



MATHEMATICAL SCIENCES FOUNDATION

Inviting All Young Minds

3rd Edition – June 6 to 28, 2011



IAYM is a one-month summer programme for about 60 high school and college level students, from Class X and above. The purpose is to nurture out of the box thinking in bright and young students by involving them in interesting real world projects that have been a subject of vigorous research in recent years.

The first IAYM was conducted by MSF in 2009 at Delhi Public School, R K Puram, New Delhi, and was partly supported by the National Council for Science & Technology Communication.

"The most memorable month of my life" – G. Kataria
"Rules were reset, myths were broken" – S. Monika
"I developed a certain ability to work with a team" – P. Kumar
"Helped me a lot in developing research and communication abilities" – S. A. Parvez

The second IAYM programme was conducted in 2010 at The Air Force School, Subroto Park, New Delhi. This edition was sponsored by the Science and Engineering Research Council (Department of Science & Technology, Govt. of India), Mr Narayana Murthy, and NIIT.

"Feel like staying here forever" – B. Biswas
"Laid a foundation as to what I want to do in future" – S. Agarwal
"Hands on activities and projects brought a new dimension to understanding the beauty of mathematics" – G. Jain
"Every individual is given equal opportunity and made to think out of the box" – N. Deka

The 2011 edition is again being held at The Air Force School. The major sponsor is the upcoming **Shiv Nadar University** of the Shiv Nadar Foundation. Outstation participants will stay in the school hostel.

Details of the online application process are given below and on the websites listed here. There is no application or registration fee.

WEBSITES:

www.mathscifound.org

www.msfonline.in

iaym-msf.blogspot.com

SELECTED STUDENTS WILL RECEIVE:

- Stipend of Rs 5000
- Accommodation and travel support if from outstation

ELIGIBILITY:

School students of Class X and above (Should have entered Class X by summer 2011. Those currently taking Class XII Board exams are also eligible.)

College Students from the streams of BSc/ BA/ BTech etc. (Should have papers of Mathematics/Statistics.)

If you have any doubt about your eligibility, apply and let MSF sort it out!



Participants will be mentored by faculty members and post-graduate students. Their activities will include:

- An Application-oriented project.
- A project of Mathematics Communication.
- Daily lectures in applicable mathematics and training in mathematical software such as Excel and Matlab.
- Exposure to model building and simulation.
- Special talks and screenings by mathematicians and other scientists.

Project in Real-World Applications:

The 2009 and 2010 IAYM editions featured student teams working on topics such as Space and rocket science, the Jantar Mantar observatories, Search engines for images, Face Recognition, Computer Viruses, Encryption, Error correcting codes, Pattern Recognition in Genetics, Alternate Energy Sources, Cryptography and Financial Modeling. The goal is always that the students develop their own insights and innovations, rather than merely imbibe or implement set procedures. The tools used are computer simulations, physical models, and constant questioning of assumptions (old and new).

The projects currently shortlisted for IAYM 2011 are:

- **Mathematics from Nature:** Living organisms have been tackling difficult computational problems for eons. In recent years, mathematicians have started picking up methods from the behavior of ant colonies, bee swarms, etc. These have been applied to problems in engineering, medicine, and artificial intelligence.
- **World of Fractals:** Since the first fuzzy pictures produced in the 1970's, fractal images have become a part of popular culture. We will explore how they can be used to generate musical patterns!
- **Innovations in Public Transportation:** Create a new form of public transport. Or delve into how to organize the flow of traffic.
- **Video Compression:** If you have ever felt annoyed at not being able to e-mail your favorite videos to your friends join us in developing our own video compressing software. Mathematical tools such as wavelets will be used.
- **Fingerprint Recognition:** Do you want to prevent strangers from accessing your personal computer? Your fingers come very handy. Explore and learn the Mathematics behind Fingerprint Recognition and make your own computer software.

KEY DATES:

**Duration of Programme:
June 6 to 28, 2011**

**Deadline for submitting
online application form:
May 1, 2011**

**Deadline for receipt of
recommendation letters:
May 3, 2011**

**Announcement of results:
May 7, 2011**

**Deadline for receipt of
registration forms from
selected students:
May 17, 2011**

Dates are subject to change.
Check our websites/blog for
updates

CONTACT DETAILS:

Email:

iaym@mathscifound.org

Tel: 011-65182616

Tel/Fax: 011-29230401

Address for Correspondence:

**45, Ground Floor
World Trade Center
Babar Road
Connaught Place
New Delhi 110001**



- **Encryption:** Do you know that Germany lost World War II, because its encrypting technique was cracked? Come and try to devise an invincible encrypting technique. Powerful tools from Number Theory will be used.
- **Mathematical Biology:** One third of the Asthmatic patients of the world are in India. Many people are added to this list each day and they are unaware of their illness. Let us identify a patient at an early stage and help get them prompt treatment. We will make use of statistical analysis and optimization techniques.

