IITs — established by the Ministry of Human Resource Development (MHRD), Government of India.

The Director is the executive head of the institute. He is appointed by MHRD for a period of five years. He chairs the Senate, which is the authority on all academic matters, and is also a Member of the Board of Governors and of the IIT Council.

Two deputy Directors (Academic & Infrastructural Affairs and Finance & External Affairs) and seven Deans (Infrastructure Planning & Support, Research & Development, Academic Programmes, Students Affairs, Alumni & Corporate Relations, Faculty Affairs and International Relations) assist the Director in his executive roles.

The Senate comprises all the professors of the institute and a few nominated members. It is responsible for controlling the maintenance of standards of instruction, education and examinations and other allied academic matters.

The Registrar and senior officials in specific areas (Academic Affairs, Estate Management, Materials Management, Finance & Accounts, Administration, Personnel Training & Development and Publications & Public Relations) perform other administrative functions.

The Institute Advisory Council is a non-statutory body comprising eminent personalities from business, industry and academia, which reviews and makes suggestions on long-term policies and short-term goals.



## **Academic Structure**

# The academic structure of IIT Bombay exhibits the diversity, comprehensiveness, and depth befitting an institution of its age and stature.

IIT Bombay is academically organised into 14 Academic Departments, ten Centres, two Schools and three Interdisciplinary Programmes. On an average, it admits 650 candidates for the undergraduate programmes and 1,050 candidates for different Ph.D/Postgraduate programmes every year.

#### **ACADEMICS AT IIT BOMBAY**

The programmes and courses offered at the institute have the flexibility to evolve and change in response to new requirements. They serve the dual purpose of building a solid foundation of knowledge and of enhancing confidence, creativity and innovation in its students.

A unique attribute of IIT Bombay's academic structure is the autonomy enjoyed by faculty in designing and structuring courses and curriculum. All courses, however, need to be approved by the senate. A favourable student-teacher ratio ensures productive, personal contact between the student and the teacher.

Finally, credit-based academic programmes offer flexibility to students to progress at their own pace. This system ensures an academic programme which is dynamic, constantly evolving and which reflects the institute's commitment to stay in tune with the expanding frontiers of knowledge worldwide.



#### **ACADEMIC PROGRAMMES**

All engineering departments (along with the Department of Physics) offer a B.Tech degree. The engineering departments also offer a five-year Dual Degree programme which is a Bachelors and Masters programme combined together. On its completion, a student can leave with two degrees instead of one.

At present, undergraduate, postgraduate and doctoral programmes are offered by Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Earth Sciences, Energy Science & Engineering, Electrical Engineering, Mechanical Engineering, Metallurgical Engineering and Materials Science department, and also by certain interdisciplinary groups.

The Industrial Design Centre of the institute offers a two year M.Des programme in Industrial Design, Visual Communication, Interaction Design and Animation, and a Ph.D in Design.

An M.Sc and Ph.D in Applied Geology, Chemistry, Mathematics and Physics, and an M.Sc in Applied Statistics and Informatics is offered by the respective departments.

The Department of Physics also offers a four year B.Tech in Engineering Physics. Both the Department of Physics and Energy Science & Engineering also offer a M.Sc-Ph.D Dual Degree.

The institute has a Humanities & Social Sciences Department that offers doctoral programmes and a two-year M.Phil.

The Centre for Studies in Resources Engineering (CSRE) offers a two-year M.Tech in Natural Resources Engineering.

Interdisciplinary programmes (IDP) in Industrial Engineering & Operations Research and Systems & Control Engineering offer Ph.D and M.Tech.

The IDP group of Corrosion Science & Engineering, which offers M.Tech and Ph.D, runs under the Department of Metallurgical Engineering & Materials Science.

The Shailesh J. Mehta School of Management offers a two year Master of Management degree and a doctoral programme. The School of Management also conducts a wide range of courses for undergraduate and postgraduate programmes.

The School of Biosciences & Bioengineering offers M.Sc in Biotechnology and Ph.D and M.Tech programmes in the interdisciplinary field of Biomedical Engineering.

Centre for Technology Alternatives in Rural Areas offers a two year M.Tech in Technology & Development, in addition to a doctoral programme.

The Quality Improvement Programmes (QIP) at IIT Bombay enable teachers from different engineering colleges to upgrade their skills by enrolling for the institute's PG and doctoral programmes, while the Continuing Education Programme (CEP) organises short-term intensive courses for practicing engineers, in an attempt to meet the manpower training and knowledge upgradation needs of industry.

Finally, the postgraduate diploma of IIT (DIIT) is offered through the Distance Education mode.

#### **DEPARTMENTS AT IIT BOMBAY**

#### **Engineering Departments**

The engineering departments at IIT Bombay offer undergraduate and postgraduate programmes leading to B.Tech, M.Tech or Ph.D degrees. The five-year Dual Degree programme pioneered by the institute in 1996, offers a B.Tech degree in a basic discipline and an M.Tech degree with specialisation in a field on its completion. This programme is now offered by all engineering departments.

#### **AEROSPACE ENGINEERING**

Established in 1966-67 as the Department of Aeronautical Engineering, this department was renamed the Department of Aerospace Engineering in 1992. The department has a total of 20 faculty members, and runs strong undergraduate and postgraduate programmes in Aerospace Engineering. The curriculum focuses on fundamentals of science and engineering related to aerospace vehicles with a strong mechanics core as well as higher level courses and electives related to specific areas within the field such as Vehicle Structures, Aerodynamics, Propulsion, Flight Dynamics, and Control & Design. The curriculum and teaching is backed by an equally strong focus on research and development, both basic and applied, in these and related areas of aerospace sciences and engineering. Some of the major areas are Computational Fluid Dynamics & Electromagnetics, Experimental Aerodynamics, Composite Materials & Structures, Structural Mechanics, Dynamics & Aeroelasticity, Structural Health Monitoring, Heat Transfer & Infrared Signatures, Turbomachines, Combustion, Air Transportation, Multidisciplinary Design Optimisation, Autonomous Mini & Micro Aerial Vehicles, etc. The department houses two Centres of Excellence funded by the Aeronautics Re-



search & Development Board, Government of India, namely, the Associate Centre for Computational Fluid Dynamics and the Centre for Aerospace Systems Design & Engineering. The department maintains very close links with aerospace industries, R&D organisations and defence organisations involved in aerospace activities in India and institutions abroad. The faculty has contributed to technology development and consultancy for several national programmes, for example, the Light Combat Aircraft. Good experimental facilities such as several wind tunnels (subsonic, supersonic, hypersonic), MAV laboratory, materials and structural testing laboratory, vibration and smart structures laboratory, ballistic impact and high strain rate testing, turbomachines and combustion laboratories, etc. The student association, AEA, is very active and organises an annual student festival called *Zephyr* in October, besides several other technical activities. The students of the department are leading an institute-wide initiative of designing and developing a nano-satellite called *Pratham*. It is to be launched by ISRO, and will involve students from all departments.

For more information visit http://www.aero.iitb.ac.in/home

#### CHEMICAL ENGINEERING

One of the original departments to be established in 1958, the Department of Chemical Engineering is recognised as a leading one, primarily because of its strong academic programme, large faculty strength and the breadth of its research areas. Along with the core fundamental areas of Chemical Engineering, the department has also consolidated its team strengths in Computer-Aided Design & Controls, Polymers & Materials, Nanotechnology and Food & Bio-process Engineering in recent years. Today, the department boasts of a wide range of sophisticated computational and experimental facilities, and has a total of 33 faculty members. The department festival — *Azeotropy* —is organised in the last week of March.

For more information visit http://www.che.iitb.ac.in/online

#### CIVIL ENGINEERING

The Department of Civil Engineering has been a part of IIT Bombay since its inception in 1958. Over the years, the department has grown tremendously, and is now recognised as one of the major engineering departments in the country. It has developed strong links with the building and construction industry and the academia, both inside and outside the country. Besides high quality teaching and instruction at both UG and PG levels, the department is actively involved in basic and applied research. With its multifaceted faculty, it provides technical advisory support through various R&D projects and consultancy to infrastructural industry, academic and research institutions. At present, the department has a strength of

34 faculty members in the following five areas: Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Transportation Systems Engineering and Remote Sensing & Photogrammetric Engineering.

For more information visit http://www.che.iitb.ac.in/online

#### COMPUTER SCIENCE AND ENGINEERING

The first computing activity in IIT Bombay started with the arrival of the Russian Minsk II computer in 1967. For a long time, this department was a part of the Electrical Engineering Department. A separate department (the Department of Computer Science and Engineering, or CSE) finally came into existence in 1982 with 22 faculty members. At that point in time, it was the largest CSE department in the country. In November 2006, the CSE department and the Kanwal Rekhi School of Information Technology merged to form a single Department of Computer Science and Engineering.

