Lecture Programme for students of class XI and XII, in association with National Academy of Sciences, Prayagaj to be held at the Chennai Mathematical Institute, Siruseri on 19th & 20th July 2024.

Friday, 19 July 2024		
Time	**Speaker**	**Title**
10.00—11.15	**Sushmita Venugopalan, IMSc**	**Areas and volumes without calculus** Abstract: In this talk we will derive some familiar formulas for areas and volumes without using calculus.
11.15—11.45	**Snacks break**	
11.45—13.00	**S Vishwanath, IMSc**	**Increasing, decreasing, this and that.** Abstract: Given a sequence of distinct real numbers, can we find a -subsequence which is strictly increasing or strictly decreasing ? Can we find the longest such subsequence ? How long can these -be ? We begin with a few such questions and use these as a starting point to explore many beautiful parts of mathematics the pigenhole principle, novel ways to sort permutations, the amazing algorithm of Robinson-Schensted, and above all, the idea of proof in mathematics.
13.00—14.00	**Lunch**	
14.00—15.15	**Alok Laddha, CMI**	**Quantum Mechanics in Everyday Life** Abstract: Quantum mechanics the fundamental theory of nature which describes physics at atomic and sub-atomic scales. In this talk we will see how quantum mechanics permeates our everyday lives in a myriad of ways. We will then discuss where the theory stands in light of current experiments.
15.15—15.45	**Snacks break**	

Saturday, 20 July 2024		
Time	Speaker	Title
10.00-11.15	**D Indumathi, IMSc**	**What is the Universe made up of? How do we know this?** Abstract: From looking up at the heavens, early astronomers learned a great deal about our Universe. With increasingly sophisticated technology, we are now learning that our Universe is even more amazing than we thought. I will present some highlights of these discoveries in this talk.
11.15-11.45	Snacks break	
11.45-13.00	**Meghana Nasre, IIT Madras**	**Tiling Problems and Proof Techniques** Abstract: In this talk we will consider some problems on an n X n checkerboard. A checkerboard is an n X n grid. Given an unlimited supply of the n X n "tiles" of a particular shape, the goal is to cover the board completely without any overlaps. Depending on the checkerboard and the shape of the tiles we will see examples of 1) A tiling exists. 2) We do not know whether a tiling exists 3) We can show that no tiling exists. Along the way we will see some interesting and useful proof techniques. The talk will be elementary and self-contained and no formal mathematical background will be expected.
13.00-14.00	Lunch	
14.00-15.15	**Sushmita Gupta, IMSc**	**Game On! Let's talk about some games** Abstract: Let's explore some classic games and see how reasoning about them allows us to understand the physical world around us. From natural interactions within ecosystems–be that of cooperation or conflict–to the intricacies of man-made processes including the development of intelligent systems, we are surrounded by gameplay, where our actions and decision making can often lead to unexpected consequences. This talk aims to shed light on these parallels and ponder whether we can engineer scenarios that lead to an 'ideal' outcome.
15.15-15.45	Snacks break	