Lecture Programme for students of class XI and XII,
in association with National Academy of Sciences, Allahabad,
to be held at the Chennai Mathematical Institute, Siruseri
on 16th & 17th July 2018.

Monday, 16th July:

Time	Speaker	Title
10.00-11.00	**S.P. Suresh, CMI**	**Introduction to algorithms** Abstract: In this talk, we introduce algorithmic thinking to students by way of well known examples: searching and sorting.
11.00-11.30		**Discussion**
11.30-11.45		**Tea break**
11.45-12.45	**Clare D'cruz, CMI**	**Fun with Geometry** Abstract: Is Geometry abstract? Can we recognise it in nature? Is it easy or difficult. We will look into these aspects.
12.45-13.15		**Discussion**
13.15-14.15		**Lunch**
14.15-15.15	**M.S. Krisnamoorthy** **Retd. Professor of Computer Science** **Rensselaer Polytechnic Institute, USA**	**Introduction to Graph theory** Abstract: Preliminaries: Graphs,isomorphism, subgraphs, matrix representations, degree, operations on graphs, degree sequences Connected graphs and shortest paths: Walks, trails, paths, connected graphs, distance, cut-vertices, cut-edges, blocks, connectivity, weighted graphs, shortest path algorithms Trees: Characterizations, number of trees minimum spanning tree Special classes of graphs: Complete Graphs, (complete) Bipartite Graphs, Eulerian Graphs, Hamiltonian Graphs, Line Graphs. Interesting Problems: Vertiex Cover Problem, Doimanating Set Problem, Coloring Problem, Matching Problem, Network Flow Problem.
15.15-15.45		**Discussion**
15.45-16.00		**Tea break & disperse**

Tuesday, 17th July:

Time	Speaker	Title
10.00-11.00	**Manoj Kummini, CMI**	**Solving polynomial equations** Abstract: We solve linear equations in many variables using matrices and/or elimination. We can solve systems of polynomial equations in one variable using long division. What if we have a system of polynomial equations in many variables? We can put together the ideas of elimination and division to devise an algorithm to solve them. We will look at this algorithm and try to apply it to proving some simple results in geometry.
11.00-11.30		**Discussion**
11.30-11.45		**Tea break**
11.45-12.45	**S Gowrishankar** **Retd. Group Captain,** **Indian Air Force**	**How Do Airplanes Fly?** Abstract: One of the most awe-inspiring sights is the gravity-defying flight by a heavier-than-air object, be it a bird or an airplane. Is it not mind boggling that a small stone, weighing only a few grams, falls down to earth when thrown up, while an airplane, weighing hundreds of tonnes, is able to fly along! The trick lies in understanding the basics of aeronautics. These talks are aimed at providing a lucid explanation of the science and technology behind flight, within the earths atmosphere and in the space beyond.
12.45-13.15		**Discussion**
13.15-14.15		**Lunch**
14.15-15.15	**Amitabh Virmani, CMI**	**The emergence of Gravitational Wave Science** Abstract: The discipline of gravitational wave astronomy combines General Relativity with some of the most powerful developments in geometry, differential equations, numerical analysis, experimental physics, and data science. In this talk, I will emphasize the synergy between these disciplines in the development of GW science.
15.15-15.45		**Discussion**
15.45-16.00		**Tea break & disperse**