The department offers opportunities to students to carry out research in the following areas: Algorithms & Complexity, Artificial Intelligence, Computer Graphics, Computer Networks, Computer Vision, Database Systems, Embedded Systems, Machine Learning or Data Mining, Operating Systems & Formal Verification, Programming Language and Compilers. There are many attractive fellowships for its M.Tech, Dual Degree and Ph.D programmes. The department has a total of 34 faculty members and 526 students.

For more information visit http://www.cse.iitb.ac.in

#### **ELECTRICAL ENGINEERING**

Since its inception in 1958, the Electrical Engineering Department at IIT Bombay has been active in teaching and research. The department has a total of 44 faculty members engaged in teaching, research and consultancy activities in a wide spectrum of areas. It is equipped with the latest experimental and computational facilities and at present, it offers the following five broad areas for specialisation: Communications & Signal Processing, Control & Computation, Power Electronics & Power Systems, Microelectronics & VLSI Design and Electronic Systems. For more information visit http://www.ee.iitb.ac.in

#### **ENERGY SCIENCE AND ENGINEERING**

Energy Systems Engineering (ESE) was founded in 1981 as an interdisciplinary group at IIT Bombay, offering M.Tech and Ph.D programmes. In 2007, the Board of Governors of IITB approved the growth of Energy Systems Engineering into a Department of Energy Science & Engineering (DESE). This new department aims to provide manpower and research inputs that are critical for the growth of In-

dia's energy sector, and also aims to provide innovative energy technologies and systems to mitigate the global problem of climate change. Currently, the department offers an integrated M.Sc-Ph.D programme in Energy Systems and also a Dual Degree B.Tech (Energy Engineering) and M.Tech (Energy Systems Engineering). Currently, there are ten core faculty and about 30 associated faculty members from across the institute.

For more information visit http://www.ese.iitb.ac.in

#### MECHANICAL ENGINEERING

The Mechanical Engineering Department (which also began in 1958, like the Civil Engineering department) is by far the largest department at IIT Bombay. It has a total of 42 faculty members involved in teaching and research, ably supported by as many as 20 laboratories. The department offers opportunities to its students for carrying out research in the following areas: Thermal & Fluids Engineering, Design Engineering, Manufacturing Engineering, Industrial Engineering and Operational Research. Apart from the classical areas of Mechanical Engineering, the department has recently decided to focus its major research efforts in the following five areas: Computational Mechanics, Nuclear Thermal Hydraulics, CIM, Refrigeration, A/C & Cryogenics, and MEMS, NEMS & Mechatronics.

For more information visit http://www.me.iitb.ac.in

#### METALLURGICAL ENGINEERING AND MATERIALS SCIENCE

The Department of Metallurgical Engineering & Materials Science emerged out of a merger between the erstwhile Metallurgical Engineering Department, and the interdisciplinary programme on Materials Science. Today, it is one of the best departments in the country for materials education and research in areas like advanced steel making, metal forming, thin films and devices, electronic materials, mechanical behaviour of materials, advanced composites, surface engineering, materials for health care, nanomaterials, polymer engineering and materials modelling and design. The department runs undergraduate, postgraduate and Ph.D programmes with various specialisations in Materials Engineering. The faculty members address various important and challenging issues, at the forefront of materials science and technology. The underlying philosophy of this department is to apply principles of basic sciences and engineering to understand the behaviour of materials, and then to apply this understanding to develop technologies of national importance in energy, defence, health care, space and agriculture.



#### **DEPARTMENTS AT IIT BOMBAY**

#### **Science Departments**

The Science departments at IIT Bombay were set up to provide basic grounding in Science and Mathematics to engineering students. However, apart from providing core courses in undergraduate programmes, these departments also offer postgraduate courses which lead to M.Sc or Ph.D.

#### **PHYSICS**

The Physics Department is as old as IIT Bombay itself — a venerable fifty years of age. The department has a tradition of vibrant teaching and offers many research programmes. Research work in the department encompasses Condensed Matter Physics, Laser & Optics, Nuclear Physics, High Energy Physics and Statistical Physics in the theoretical as well as experimental domains. The department offers many programmes in Engineering Physics — B.Tech/Dual Degree, B.Tech and M.Tech, with a specialisation in Nanoscience. This unique course blends all that is best in the areas of contemporary physics and engineering sciences to create professionals who are equally comfortable with science and technology. The department was the first in the country to offer this exciting course, and since then, many other institutions in the country have followed suit. A two year M.Sc programme is also offered by the department. It also offers a Dual Degree programme of M.Sc and Ph.D in Physics. The department has a total of 28 faculty members. For more information visit http://www.phy.iitb.ac.in

#### **CHEMISTRY**

From a small department that started in 1965, the Department of Chemistry at IIT Bombay has grown into a major centre for teaching and research in the chemical sciences in India. The department is well-equipped to do both basic and applied research. It has over 30 research laboratories in varying areas of research, ranging

from Theoretical Chemistry to Biological Chemistry. At the B.Tech level, the department offers core laboratory and theory courses covering basic concepts in the various sub-disciplines of Chemistry (physical, inorganic and organic). Besides these, the department routinely runs minor Chemistry and preparatory programmes.

In addition to a two year M.Sc programme, the department offers a unique five-year integrated Master's programme, where students are selected through JEE. A two-year M.Sc programme (for four semesters) is also offered for post-B.Sc students. Its entrance is through JAM. Finally, there is the conventional Ph.D programme. The department has a total of 30 faculty members and 290 students. For more information visit http://www.chem.iitb.ac.in

#### **MATHEMATICS**

The Department of Mathematics (also started in 1958) conducts basic, applied and interdisciplinary research in varied areas of Mathematics, including Algebra & Number Theory, Analysis, Geometry & Topology, Combinatorics & Theoretical Computer Science, Partial Differential Equations & Numerical Analysis, and Probability & Statistics. The department has 32 faculty members. It offers two main programmes — a Master's degree in Mathematics and Applied Statistics & Informatics, and a Ph.D programme. The department also offers two minor area programmes in Mathematics and Statistics for students pursuing B.Tech. For more information visit http://www.math.iitb.ac.in

#### EARTH SCIENCES

The Department of Earth Sciences was constituted in 1982 from the erstwhile Geology Section of the Department of Civil Engineering. Before that, it used to run the M.Sc programme in Applied Geology from 1964. Now, as a separate department, it offers academic programmes leading to M.Sc in Applied Geology & Applied Geophysics, and M.Tech in Geo-exploration and Petroleum Geoscience. In addition to this, it also offers doctoral degrees.

The department has a total of 17 faculty members, and research work in the department encompasses Active Tectonism, Fluid & Melt Inclusion Research, Geochemistry, Geomagnetism and Electromagnetism, Geothermics, Geostatistics, Gravity, Seismotectonics & Geodynamics, Hyperspectral Remote Sensing, Igneous Petrology, Isotope Geology, Metamorphic Petrology, Micropaleontology, Mineralogy, Ore Petrology, Organic Geochemistry, Petroleum Geology, Rock Engineering, Sedimentology, Seismology, Structural Geology and Volcanology. For more information visit http://www.geos.iitb.ac.in

#### **HUMANITIES AND SOCIAL SCIENCES DEPARTMENT**

The Department of Humanities & Social Sciences was founded in 1958. At present, the department has six disciplines: Economics, English, Philosophy, Psychology, Sanskrit and Sociology. It offers a vast range of courses at various levels, based on the belief that education in science and technology is incomplete without a study of liberal arts and social sciences. It also aims at empowering students with a high degree of communication skills. The department offers compulsory and elective courses at both UG and PG levels. It conducts a two year M.Phil programme in Planning & Development and a Ph.D programme. The department has a total of 34 faculty members.

For more information visit http://www.hss.iitb.ac.in



#### **DEPARTMENTS AT IIT BOMBAY**

#### **Schools**

The schools offer postgraduate programmes in new, emerging areas and aim to expand the scope of the academic programmes in the institute. They have been set up with substantial support from IIT Bombay alumni and industry. The Kanwal Rekhi School of Information Technology (KReSIT) merged with the Computer Science & Engineering Department in the year 2006.

