



**THE INSTITUTE OF MATHEMATICAL SCIENCES
TARAMANI, CHENNAI 600 113.**

**Quarterly Report
April - June 2018**

Research Highlights and outreach activities:

1. Popular Matching in Roommates Setting is NP-hard

An input to the Popular Matching problem, in the roommates setting, consists of a graph G and each vertex ranks its neighbors in strict order, known as its preference. In the Popular Matching problem the objective is to test whether there exists a matching M^* such that there is no matching M where more people are happier with M than with M^* . In a recent paper we settle the computational complexity of the Popular Matching problem in the roommates setting by showing that the problem is NP-complete. This resolved an open question that has been repeatedly, explicitly asked over the last decade.

<https://arxiv.org/abs/1803.09370>

2. Zero Shadow Day, April 24th 2018

Kamal Lodaya, Varuni P and Vijay Ravikumar (CMI) designed a poster to explain the astronomical phenomena called Zero Shadow Day which occurs twice a year when the sun is directly overhead at each latitude in the tropics. The poster received much attention on social media and was even covered in the science section of the Indian Express.

<https://indianexpress.com/article/explained/zero-shadow-day-how-shadows-played-hide-peek-with-chennai-kids-5156463/>

Kamal Lodaya, Varuni P and Vijay Ravikumar (CMI) also conducted a session for students at Pudiador (Urur Kuppam) on 24th April at local noon to observe the phenomena.



Zero Shadow Day, April 24th 2018

3. Summer School Students Workshop: 8th - 17th May 2018

IMSc organized a Mathematics and Science workshop for high school students. We were delighted by the overwhelming number of applicants for the program!

IMSc hosted 70 students from classes X & XI for the program. The workshop consisted of activity sessions, lectures and research talks in a range of topics from microscopy to astronomy. Participants also worked on projects and presented them on the last day of the workshop.

Sessions: Ajjath AH, Aparna Sankar, Anantha Padmanabha, Arivnd Gupta (Arvind Gupta Toys), G. Baskaran, K. A. Chandrashekar, Digjoy Paul, Pinaki Chaudhuri, Indumathi D. Jayashree (HBCSE), Kamal Lodaya, Madhusudan Raman, M.V.N. Murthy, Oorna Mitra, Pandu Rangan (IITM), S. Pavitra, Pooja Mukherjee, R. Ramanjuam, Semanti Dutta, R. Shankar, Sreevidya T S, Sushmita Venugopalan, Varuni P.



Summer School Students Workshop: 8th - 17th May 2018

4. Teacher's Enrichment Workshop: 21st - 26th May 2018 (Algebra, Analysis and Topology of p -adic numbers)

IMSc hosted a week long workshop aimed at mathematics teachers in Arts and Science colleges, to enable them to revisit and update content knowledge.

Discussion hours offered opportunities to get doubts cleared and work out exercises (both routine and advanced). About 60 teachers were selected from about 200 applicants. This program was part of IMSc's Enriching Collegiate Education (ECE) series of workshops as an effort to facilitate interactions between research mathematicians and college teachers. The workshop was held as a Teacher's Enrichment Workshop, a series co-sponsored by the National Centre for Mathematics (NCM).

Speakers: Anirban Mukhopadhyay, D. S. Nagaraj, P. Sankaran, Sanoli Gun