

Information and Announcements



The Institute of Mathematical Sciences, Chennai, India

The Institute of Mathematical Sciences (IMSc), which started in 1962, is a national institution of higher learning whose primary purpose is to foster high quality fundamental research 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 Tamilnadu.

The Institute is justly proud of being able to count in its faculty, among whom many are young, several distinguished scientists with high international acclaim. The three major groups of research areas at the Institute are: Mathematics, Theoretical Computer Science and Theoretical Physics.

The Institute has dynamic programmes for pursuing research in these three disciplines leading to the doctoral degree, for post-doctoral work, and a very active Visiting Scientists Scheme.

The Institute has an excellent library, state-of-the-art computing facilities, and very good communication systems such as e-mail, fax, etc.

Areas of Research

Mathematics: Algebraic and analytic number theory, complex analysis, differential geometry, algebraic geometry, algebra, functional analysis, harmonic analysis, partial differential equations, probability theory.

Theoretical computer science: algorithms and complexity, automata theory, distributed computing, logics of programs and semantics.

Theoretical Physics:

Condensed matter physics: complex fluids, disordered systems, fracture propagation, high temperature superconductivity, martensites, nanostructures, phase segregation, quantum



Hall effect, quantum magnetism, superfluidity.

High energy physics: Conformal field theory, lattice gauge theory, quantum field theory, quantum chromodynamics, quantum gravity, string theory, phenomenology.

Mathematical physics: Group theory and differential geometry in physics, quantum algebras, knot theory, special functions and differential equations of mathematical physics.

Nonlinear dynamics: Dynamical systems, chaos, coupled map lattices, integrable models, semiclassical methods.

Photon and particle optics: Classical and quantum optics, physics of particle beams.

Campus

Located in South Chennai the Institute is housed within the Central Institutes of Technology (CIT) Campus in the Adyar–Tharamani area. The quiet location and a commitment to a green environment make IMSc a haven for scholarly pursuit. Across the street from the main academic building complex of the Institute there is a modern Hostel Guest-House complex with in-house catering facility. The Institute has its own faculty housing in South Chennai near the seashore.

Library Facilities

The Institute has a very well-equipped, air-conditioned, and computerized library housed in a modern building on campus. Almost all the leading international journals in the relevant areas of research are subscribed to on a regular basis. The library receives preprints/reprints/reports from numerous research centres and laboratories worldwide. The Institute houses a mirror site of the Los Alamos National Laboratory E-Print Archive for Physics and Mathematics so that all the preprints in the areas of research of the Institute are accessible immediately via the internet. The Institute library is also being extensively used by researchers from all over India, thus effectively functioning as a Regional Library Centre for mathematics, theoretical computer science, and theoretical physics.

Computing Facilities

The computer system at IMSc is a state-of-the-art system providing its users with the very latest in hardware and software. It is continuously upgraded to remain at the forefront of the computer world. At present, the computer network has several SunSparc workstations and Pentiums serving as general-purpose machines, and dedicated number crunchers and advanced



graphics machines including the HyperSparc4 4 cpu machine, the Power Indigo, a 4 cpu R8000 Power Challenge L, a 4 cpu R10000 Origin, and a few Ultra Sparc machines. In addition there is a lot of scientific software available like MACSYMA, Mathematica, MatLab, IMSL, FORM and so on. A host of access stations and peripherals ensure easy usability for various applications. The network is connected to the Internet via a VSAT link and a 64Kbps VSNL link. The IMSc website is a mine of current information relevant to research activities, including the Indian mirror of the LANL physics and mathematics archives.

Doctoral Programmes

Motivated students aspiring to do high quality research in mathematics, theoretical computer science and theoretical physics are selected every year for enrolment in PhD programmes in their respective disciplines. The process of selection for PhD programmes in theoretical computer science and theoretical physics is based on the Joint Entrance Screening Test (JEST) conducted around February, in collaboration with several National Institutes, with examination centres situated throughout India, and later interviews at the Institute around June. The process of selection for PhD programme in Mathematics is based on an at-home examination, for which the question paper is sent to the candidates on receiving their completed application forms and later interviews at the Institute. Normally, the advertisement calling for applications for the PhD programmes is issued in November in all leading newspapers in India. Upon admission to the PhD programmes, the students, or the Junior Research Fellows, go through intensive course work enabling them to take up original research leading to the PhD degree. Students with an undergraduate degree can also avail of the integrated MSc–PhD programme conducted in collaboration with the Anna University. The students have access to all the facilities in the Institute and can stay in the hostel. At present, the Junior Research Fellowship of the Institute carries a stipend of Rs. 5600/- per month for the first two years and Rs. 6000/- per month after that, plus house rent allowance and medical benefits as per rules and a book grant of Rs. 2000/- per year.