#### SHAILESH J. MEHTA SCHOOL OF MANAGEMENT (SJMSOM)

To promote interdisciplinary learning and to keep up with the changing environment, IIT Bombay established its management school in 1995, with the objective of transforming professionals with technological background to the 'Renaissance Leaders' of tomorrow. In the year 2000, the school was renamed as Shailesh J. Mehta School of Management. Ranked high amongst the business schools of the country, SJMSOM offers Master of Management and Ph.D programmes. It also conducts Management Development Programmes (MDPs), an executive programme aimed towards developing and maintaining a strong interface with the industry. The programme enables the school to identify current trends in business processes. Its strengths are knowledge creation through research and case development. The school has a total of 19 faculty members. For more information visit http://www.som.iitb.ac.in

#### SCHOOL OF BIOSCIENCES AND BIOENGINEERING

The School of Biosciences & Bioengineering (Bioschool) is a nodal centre of excellence for furthering multidisciplinary efforts in biology-related areas, addressing both fundamental and applied aspects of biology. It mainly comprises of four



areas representing Biotechnology, Biomedical Engineering, Chemical Biology and Biochemical Engineering. The school aims at creating an international impact in bio-related areas and trains leaders in this field under its postgraduate programmes, viz., M.Sc, M.Sc-Ph.D Dual Degree, M.Tech and Ph.D. The M.Tech programme is unique in the sense that it provides an entry point for medical doctors (MBBS) to work together with engineering students and obtain an engineering degree. As a part of their curricula, M.Sc, M.Sc-Ph.D Dual Degree and M.Tech students are involved with ongoing research projects at the Bioschool. The diverse areas of research include Metabolic Engineering, Microtubule Dynamics as a target for anti-cancer drugs, Neurophysiology, Prokaryotic & Eukaryotic Gene Regulation, Signal Transduction, Carbohydrate Biology, Lipid Biology for drug delivery and BioMEMS. The school admits graduates from science, engineering as well as medicine to its programmes. At present, there are a total of 15 faculty members at the school.

For more information visit http://www.btc.iitb.ac.in



#### **DEPARTMENTS AT IIT BOMBAY**

#### **Centres/Interdisciplinary Groups**

The centres and interdisciplinary groups offer postgraduate programmes and reflect the institute's multidisciplinary approach and emphasis on staying with leading-edge technologies in its academic approaches.

#### INDUSTRIAL DESIGN CENTRE

Set up in 1969, the Industrial Design Centre (IDC) offers an excellent environment for academics, research and applications in the field of design. It has M. Des and Ph.D programmes in the areas of Industrial Design, Visual Communication, Interaction Design and Animation. A doctoral programme in Design began from July 2005. The centre has a total of 19 faculty members. The education programme is a unique mix of pedagogic experimentation with a pragmatic design approach and blends hard-core problem solving with design research. New thoughts, philosophies and research on several aspects of design are experimented and integrated, to have a continuous revitalisation of the academic programmes at the centre. In the area of design practice, IDC offers professional design consultancy and advisory services to industries and other organisations.

For more information visit http://www.idc.iitb.ac.in

#### **CENTRE FOR ENVIRONMENTAL SCIENCE & ENGINEERING**

The Centre for Environmental Science & Engineering (CESE) at IIT Bombay was established in 1985. CESE has a dedicated group of faculty members with multidisciplinary backgrounds and interests. Currently, CESE offers M.Tech and Ph.D programmes in Environmental Science & Engineering which are interdisciplinary in nature. These programmes consist of course work followed by a re-

search project. The programmes and activities are focused towards addressing the needs and challenges of major industrial sectors and international agencies like WB and USEPA. CESE has plans for expansion of teaching and research activities, and is looking to increase the strength of its existing M.Tech and Ph.D programmes. In addition to this, two new programmes, an M.Sc-PhD Dual Degree and a B.Tech-M.Tech Dual Degree, have been approved and will be initiated in the near future. The research at the centre is in the fields of Aerosols & Air Quality, Water & Wastewater, Environmental Biotechnology, Clean Technology, Environmental Impact Assessment and Novel Technologies for Industrial & Hazardous Waste Management. CESE has established strong links with leading industries, academic institutions and with national and international agencies through sponsored research projects, consultancy projects and collaborations. For more information visit http://www.cese.iitb.ac.in

#### CENTRE OF STUDIES IN RESOURCES ENGINEERING

Since its inception in 1976, the centre has been actively involved in developing Remote Sensing Technology and its application to Natural Resources Management and Environmental Monitoring. Thrust areas at the centre are Agro-Informatics & Rural Development, Atmospheric Remote Sensing, Coastal & Marine Environment, Computer Vision and Graphics, Digital Image Processing, Digital Photogrammetry, Geographic Information Systems, Microwave Remote Sensing, Multimedia Educational Content Development, Natural Hazard Assessment & Mitigation, Snow, Avalanche & Glacial Studies, Terrain Evaluation and Water Resources Studies (surface and groundwater). The centre has a total of 12 faculty members. It offers M.Tech and Ph.D programmes in Natural Resources Engineering, and carries out sponsored research and consultancy in the fields of Natural Resources Management and Geo-Informatics.

For more information visit http://www.csre.iitb.ac.in

#### CENTRE FOR TECHNOLOGY ALTERNATIVES FOR RURAL AREAS

Centre for Technology Alternatives for Rural Areas (CTARA) was established at IIT Bombay in 1985, for the purpose of responding to the technological needs in rural areas. The centre has been working on developing and disseminating technologies from diverse fields that are relevant to the rural areas. The centre offers M.Tech (Technology & Development) and Ph.D programmes. Students are exposed to techniques of resource assessment, the needs of our rural population and possible technological interventions for regional developments. In addition to the courses and research projects, field visits and field work are essential components of the programme.

For more information visit http://www.me.iitb.ac.in/ctara

#### CENTRE FOR FORMAL DESIGN AND VERIFICATION OF SOFTWARE

The centre was started in 1999 with the broad aim of carrying out R&D activities in the area of quality software development, with a special focus on formal verification techniques for safety-critical applications. Formal verification methods are founded on rigourous mathematical techniques, and hence enable development of quality software.

For more information visit http://www.cfdvs.iitb.ac.in

#### INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH

Established as the first interdisciplinary programme in IIT Bombay, the IEOR programme is the first of its kind in India, involved in teaching and research in the areas of Optimisation, Stochastic models, Stochastic control, Simulation, Game Theory, Artificial Intelligence, System Dynamics, Statistical techniques and their applications. The application areas include Logistics & Supply-chain management, Transport, Communication systems, Finance, Service sector and Quality & Operations management. Faculty and students have diverse backgrounds with degrees in various disciplines of engineering and science. IEOR has five core faculty members and many associate faculty members. The group has been offering M.Tech and Ph.D programmes since its inception and from 2009, it will be offering a Dual Degree M.Sc-Ph.D in Operations Research.

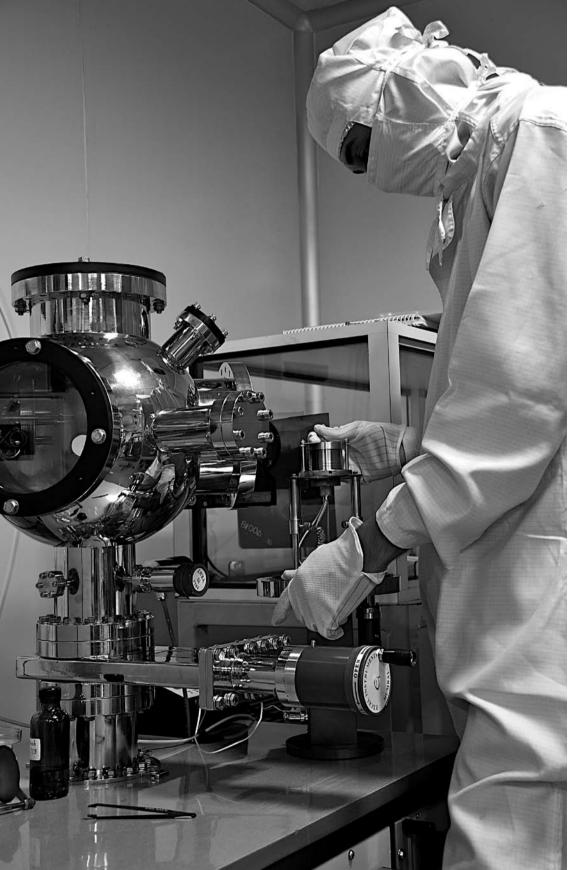
#### SYSTEMS AND CONTROL ENGINEERING

Systems & Control engineering is a broad, multidisciplinary area concerned with modelling of physical systems, analysis of their behaviour and the design of controllers which influence that behaviour to take some desired form. It touches all divisions of engineering, Applied Mathematics and other application areas such as Economics. Early on during its evolution, IIT Bombay recognised the importance of this multidisciplinary area. For this purpose, a Systems and Control (SYSCON) engineering programme was formed as a separate postgraduate programme in 1977. Currently, the group has four faculty members and offers Masters and Doctoral level courses. Major research areas are Modelling & Simulation of Dynamic Systems, Global & Dynamic Optimisation, Artificial Intelligence, Systems Theory, Controls Theory & Applications and Scientific Computing.

