MONDAY

# COLLOQUIUM

## Towards AI Bacteria: Genetically Engineered E.*coli* Networks Identifies Prime Numbers, Vowels and Answer Math Questions

Sangram Bagh (SINP, Kolkata)

09 Feb 2026 (Monday) | 16:00 Hrs (Tea / Coffee 15:45 Hrs) | Venue: TIFRH Auditorium

Performing cellular computations with engineered bacteria has enormous importance in biocomputer technology development at the micron scale, where microprocessor-based computers have limitations due to energy, cost, and technological constraints. Here, we designed and built artificial neural networks (ANNs) with genetically engineered bacteria that can identify prime numbers, vowels, and even determine the maximum number of pieces of pizza or pie that can be obtained from a given number of straight cuts. In addition, the 'intelligent' bacteria can answer mathematical questions such as whether a number n's factorial is divisible by n × (n + 1)/2 OR whether a number n's square can be expressed as the sum of three factorials. To build such "intelligent" bacteria, we created synthetic gene regulatory networks such that each bacterium function as artificial neuro-synapses and collectively form mix-and-match multicellular networks in liquid culture. Introducing such abstract computational capability in living cells, will be a step forward in biocomputer technology development and may help understanding the biochemical nature of 'intelligence'.

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