Post-Doctoral Programme

Candidates with the PhD degree from leading institutions are offered Post-Doctoral Fellowships tenable for a period of one/two years. There are about ten post-doctoral fellows working in the Institute at any given time.

Visiting Scientists Programme

Internationally reputed, front-ranking, scientists from all over the world visit the Institute frequently, for periods ranging from a few weeks to several months. They collaborate with the



IMSc scientists and give series of seminars and colloquia. Over the years the Institute has been privileged to have several Nobel Laureates and Fields Medalists among its distinguished visitors.

Academic Meetings

Besides the regular seminar/colloquium activities by the members of the Institute and the visiting scientists, workshops/symposia/conferences in various fields are being organized frequently by the Institute. The conference participants come from all over India and abroad. The Institute takes part in the Theoretical Physics Seminar Circuit (TPSC) programme under which scientists can visit leading research centres in India and lecture on their work. IMSc is actively participating in advanced schools like 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). The Institute actively encourages its members to collaborate with scientists elsewhere, and provides all required help to enable this.

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Errata

In *Resonance*, Vol.3, No.11, November 1998

p.77 – subsection caption should read ‘The Inert Pair Effect’.

p.78 – Table 1, first set of entries ‘antagonistic’ should read as ‘agonistic’ in three places.

In *Resonance*, Vol.3, No.12, December 1998

Replace ‘mm’ by ‘ μm ’ in the following lines

p.9 – fourth line from bottom

p.10 – second highlighted text

p.11– fourth line from top.



Visvesvaraya Museum—Invaded by Insects!

The Visvesvaraya Industrial and Technological Museum in Bangalore has been invaded by insects and arthropods – an exhibition called '*Giants from the Backyard*' has been set up in the museum. This *Science Fantasy Exhibition*, organised by the National Council of Science Museums, aims to celebrate the hidden world of Arthropoda. The National Council of Science Museums has been striving to create a scientific temper among the people of the country and popularise science through hands-on and interactive exhibition galleries, outdoor science parks, mobile science exhibition programmes and a variety of other activities directed towards the students and the general public.

Designed and developed indigenously at Science Centres in Calcutta, Bangalore, Mumbai and Delhi, '*Giants From the Backyard*' comes close on the heels of its previous, enormously successful exhibition on '*Dinosaurs*'. *Giants from the backyard* attempts to reveal the fascinating world of arthropods, especially the insects. Arthropoda is the largest phylum in the animal kingdom, forming almost 85% of the known species of animals. Insects themselves constitute about 80% of the arthropod species. Arthropoda and especially insects, have been dominating this planet for almost 350 million years. Much before man, they knew how to make paper, silk and sugar, recycle waste, practise agriculture, eliminate pests and so on. Familiar creatures like spiders, centipedes, millipedes and insects like ants, grasshoppers, mantids, locusts, butterflies, wasps and honeybees are displayed in this exhibition.

This exhibition explains the evolution, life cycle, locomotion, usefulness and defence mechanisms of the tiny creatures found in our backyards. The exhibition also reveals some fascinating facts about insects not known to many. This exhibition has been developed in an imaginative way to combine education and entertainment. The exhibits are enlarged to about 25–300 times the original size of the species and are animated robotic forms covering an area of about 7000 sq.ft. Along with these, the exhibition contains some interesting participatory exhibits in which the mouthparts of the insects, how they find their food, how they move and fly, their breathing mechanisms, their life cycle, their vision, their communication system, defence mechanism, usefulness and harmfulness and the distribution of arthropods, are all explained. In all the exhibition depicts 20 species of the arthropod world.

The exhibition is open to the public at the **Visvesvaraya Industrial & Technological Museum, Kasturba Road, Bangalore 560 001, from 25th of December 1998 till mid February 1999**. Apart from this exhibition, visitors can also enjoy 7 other interactive science exhibition halls in the museum premises. *Giants from the Backyard* will be a major attraction in Bangalore for about 50 days and after that it will be taken to the other NCSM Science Centres at Nagpur, Delhi and Calcutta.