For more information visit http://www.sc.iitb.ac.in

#### CORROSION SCIENCE AND ENGINEERING PROGRAMME

Corrosion Engineering plays a pivotal role in major issues being faced by our world today, namely, energy, environment and conservation of the environment. In addition, Corrosion Engineering is an integral part of plant reliability, safety and profitability of any industry. Corrosion Science & Engineering, being a mul-



tidisciplinary area, requires expertise from diverse disciplines such as Materials, Chemical and Mechanical Engineering. Realising this, IIT Bombay started an independent postgraduate programme in Corrosion Science and Engineering in 1982. From then onwards, this programme has grown from strength to strength. It has a well-tailored academic programme leading to a Master's degree in Corrosion Science & Engineering. It has greatly matured R&D activities, which have developed strong links with industries. In its R&D activities, the programme addresses corrosion mechanisms, development of corrosion-resistant materials, protective coating and industrial failure analysis. The programme has attracted large research grants from various funding agencies and industries and has also established interactions with leading institutes from around the world. In addition, the programme offers training programmes for industry personnel. The masters and Ph.D students are greatly sought after by industries, R&D institutions and academic institutions. The Corrosion Science and Engineering programme is well-poised to take up any challenging corrosion R&D activities.

#### CENTRE FOR RESEARCH IN NANOTECHNOLOGY AND SCIENCE

IIT Bombay is one of the leading institutions in the country for research in the area of Nanotechnology. It has recently consolidated its Nanotechnology research activities through the formation of a Centre for Research in Nanotechnology & Science (CRNTS). At present, over 45 faculty members from nine different departments and schools are working together in the broad area of Nanotechnology. The centre currently offers a Ph.D in Nanotechnology & Science. Students are admitted from diverse backgrounds, such as Engineering, Science and Life Sciences. As this programme is interdisciplinary in nature, each Ph.D candidate is guided by two faculty members, preferably from any two different departments of the institute. Major research areas are Nanomaterials, Nanobiotechnology, Nanoelectronics, Nanofluidics, Nanosensors, Nanomanufacturing, NEMS and computational research in Nanotechnology.

For more information visit http://www.iitb.ac.in/crnts



#### **ADMISSIONS**

The institute provides the best, and it ensures that its students are also of exceptionally high quality. Admission to IIT Bombay is enabled through its various entrance examinations, like the Joint Entrance Examination (JEE) for the undergraduate programme, the Graduate Aptitude Test in Engineering (GATE) for postgraduate programmes, the Common Entrance Examination for Design (CEED), MET for M.Phil, JMET for the Master of Management programme and JAM for M.Sc and M.Sc-Ph.D Dual Degree programmes.

For further information, please visit:

**ACADEMIC** www.iitb.ac.in/academic

JEE www.jee.iitb.ac.in
GATE www.iitb.ac.in/pge
JAM www.iitb.ac.in/Jam

Applications of foreign nationals (nominated by the Government of India under the Cultural Exchange Fellowship Programmes) and of self-financing foreign nationals shall be entertained for all programmes, provided that they satisfy the minimum eligibility criteria for admission as prescribed by the institute.

#### **ADMISSION FOR FOREIGN NATIONALS**

Foreign students interested in pursuing their undergraduate studies at IIT Bombay, that is, B.Tech, Dual Degree and the five year integrated M.Sc programme have to appear for JEE conducted by the IITs.

For more details, please visit http://www.jee.iitb.ac.in

Foreign nationals can also seek admission to various postgraduate and research programmes either as self-financing students (full programme) or through the CEFP (Government of India). Foreign nationals, who have registered for a degree in an institute or university abroad, can also seek admission as visiting students to carry out coursework and/or project work at IITB.

For further information, please visit http://www.iitb.ac.in/academic/pgprgm.html



#### **GROWTH AND EXPANSION**

IIT Bombay continuously strives to introduce new areas in its academic programmes and innovate in its academic activities, in a bid to generate the kind of intellectual capital that will keep the institute and the nation up-to-date on the technological front.

The institute believes that apart from gaining an education that is both novel and relevant, students should also gain an exposure to international scientific developments. Thus, students are encouraged and supported to write research papers and participate in international conferences.

IITB was an early adopter of the concept of business incubation in India. In 1999, an entrepreneurship cell was set up. Encouraged by the success of this initial experiment, a full-fledged technology business incubator, Society for Innovation and Entrepreneurship (SINE) was set up in 2004. It was set up with the objective of guiding and encouraging both students and faculty by facilitating the conversion of research activity into entrepreneurial ventures.

At present, IITB has MoUs with several universities in Asia, Australia, Europe and USA. These MoUs facilitate collaboration through faculty and student exchange programmes. These include:

- The University Paris-Sud 11, France
- Universite de Liege, Belgium
- Universite Catholique de Louvaine, Belgium
- The Technische Universitat Darmstadt, Germany
- Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany
- Technische Universitat, Munchen, Germany
- University of Cambridge, Great Britain
- University of Ulster, Great Britain
- University of Southampton, Great Britain
- University of Udine, Italy
- University of Bologna, Italy
- University of Calabria, Italy
- North Carolina A&T State University, USA

- Rice University, USA
- The Robert R. McCormick School of Engineering & Applied Science, Northwestern University, USA
- Kellogg Graduate School of Management, Northwestern University, USA
- College of Engineering Purdue University, USA
- Washington University in St. Louis (McDonnell International Scholars Academy)
- University of Waterloo, Canada
- McMaster University, Canada
- University of Alberta, Canada
- York University, Canada
- Tsinghua University, China
- Keio University, Japan
- Nagoya Institute of Technology, Japan
- Tohoku University, Japan
- Kyushu University, Japan
- Korea Industrial Technology Foundation
- Korea Advanced Institute of Science and Technology
- Information and Communications University, Korea
- Dongguk University, Korea
- Nanyang Technological University, Singapore
- National University of Singapore Joint Degree Programme
- King Abdullah University of Science and Technology, Saudi Arabia
- Monash University, Australia (IITB Monash Research Academy)
- Institute of Engineering, Tribhuvan University, Nepal
- Cambodia Institute of Technology (ITC), Cambodia

Within India, IITB also has MoUs with the University of Goa, Pune University, BARC, IISc Bangalore and TIFR for joint programmes. MoUs are also signed with various industries for student projects and collaborative research. Selected examples include:

- Siemens Power Generation Inc., USA (Research collaboration )
- BHP Billiton Innovation Pty, Australia (Research collaboration)
- Tata Teleservices Ltd. (Centre of Excellence in Telecommunications)
- Applied Materials (Research collaboration in Semiconductor Technology)
- Pinnacle Knowledge Group, Dubai (Collaboration in CEP, CDEEP)

#### STUDENT EXCHANGE PROGRAMMES

Student Exchange Programmes enable students of IIT Bombay to study in institutions from different corners of the globe. Students from Germany, Spain, Mexico, USA, Singapore, France, Bangladesh, Egypt, Ethiopia, Cameroon, Fiji, Iran, Iraq, Jordan, Mauritius, Malaysia, Nepal, Palestine, Sri Lanka, Vietnam and Yemen also study at IITB under its various programmes. In 2008-09, 17 students travelled abroad under different student exchange programmes. Regular updates on available student exchange programmes and scholarships are available at:

http://www.iitb.ac.in/inter\_relns.html

http://www.iitb.ac.in/academic/scholar.jsp

#### **PLACEMENTS**

The Placement Office takes care of placing students in the right kind of job environment. Both national and international companies visit the campus for recruitment. Students have job opportunities in various sectors, including Information Technology, Engineering, Consultancy and R&D.



#### **OUTREACH PROGRAMMES**

IIT Bombay strives to reach out beyond its student community to the larger society that exists beyond its walls. This reflects the institute's inherent philosophy — to teach what we know and share what we have, for mutual benefit. As such, the institute engages in several activities to reach out to the academic communities at national and international levels. In this regard, its major activities are the following.