Project in Mathematics Communication:

Each participant will work on the development of at least one idea on how to communicate to the public at large, some aspect of mathematics. In the earlier editions of IAYM students have approached the task of communicating school level mathematics through interactive e-lessons, cartoons, skits, and stories.

In the Class Room:

Apart from the time devoted to project-work, students will attend regular classes in applicable mathematics (Sets and Functions, Limits, Calculus, Matrices and Vectors, Geometry, Probability, Linear Algebra, Finite Fields, Numerical Analysis) and computer programming (Excel, Matlab, Flash).

Special Events:

Earlier IAYM editions have featured special lectures featuring History of Indian Mathematics, The Origin of Life (as an application of dynamic graphs), Symmetry, The life of Emmy Noether, The life of Ramanujan, Applications of Mathematics to Genetics, Statistical Simulation, Mathematical Finance, and Queuing Models, as well as screening of movies such as Flatland and a workshop on personality development.

Some special screenings and outings are also arranged for the hostel residents on Sundays.

One of the outstanding developments of IAYM has been the close friendship that is developed among the students of different ages and backgrounds, as well as between the students and faculty – especially the junior faculty that resides with the students in the hostel. **The students have written about their experiences on their own blogs as well as on networking sites such as Facebook and Orkut.**

About MSF

CHAIRMAN

- **Mr Naresh Chandra**
Former Ambassador to USA
Former Cabinet Secretary

INSTITUTIONAL MEMBER

- **ICICI BANK LTD.**

IAYM 2011 Resource Persons

COORDINATOR

- **Dr Sanjeev Agrawal**
Associate Professor
St. Stephen's College
Ph.D (Delhi)

CO-COORDINATOR

- **Dr Amber Habib**
Professor, MSF
Ph.D (Berkeley)

PROGRAMME MANAGER

- **Wg Cdr (Retd.) Sharad Chaturvedi**



How to Apply:

- Fill in the online application form before **midnight May 1, 2011.**

The form is available at www.msfonline.in

- While filling the form you will be asked to give your project preference. **While we will try to give selected students a project of their choice, we do not guarantee this and our choice of project allotment is final.** You also have the opportunity to propose your own project! A good project proposal will give your application extra weight.
- When you submit the form you will receive a reference number. Please use this number in any further correspondence about your application.
- Submit recommendation letters from **two** of your teachers.

Last date for receipt of recommendation letters: **May 3, 2011.**

- For the recommendation letters, your teachers can use the format available on the website.
- Mail the recommendation letters to MSF at the following address:

Mathematical Sciences Foundation
45 (Ground Floor), World Trade Center
Babar Road, Connaught Place
New Delhi 110001

Alternately, your teachers can directly email the letters from their official or institutional email account to iaym@mathscifound.org.

Your application will not be processed until the recommendation letters are received.

For further details about the programme or the application process, consult the MSF website www.mathscifound.org. You can also email queries to us at iaym@mathscifound.org or call us at 011-29230401, 011-65182616.

MSF FACULTY

- **Dr S K Tandon**
Distinguished Professor
FNA, FASc, Bhatnagar Prize
- **Dr L M Saha**
Professor
Ph.D (Kolkata)
- **Dr Manju Lata Agarwal**
Professor
Ph.D (Delhi)
- **Dr Sneh Lata**
Assistant Professor
Ph.D (Houston)
- **Dr Ajit Kumar**
Assistant Professor
Ph.D (Houston)
- **Mr Niteesh Sahni**
Senior Lecturer
M.Phil (Delhi)
- **Ms Charu Sharma**
Senior Lecturer
M.S (Houston)
- **Mr Ziaur Rehman**
Senior Lecturer
B.Ed (Aligarh)

ADJUNCT FACULTY

- **Dr Shobha Bagai**
Associate Professor
S P Mukherjee College,
University of Delhi
- **Dr Sanjeev Singh**
Institute of Informatics &
Communication, University
of Delhi
- **Dr Geetha Venkataraman**
Professor
Ambedkar University, Delhi