

DEPARTMENT OF MATHEMATICS, IIT MADRAS, ORGANISES
– RESEARCH SEMINARS, ON 15TH FEBRUARY, 2023

(I) **Prof. Apoorva Khare**, IISC Bangalore. (3-3.45 pm, 15th Feb.)

Title: *Total positivity and Polya frequency sequences.*

Abstract: This talk provides a gentle introduction to totally positive matrices and Polya frequency sequences. We will see basic examples, history, and fundamental results on total positivity, variation diminution, and sign non-reversal – as well as a few proofs to illustrate how the main ingredients fit together. Several classical results (and one Hypothesis) from before 1955 feature in this journey. We will end by connecting Polya frequency sequences to the Laguerre–Polya class and hence to Polya–Schur multipliers, and mention 21st century incarnations of the latter.

(II) **Prof. Barbara Rüdiger**, University of Wuppertal, Germany. (4-4.45 pm, 15th Feb.)

Title: *On the construction and identification of Boltzmann processes.*

Abstract: The first part of the talk will be dedicated to an introduction to the Boltzmann equation.

In the second part of the talk a new result, joint with S. Albeverio (University Bonn, Germany) and P. Sundar (Louisiana State University, USA), will be presented: Given the existence of a solution of the Boltzmann equation for hard spheres, we find the stochastic process which distribution solves the Boltzmann equation. This solves a McKean -Vlasov Stochastic Differential Equation with a Poisson Noise defined in terms of the solution of the Boltzmann equation.

(III) **Prof. Somasundaram K**, Amrita Vishwa Vidyapeetham, Coimbatore. (5-5.45 pm, 15th Feb.)

Title: *Graph Analytics for Large Scale Networks.*

Abstract: The advent of social networks, big data, and e-commerce have re-emphasized the importance of analyzing a unique type of data structure—one which depicts relationships among its entities, also known as a Graph. Graph-based data analytics is emerging as one of the primary research in Data Science. Degree, distance, and spectral-based centralities are some of the centrality measures. This talk will focus on these centrality measures with some case studies in networks.

• **Venue-** NAC 522. **Sponsored by -** Global Engagement of IIT Madras.