#### CONTINUING EDUCATION AND QUALITY IMPROVEMENT PROGRAMME

Under the Quality Improvement Programme, training is imparted to teachers from other institutions to facilitate them in obtaining their Master's and Ph.D degrees. About 20 teachers take the benefit of this service every year. Short, intensive courses are conducted under the Continuing Education Programme for the enhancement of expertise of working professionals in industry and government. 'Open' courses cater to a wide variety of professional interests, and are open to professionals from any industry. 'In-house' courses are conducted for providing specific, customised training and for extended learning, to meet the needs of a particular group from an industry. It has been awarded the Golden Peacock National Training Award for excellence in training. For more details regarding the norms for application for PG level courses for working professionals, please visit: http://www.iitb.ac.in/cep

#### CENTRE FOR DISTANCE ENGINEERING EDUCATION PROGRAMME

The Distance Engineering Education Programme (CDEEP) aims to provide high quality distance education in engineering and science to a large number of participants throughout the country and abroad. The expertise of IIT Bombay's faculty is freely available for students and working professionals everywhere, as the courses offered through distance education are the same ones taken by IITB students. To provide quality engineering course materials to the maximum number of learners, CDEEP uses different mediums and varied technologies, like uploading webbased courses, taking video recordings of classroom lectures, and transmitting these courses through satellite with live interactions. Live courses are transmitted through EDUSAT, an ISRO satellite dedicated solely to the education sector. These courses are quite popular. As many as 57 colleges and technical institutions have registered under the programme and are recipients of the courseware.



## Research and Development

In a world increasingly propelled by technology, university research is the foundation of any nation's economic growth. Since it is the foundation of IIT Bombay's future development, it is committed to basic long-term research.

IIT Bombay has made concerted efforts to align its R&D focus with the national goal of achieving technological self-reliance. Students and faculty conduct research projects in thrust areas of science and engineering. The institute has ongoing academic and research collaborations with many national and international universities, governments and industries, in order to keep pace with expanding frontiers of knowledge and global developments, and also to be continually aware of national needs. Its pre-eminent position at the cutting-edge of research is reflected in its impressive list of research projects, which cater to both our national needs and global developments.

#### **RESEARCH PROJECTS**

One of the key goals of the institute is to provide an ambience in which higher studies and research thrives among the students and faculty. Along with fundamental research, many R&D projects offer opportunities to tackle 'live' problems. Its commitment to merge education with the creation of knowledge provides a fertile setting for productive research, which has led to a range of scientific and technological achievements.

The Industrial Research and Consultancy Centre (IRCC) is responsible for fostering the overall R&D growth of the institute, by facilitating interactions with external agencies, and promoting and managing interactions between the institute and the industry.



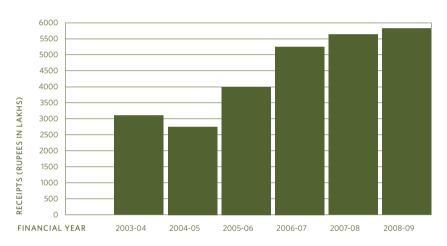
The institute undertakes R&D projects in various areas of specialisation. They can be broadly categorised as follows:

- Sponsored R&D Projects
- Consultancy Projects
- Sponsored Student Projects

#### SPONSORED RESEARCH

In a year, about 700 new projects are undertaken by our faculty members and research scientists, which include basic, developmental and application oriented research projects on a long term basis. These projects entail funding from national, international and governmental agencies and industries.

#### SPONSORED PROJECT GRANTS DURING THE LAST SIX YEARS

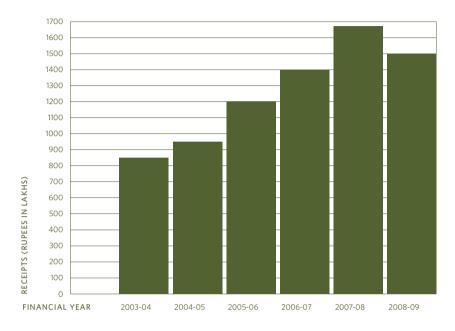


#### **CONSULTANCY PROJECTS**

Varied consultancy projects with clear-cut deliverables, which are aimed at solving specific problems of interest to user agencies or industries are also undertaken in the institute. The types of contract research carried out include the following:

- Technology assessment/management and project assessment
- Product/process design/development
- Simulation/modeling/optimisation
- Software development
- Retainership of faculty in advisory capacity over specified periods
- Troubleshooting/testing

#### RECEIPT OF CONSULTANCY PROJECTS DURING THE LAST SIX YEARS



#### SPONSORED STUDENT PROJECTS

This entails sponsorship of postgraduate and undergraduate students to undertake live projects related to industry along with implementation, during the time span allocated in the programme.

#### **MAJOR AREAS OF RESEARCH**

An illustrative list of the areas in which research is pursued:

- Alternative Energy Sources
- Artificial Intelligence
- Biochemical and Electrochemical Processes
- Bioinformatics
- Bioinorganic Photochemistry
- Cognitive Science and Logic
- Communications And Signal Processing
- Composites and Smart Materials
- Computer Aided Design and Computer Integrated Manufacturing
- Corrosion Inhibition
- Design of Structures
- Development of Alloys
- Diagnostic Instrumentation
- Earthquake Engineering
- Electronic and Fuel Cell Materials
- Food Process Engineering
- Functional and Numerical Analysis
- Hazardous Waste Management
- Image Processing
- Information Technology Tools and Packages
- Manufacturing and Technology Management
- Microelectronics
- Molecular Electronics
- Nanotechnology (Nanoelectronics, Nanobiotechnology, Nanomaterials, Nanofluidics)
- Neural Networks and Information Theory
- Novel Refrigeration and Cryogenic Systems
- Photonics, Non-linear Optics and Lasers
- Polymer Materials
- Powder Metallurgy
- Power Electronics and Systems
- Product Design, Visual Communication and Ergonomics

- Protein Evolution and Protein Folding
- Real Time Systems, Databases and Data Mining
- Robotics and Mechatronics
- Robust Control Systems
- Science of Materials and Thin Films
- Sensors
- Structural Geology and Seismology
- Surfaces and Interfacial Engineering
- Technology Management
- Telematics
- Textile Machinery Design and Development
- Transportation Engineering
- Very Large Scale Integrated (VLSI) Design

#### SPECIALISED CENTRES (FOR RESEARCH AND TEACHING SUPPORT)

- Centre for Environmental Science and Engineering (CESE)
- Centre of Studies in Resources Engineering (CSRE)
- Centre for Research in Nanotechnology and Science (CRNTS)
- Centre for Aerospace Systems Design and Engineering (CASDE)
- Centre for Formal Design and Verification of Software (CFDVS)
- Centre for Technology Alternatives for Rural Areas (CTARA)
- Centre for Distance Engineering Education Programme (CDEEP)
- Sophisticated Analytical Instruments Facility (SAIF)

#### INNOVATIONS FOR SOCIETY

At IIT Bombay, R&D efforts attempt to seek an optimal balance between research with a long-term perspective, and research which has an immediate relevance to the society. The institute is, therefore, actively involved in work which is related to harnessing modern science and technology towards the development of devices, packages and strategies. These are of direct relevance to people. It also ensures that the benefits of modern technology do not remain just an urban preserve, but extend into the fields and villages of rural India. Some representative projects and products are listed below.

- Animal driven battery charging unit
- AQUA Web portal for providing information to farmers
- Ascender The climbing wheelchair
- Bio Char unit for low-cost production of charcoal
- Riding type power tiller
- Bio-reactor for recycling of wastewater (Vermiculture)

- PC based Communicator for children with special needs
- Lightweight rehabilitation aids for polio-affected children
- Storytelling using traditional and digital media
- Computer keyboard for Indian languages
- Development of LPG stove for visually-impaired
- Development of technologies for Indian languages on the web
- Development of extraction unit for preparing herbal oil
- Different aids for children with cerebral palsy
- Modular FRP toilet units for railways
- Mumbai navigator
- Pedal power devices for rural applications
- Low-cost automation systems
- Silicon locket for cardiac monitoring
- Tools and technologies for the cane and bamboo craft
- Multi-utility heat pumps and plastic solar dryers
- K-Yan Compact media centre
- Low-cost motorised arm
- Low-cost engine management systems for petrol-powered small vehicles (two/three wheelers)

#### **R&D PROGRAMS OF NATIONAL IMPORTANCE**

IITB has contributed to several major national research programmes, and continues to do so on an ongoing basis. These programmes cover a wide spectrum of areas and engage the interest of people across a number of disciplines.

