

THE INSTITUTE OF MATHEMATICAL SCIENCES

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The Institute of Mathematical Sciences, (IMSc), founded in 1962, is a National Institution of higher learning which promotes fundamental research of high quality in frontier disciplines of Mathematical Sciences. It is an autonomous Institute funded by the Department of Atomic Energy of the Government of India and by the Government of Tamil Nadu.

The Institute has three major disciplines: **Mathematics**, **Theoretical Computer Science** and **Theoretical Physics**. Research areas actively pursued in these disciplines are:

Mathematics: Algebraic and Analytic Number Theory, Complex Analysis, Differential Geometry, Algebraic Geometry, Algebra, Algebraic Topology, Functional Analysis, Harmonic Analysis, Operator Algebras, Differential Equations, Probability Theory, Representation Theory.

Theoretical Computer Science: Algorithms and Data Structures, Automata Theory, Computational Complexity, Distributed Computing, Finite Model Theory, Graph Theory and Combinatorics, Logics of Programs and Semantics.

Theoretical Physics: Complex Fluids, Disordered Systems, Non-equilibrium Processes, Superconductivity, Quantum Hall Effect, Quantum Magnetism, Bose-Einstein Condensation, Electron Transfer, Biophysics, Quantum Field Theory, Lattice Gauge Theory, Quantum Chromodynamics, B Physics, CP Violation, Neutrino Physics, String Theory, Quantum Gravity, Black Holes, Cosmology, Foundations of Quantum Theory, Non-Commutative Geometry, Knot Theory, Quantum Algebras, Dynamical Systems, Solitons, Chaos, Integrable Models, Semiclassical Methods, Optics and Beam Physics, Quantum Information Theory.

M.Sc. & Ph.D. Programmes

The Institute offers **Ph.D.** programmes in all the three disciplines for students with M.Sc./M.E./M.Tech. in related disciplines (degrees from either Anna University or Madras University).

The Institute also offers an **M.Sc.** (by research) programme (jointly with Anna University) in the three disciplines above, as part of an integrated Ph.D. pro-

grammes in related disciplines.

Interested students may apply for these programmes in response to the newspaper advertisement which appears in late October/early November of each year.

All selected students receive fellowships of Rs. 8,000/- per month for the first two years and Rs. 9,000/- per month thereafter. In addition, they also receive rent-free hostel accommodation, if it is available, or HRA, a contingency grant of Rs. 7,500/- per year, which will be substantially increased in near future, for books and conference participation.

Selection for Theoretical Computer Science and Theoretical Physics is based on a Joint Entrance Screening Test (JEST) conducted around February, in collaboration with several National Institutes, at examination centres situated throughout India. This qualifying examination is followed by an interview held at the Institute. In addition, students seeking admission to *Ph.D. programme in Theoretical Physics* and who have qualified in the UGC-CSIR NET JRF examination in 'Physics' conducted not earlier than 2004, are exempted from appearing in the JEST. They may apply directly to the Institute using the application form available at the IMSc web site, enclosing a copy of the NET JRF qualification certificate. The last date for receipt of the application form is March 31, 2006.

Selection for Mathematics is based on the screening test for the **Research Awards** of the **National Board for Higher Mathematics** (NBHM) followed by an interview at IMSc. Candidates who wish to apply for this programme **need not** send in any application. However, they **must** apply for the **Research Awards** of the NBHM and appear for that screening test (which is expected to be held on the last Saturday of February 2006). The advertisement of the NBHM Research Awards will appear in national newspapers in December 2005.

Post-Doctoral Fellowships

Candidates with a Ph.D. degree and a proven aptitude for research are offered Post-Doctoral Fellowships tenable for a period of one/two years. There are about fifteen post-doctoral fellows working in the Institute at any given time.

Associateships

The Institute has an Associateship Programme in all the three disciplines for college and university teachers. The program provides an opportunity for associates to spend some time at the Institute and encourages collaboration between members of the Institute and scientists in the university system.

Visiting Scientists Scheme

Front-ranking scientists from all over the world visit the Institute frequently. Over the years the Institute has been privileged to have several Nobel Laureates and Fields Medalists among its visitors.

Graduate Visitors Programme

This programme is envisaged as a part of the Institute's commitment towards strengthening its interaction with the university system. Graduate students, already registered for their Ph.D. with any university, are eligible. Under this programme, a Graduate Visitor may periodically visit IMSc during his/her studentship. During the visit, the student is expected to be attached to a specific faculty member of IMSc and participate in a collaborative research project worked out jointly with the student's adviser in his/her parent university.

Summer Students Programme

Students studying for a Master's degree or completing the penultimate year towards a Bachelor's degree can apply for a 4 to 8 week summer students programme at IMSc. The programme involves project work at IMSc under the guidance of a faculty member of the Institute. Overview lectures on front-line topics are also arranged.

Academic Meetings

The Institute frequently organizes national and international Workshops/Symposia/Conferences in various fields. IMSc actively participates in Advanced Schools such as those conducted by the Science and Engineering Research Council (SERC) of the Department of Science and Technology (DST) and the National Board for Higher Mathematics (NBHM) and is part of the Theoretical Physics Seminar Circuit (TPSC) programme.

Campus Facilities

Located in South Chennai, the Institute is housed within the Central Institutes of Technology (C.I.T.) Campus. Being in the Adyar-Taramani area, the In-

stitute enjoys the convenience of the metropolitan city and is yet withdrawn from the bustle of the city centre. It has a centrally air-conditioned complex with offices and lecture halls, together with the 200-seat state-of-the-art *Ramanujan auditorium*. Across the street from the main academic campus is a modern Hostel & Guest-House complex with an in-house catering facility. The Institute has its own faculty housing in South Chennai near the seashore.

Library

The Institute has a well-equipped, air-conditioned, computerized library on campus. The library has as on date about 55000 books and bound volumes. It subscribes to about 300 print journals and provide access to over 2500+ online journals. Besides, the Library also subscribes to various electronic resources such as SCIENCE DIRECT SERVICE of Elsevier, IOP's Digital Archives, JSTOR's digital archive and MathSciNet database. The library has developed a website to host and provide access to all the electronic resources. Compact storage system (mobile racks) has been installed for optimum utilization of space. It also has a heavy duty Xerox machine.

The library has been serving as regional library for students and researchers in the areas of mathematics and allied subjects. The Library remains open from 9.30 am to 6.00 pm on weekdays and from 10.00 am to 5.00 pm on Saturdays. However, 24 hours access to library is enabled by digital access control system through library access cards.

Computing

IMSc has a highly sophisticated user community working in areas such as lattice gauge theories, Monte-Carlo simulations and large scale symbolic manipulations in physics and mathematics. The network consists of SUN Ultra Sparc machines and Pentium desktops for all users. In addition, we have 2 16-CPU Xeon clusters, and 'a large scale teraflop 144 node dual Xeon cluster'. Internet access is provided through a high speed 2Mbps link to VSNL.

Apart from Fortran and C libraries, the system has symbolic manipulation packages like MACSYMA, MATHEMATICA and FORM. Packages like Super-Mongo, IMSL, Numerical Recipes and MATLAB libraries are also available.