To mention a few:

- Communication technology programme
- Disaster management Earthquakes
- Energy-gasifier action research project
- Geo-referenced area management programme (GRAM ++) software
- Indian global positioning system (GPS) programme
- Language technology UNL-India project
- Light combat aircraft (LCA) project
- Micro and smart systems
- Photovoltaics
- Distance education learning
- Transport and infrastructure programme



#### INSTITUTE INDUSTRY INTERACTIONS

From its inception, IIT Bombay has benefited from its location, which is one of the most industry-intensive hubs in the country. The overall external R&D orientation of the institute has been very much promoted by this situation. The institute houses several advanced R&D facilities, including sophisticated state-of-the-art laboratories furnished by industry. Select major industry-sponsored interactions and laboratories in recent years are:

- Xilinx FPGA Laboratory
- The Tata Infotech Laboratory
- Intel Microelectronics Laboratory
- Laboratory for Intelligent Internet Research
- Tata Consultancy Services Laboratory for VLSI Design and Device Characterisation
- Texas Instruments Digital Signal Processing (TI-DSP) Laboratory
- Wadhwani Electronics Laboratory
- Cummins Engine Research Laboratory
- Applied Materials Nano manufacturing Laboratory
- Tata Teleservices IITB Centre of Excellence in Telecommunications (TICET)
- VLSI Design Consortium

#### **TECHNOLOGY TRANSFER**

An important indicator of industry-relevant research is the growth in the number of technologies which have been commercialised or transferred to user industries. These include the transfer of designs, devices, processes and software developed by the institute's faculty and scientists. These are developed in a number of areas and then transferred to the industry. Some recent examples of technology transfer are listed below:

- Supercritical fluid extraction technology (SCFE)
- Electro-slag refining (ESR) process
- OptiLOM software for laminated object manufacturing (LOM)
- A learning-based tool for automatic address segmentation
- WebROBOT Internet based robotic assembly planning
- Improved design of post boxes
- Novel 4-in-1 heat pump for providing AC, hot water, portable chilled water and drying
- Design of board games
- Novel design for packaging cement and other materials
- Steel by wire system for vehicles
- Technology for fuel additives in fuel combustion and allied areas

- Thermoelectrically cooled two wheeler helmet
- · Educational robots
- Corrosion simulation software
- Hindi word net software
- Design of V-trough concentrated module
- Technology on extraction of natural sweetener from leaves
- Software development and documentation synchronisation package

#### **INTELLECTUAL PROPERTY RIGHTS INITIATIVES**

As a policy, IIT Bombay promotes strong intellectual property protection and management for assisting the 'Creators of Intellectual Property'. Safeguarding of Intellectual Property Rights (IPR) ensures due recognition of all innovations. It also contributes to the revenue, which in turn enhances the institute's R&D activities. The importance of maintaining a balance between providing incentives for innovation and the need for sustaining a strong and vibrant public domain is at the heart of all IPR policies. IITB attempts to provide this balance in its IPR policy, through its efforts at educating the institute's community about the importance of IP rewards and public access to information. It has already put processes for facilitating IP protection in place. Other major IP related initiatives include:

- Support for IPR protection
- Lectures and national workshops on IPR
- IPR courseware
- Mechanisms/processes to commercialise IP

#### **NATIONAL FACILITIES**

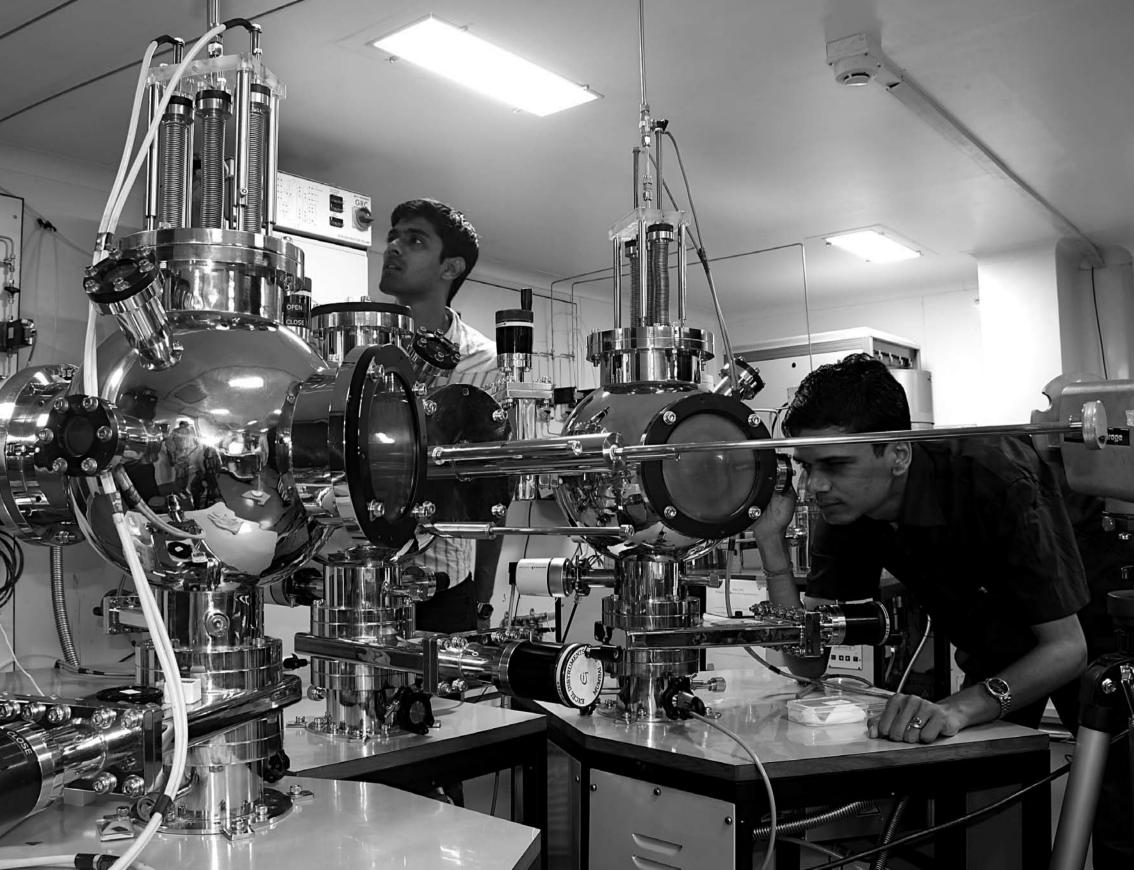
National facilities housed at IIT Bombay include the following:

- Chemical Vapour Deposition Inductively coupled plasma, hotwire, low pressure
- Lithography Electron beam lithography, laser writer, double sided aligner
- National facility for texture and orientation imaging microscopy
- National Facility of <sup>40</sup>Ar <sup>39</sup>Ar Geo-thermochronology
- Peptide sequencing and photolabelling facility
- Pulsed laser deposition
- Single crystal X-ray diffraction facility
- Sophisticated Analytical Instruments Facility (SAIF)
- Sudarshan: The National Geotechnical Centrifuge Facility (NCGF)
- Protein Sequencer

#### **KEY R&D FACILITIES**

A large number of sophisticated equipment and research facilities are available at IIT Bombay. A few major ones are listed below:

- Cluster tool for thin film technology
- Cryogenic facilities
- Dip pen lithography
- Electron spectrometer for chemical analysis
- Electro-slag refining facility
- Facilities for distance education
- Facility for isothermal titration calorimetry in biologically important systems
- Facility for modelling and simulation of telecommunications networks
- Food engineering laboratory
- Global positioning systems facility
- High-resolution scanning electron microscope
- High-resolution transmission electron microscope
- Microengineering facilities
- Nanoelectronics facilities
- Nanoindenter
- Nanoparticle sorter
- Rapid prototyping facility
- Scanning probe microscope (both conventional and environmental)
- Signal and image processing facilities
- Supercritical fluid extraction facility
- Thermal hydraulic simulation studies facility
- VLSI Design centre
- Wind tunnel facilities
- Single crystal X-ray diffractometer
- Robotic laboratory
- GRAM++, a tool for local level planning
- Shake table facilities
- Steel melting facilities





#### **PROMOTING ENTREPRENEURSHIP**

The institute has designed and developed mechanisms and bodies to help create new enterprises that employ technologies developed by its faculty and students.

#### SINE AND BUSINESS INCUBATION

The Society for Innovation and Entrepreneurship (SINE) is an umbrella organisation, for various activities related to entrepreneurship and its promotion at IIT Bombay. It administers a business incubator that provides support for technology-based entrepreneurship. SINE widens the scope of the institute's research activities by enabling commercialisation of the IP generated through entrepreneurial ventures. Since its inception, 32 companies have been incubated.

#### **TECHNOLOGY BUSINESS INCUBATOR**

The technology business incubator also has a wide spectrum of incubatee companies. The current entrepreneurs (a majority of whom are funded by either angel or venture capital funds) comprise student or faculty teams from the Industrial Design Centre and the departments of Aerospace Engineering, Chemical Engineering, Computer Science & Engineering, Electrical Engineering, Mechanical Engineering and Earth Sciences.

#### **ENTREPRENEURSHIP CELL**

The Entrepreneurship Cell at IIT Bombay (commonly known as E-Cell) is a student organisation which motivates students to bring out their latent spirit of enterprise. It works throughout the year, showing students the opportunities that lie within their grasp and the path they can take to make a difference. Its initiatives include *Eureka*, the annual international business plan competition; *Ideaz*, the pan IIT business idea contest; *E-Summit*, the entrepreneurship summit; *InCorpora*, the business club of IITB; *GEN*, the Global Entrepreneurship Network (www.genportal. org); *EnSpace*, a newsletter, and *ECampaign*, the nationwide entrepreneurship drive. *For more details*, *please visit* www.ecell.in.



## **Faculty**

The faculty of IIT Bombay is not only considered amongst the best within the country, but is also highly recognised in the world for its achievements in the field of education and research.

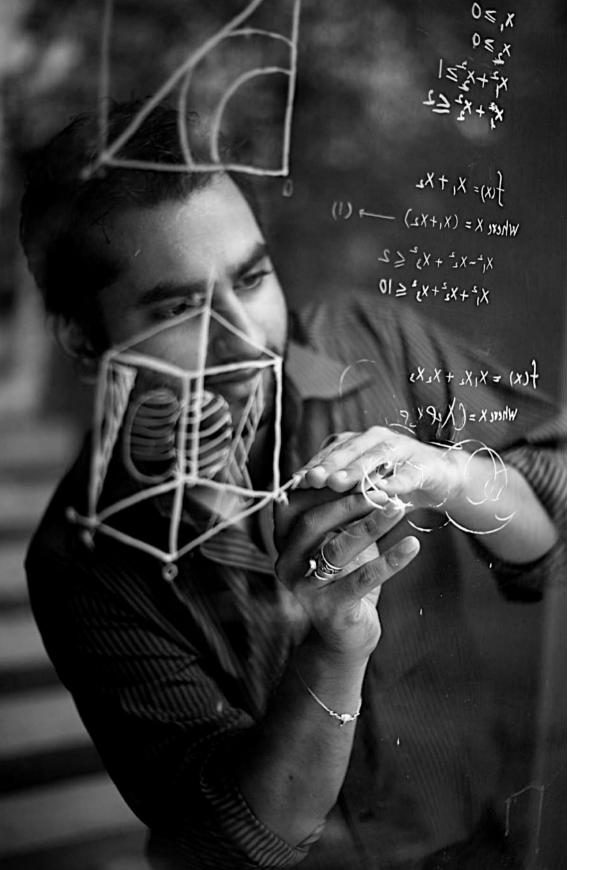
At present, there are 495 faculty members in the institute (in the year 2008-09). These include 216 full professors, 97 associate professors, 121 assistant professors and 7 distinguished guest professors. There is a conscious continuous effort by the institute to widen its faculty base and add greater variety and depth to the scope of teaching, and also to the R&D experience. As a measure towards this end, there is a regular induction of adjunct and visiting faculty to the institute. At present, there are as many as 54 faculty members under this category.

#### **TECHNOLOGY LEADERSHIP**

The faculty of IIT Bombay is engaged in a wide range of activities besides substantial academic and research commitments. They contribute significantly to the country's growth in science and technology, by making their services available to various national and state level committees. Many faculty members also serve on selection committees, on editorial boards of leading journals as reviewers for publications and on review boards of leading institutions and governmental agencies.

#### **BROADENING HORIZONS**

Faculty involvement in research and consultancy activity leads to a significant output of publications in leading national and international journals. Faculty members are encouraged to interact with peer groups by participating in international conferences, and by visiting leading institutions for academic and research activities. In the year 2008-09, IIT Bombay's faculty published 631 papers in international journals and another 79 in national journals. In addition to this, there were 479 papers presented in international conferences and an additional 216 in nationwide conferences. Finally, about 14 patents have also been filed in the same year.



The faculty of IITB has established close links with the industry through consultancy projects. Many serve as advisors or as members of Boards of Directors of various companies.

The institute has established various awards for recognising faculty contributions, viz., the Lifetime Achievement Award, the Annual Excellence in Teaching Award, the Annual Technology Development Award and the Award of Professor Emeritus, to honour retired faculty who have contributed significantly to the institute.

Our faculty has made their mark among peer groups and has also been recognised with awards and distinctions instituted by professional bodies. Over the last few years that our faculty members have been presented with include the Padmashri, the Shanti Swarup Bhatnagar Award, the Swarnajayanti Fellowship and fellowships and awards from numerous national and international institutions.



#### **INSTITUTE FACILITIES**

A wide variety of research and developmental work is the backbone of any good learning system. At IIT Bombay, this is ably supported through appropriate infrastructural and research facilities at IIT Bombay.

#### **INSTRUCTIONAL FACILITIES**

IIT Bombay has a variety of instructional facilities and teaching aids, which are of significance for its students and faculty. Computer classrooms with individual workstations have been provided, and each department has designated independent research space for its research scholars.

#### **LABORATORIES**

IIT Bombay has well-equipped laboratories with state-of-the-art facilities. There are undergraduate teaching laboratories as well as sophisticated research facilities.

#### LIBRARY

The Central Library in IIT Bombay is one of the best technical libraries in India. It hosts an impressive collection of academic resources in the form of books, journals, research papers and electronic journals on a variety of subjects including science, technology, humanities, social sciences and management sciences. It houses a large number of full-text electronic journals, online databases and Electronic Theses and Dissertations (ETD). The web-based library catalogue is accessible from anywhere on the campus' Local Area Network. The library has an online catalogue equipped with a global catalogue search. The library also offers videoviewing facilities. It subscribes to various important bibliographic services in the field of science and technology on CD-ROM or through the web. It is closed for only three days in the entire year.



#### COMPUTER AND INTERNET FACILITIES

The computer centre provides computational facilities to users in the institute. Accounts are given on the high-end computational server to all faculty members, students and staff. The centre also administers the computer network and internet links. The campus-wide fibre optic network provides a high-speed backbone. Connections are provided to all faculty houses and individual rooms in the hostels.

#### APPLICATION SOFTWARE CELL

The Application Software Cell (ASC) is responsible for software applications used in IIT Bombay, such as academic software for admissions, course registration, grading and scholarships, accounting and payroll, administrative and HR software, and for a variety of other applications such as the library, estate and hostel management, security and hospital administration. All this software is web-based and provides information to those who need it. The institute has been a technological leader in this area among institutions in India. By using a judicious mixture of commercial, locally-developed and public domain software, ASC has been able to provide all these services at a very low cost.

#### **CONFERENCE FACILITIES**

Well-equipped, air-conditioned seminar rooms, conference halls and lecture theatres facilitate the organisation of workshops, lectures, conferences, which are regular events on the campus.

#### HOSPITAL

The institute also has an in-house hospital with facilities to take care of all general health issues of residents. Apart from the resident doctors, it is also visited by specialists including ENT, surgeons, orthopaedists, neurologists, etc. It has well-equipped laboratories to conduct all types of medical tests, ultra-sonograms, X-rays etc. and also has in-patient wards, OT and ambulance facilities.

#### **GUEST HOUSES — JAL VIHAR AND VAN VIHAR**

Set in the backdrop of the scenic Powai lake are the two institute guest houses, Jal Vihar and Van Vihar. People visiting the institute — academic guests of the institute, parents of students and alumni reside here during their stay. The only requirement is to book well in advance (three months is a safe bet) as the guest houses are almost always full.

#### IIT SOUVENIRS SHOP

Souvenir items like t-shirts, mugs, tea coasters, bags, etc are available at the Alumni Association souvenir shop, situated on the first floor of the Gulmohar building.



## **The Campus**

An island of soothing green, the campus is flanked by two lakes (Powai and Vihar) and hills — its natural beauty and peaceful atmosphere belies the range and intensity of the activities which are always underway and which also complement academic life.

An 'ecological hot-spot', IIT Bombay's biodiversity would do any wildlife reserve proud. There are more than a hundred species of trees, and wild flowers abound the campus, as do about 150 recorded species of birds. Forest dwelling reptiles and the occasional nocturnal visits of panthers from the nearby Borivali National Park make it a campus of 'many-splendoured riches'.

#### **LIFE ON CAMPUS**

One of the most distinctive characteristics of IIT Bombay is its close-knit and integrated residential community. Housing is guaranteed for all students, and approximately 15,000 people live on this large campus of 489.18 acres, allowing for a blending of academic and residential life. This residential experience is central to the institute's educational programme, and offers its students a supportive and enriching environment, full of opportunities for personal growth.

A vast range of cultural, educational, athletic and social activities is available to IIT Bombay's students, faculty and staff. The quickest way to get involved in campus life is to become a part of the institute community, and to create one's own IITB experience.



#### STUDENT LIFE

#### SPORTS, CULTURE AND LEISURE AT THE INSTITUTE (GYMKHANA)

Students here do much more than only study. There is ample opportunity to nurture all kinds of talent in students. There are excellent recreational facilities for sports, including gymnasiums, a swimming pool, courts for tennis, basketball, volleyball, hockey, football and cricket, athletics tracks and much more. There is an annual state-level swimming gala, an extremely popular event organised by the swimming club. Finally, there is *Crossy*, or the cross-campus race, an integral part of IIT Bombay's athletic tradition.

Facilities for sports are matched by those for cultural activities, which include film clubs, classical music societies, a debating club and a literary society. If that is not enough, then there is *Fourth Wall* — the drama club, *Rang* — the fine arts club, *In sync* – the dance club, *Saaz* — the music club as well as a wildlife club and a trekkers club.

Students are also enthusiastic participants at the Science club, bringing the fun back into science and scientific hobbies. There is an Aeromodelling club, a HAM club, an electronics club and *Krittica*, the astronomy club, while *Technic* is the club that coordinates all technical activities on campus. There are amateur astronomers, HAM radio operators, designers and builders of aeroplanes, race cars and satellites.

The students also produce *Insight*, a monthly English magazine that keeps students up-to-date on campus happenings. In addition there is also *Awaaz*, the institute's monthly newsletter.

#### **INTRA AND INTER-HOSTEL ACTIVITIES**

The co-curricular activities for students are organised by the student's Gymkhana and are held at the Students Activity Centre (SAC). These activities can broadly be classified into cultural and sports. There are inter-hostel athletics, triathlons, football, hockey, basketball, badminton, tennis, table-tennis, volley ball, kho-kho, squash, swimming, chess, carrom and bridge. Competitions in music, drama, literature, debating, photography, fine arts, etc. are also held. The Performing Arts Festival (PAF) is a mega-extravaganza that exhibits the best of student talent. Along with other amenities, the Gymkhana also has an open-air theatre with a seating



capacity of 3,000 people. Some student festivals and activities at IITB are very popular and gather large crowds.

Inter-IIT Sports Meets are held annually in October and December, and are keenly contested for the glory of the Inter-IIT General Championship.

#### HOSTEL LIFE

In many ways, hostel life defines the life of a student on campus. Life at IIT Bombay's hostels comes with its own traditions, some of them quite unique.

The hostel wings are the hubs of activity. One of the first things a freshie (what a sophomore is called here) needs to learn is the administrative body of the hostels, which include the warden, the assistant warden, the hall manager and the mess manager. Every hostel has a *Freshie Nite*, a fun initiation that allows seniors to get to know the freshies. Various contests, like *Scavvy* (a scavenger hunt), *Matki Phod* (to celebrate the sacred occasion of *Janmashtami*) and *Mock Rock* are held in all hostels individually.

Most day-to-day hostel matters are managed by the students, who are given a free hand in most cases. Virtually everything is managed by them, be it hostel messes and maintenance, to MI and Techfest. Of course, the setup is wholly democratic with free and fair elections — the one time of the year that IITians indulge in politics. The student body, comprising the General Secretary, councillors and secretaries, is always available to address the problems and suggestions of the hostelites.

Many orientations are held for all fresh entrants to bring them up-to-date with life within the hostel as well as on the campus. Attending the orientations is important, because it is these sessions that help successive generations of students discover and hone their talents. These sessions also help them to gradually get absorbed into the rich and diverse culture of extra-curricular activities on campus.





#### **INSTITUTE FESTIVALS**

IIT Bombay has a number of student festivals like Avenues, Chemsplash, Design Degree Show, Eureka, Last Straw, Generations, etc. The most well-known and popular events are Mood Indigo, Techfest and Performing Arts Festival.

#### **MOOD INDIGO**

Come December, the lush green campus at Powai turns a resplendent indigo, as this is the season for the institute's annual cultural festival — Mood Indigo, often shortened to an affectionate Mood I. With budgets stretching towards eight figures and over 80 competitions, Mood I is the largest college cultural festival in Asia (in terms of participation and number of events). The last edition registered 75,000 student participants, drawn across far corners of the country. Mood I is a four-day long cultural festival which began way back in 1973, offering an unique platform for recognition of talent. Students from campuses all over India meet and compete in events in the fields of dance, dramatics, speaking, literary arts, fine arts, music and many more. These are coupled with the very best of professional performances from both Indian and international performers. There are workshops, exhibitions, and interactive sessions — in short, Mood I provides a chance to all those who come for it, whether as active participants or passive spectators, to be a part of and experience culture in all its myriad forms.

#### **TECHFEST**

Come January, IIT Bombay turns into the mecca for all technology enthusiasts in the country. It is the season for Techfest, the annual technology festival of IITB. 30,000 students from over 1,000 colleges spread across India and countries like USA, Singapore, Iran, Nepal and Sri Lanka throng the campus to experience the



largest science and technology festival in Asia. Held in January for three days, it has grown into a mega-event which draws thousands to the campus. Techfest provides a platform for a confluence of the industry, academia and students. Events in Techfest include a combination of lectures, competitions, exhibitions and demos of the latest innovations in technology. It draws participants from across the globe. Techfest events and other competitions are held throughout the year, and provide the participants with an opportunity to garner invaluable hands-on experience in making machines and models, and by exploring different facets of technology.

#### PERFORMING ARTS FESTIVAL

The Performing Arts Festival (or PAF, as it is more commonly called by the campus community) is the biggest inter-hostel cultural competition in IIT Bombay. Untouched by the phenomenon of footfalls, it is IITB's best-kept secret, where you can find the best of the institute's cultural and creative talents at play.

Technically a drama, each PAF comprises contributions from several cultural arts including dramatics, literature, music, fine arts, debating and dance. Typically, three or four hostels are grouped together by a random draw for each PAF. The main performances are held at the open air theatre (OAT) inside the SAC. Screenplays are expected to be original and all dialogues at PAF are delivered using voice-overs, not by the actors themselves. This is mainly owing to the huge size and structure of the OAT. The live dubbing requires a great deal of coordination between the actors and the voice actors. Another major part of a PAF performance is the preparation of sets. This production aspect (abbreviated to *prod* or *prodwork*) is where the engineering skills of students are on display, as massive sets are constructed using bamboo, wood and jute rope, and screens which are often made with nothing but layers of newspaper glued together.

Most students consider PAF to be the single most important extra-curricular activity in the institute. Prizes awarded for the best PAF and its various other aspects are highly coveted by the hostel fraternities.

#### **COMMUNITY INITIATIVES**

Manthan is a remarkable initiative dedicated towards transforming the lives of underprivileged children in and around the IIT Bombay campus. It aims to help these children with the support of IITB students and staff members.

Unnati and the NSS (National Service Scheme) act as umbrella organisations for all the activities related to social services happening in and around the institute. Unnati looks at a more serious aspect of personality development, with the objective of social concern and giving back what we owe to the society.



#### **INSTITUTE ALUMNI**

The alumni of IIT Bombay are of the highest calibre and enjoy the most prestigious reputations. Many of them have reached positions of eminence in their selected fields of industry, business, public sector, academics and research, or as entrepreneurs.

The institute recognises its alumni, who have distinguished themselves through their work and done the institute proud. The Distinguished Alumnus Awards have been instituted for this purpose. In addition to this, IIT Bombay has instituted the Distinguished Service awards for alumni who have rendered special services to the cause of the betterment of the institute. The institute also involves the alumni in its educational and research activities whenever possible, by inviting them to participate on its advisory boards as visiting faculty or as guest speakers. Our alumni has responded whole-heartedly by supporting the institute with their most generous endowments, leading to the establishment of schools, laboratories, scholarships, chairs and various infrastructure developments. The office of the IITB Alumni Association is housed on the first floor of the Gulmohar Building. Details about alumni achievements and initiatives are available at www.iitbombay.org.

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**DR. ANIL KAKODKAR** is the current Chairman of the Board of Governors of IIT Bombay. He is also Chairman, Atomic Energy Commission, and Secretary, Department of Atomic Energy. A distinguished engineer and scientist of international repute, Dr. Kakodkar has played a major role in enhancing India's design and development capability and self-reliance in nuclear technology. Dr. Kakodkar received the prestigious Padma Bhushan award from the Government of India in 1999.



**PROF. DEVANG V. KHAKHAR** is the present Director of IIT Bombay. A professor in the institute's Department of Chemical Engineering. Prof. Khakhar is a Fellow of the Indian National Academy of Engineering, the Indian National Science Academy and Indian Academy of Sciences. An accomplished researcher, Prof. Khakhar has won many laurels, including Shanti Swarup Bhatnagar Award (1997) and Swaranjayanti Fellowship (1998). He is also a recipient of IIT Bombay Excellence in Teaching Award and the H. H. Mathur Award for Research Excellence. Prof. Khakhar has over 150 publications to his credit, including papers in *Nature* and *Science*.

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