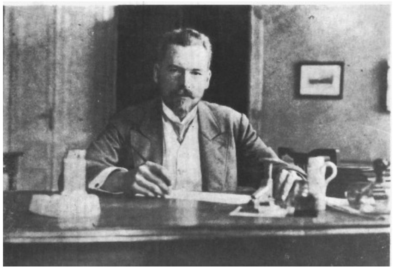

Contribution ID: **57** Type: **Flash talk**

Leveraging large deviation statistics to decipher the stochastic properties of measured trajectories

Wednesday, 29 September 2021 17:50 (5 minutes)

Single-particle tracking routinely measures the motion of different particles in biological and soft-matter systems and often unveils characteristic deviations of the observed stochastic dynamics from standard Brownian motion. To identify the correct underlying physical mechanism often tools such as machine-learning and Bayesian inference are employed. These methods are technically involved and computationally expensive, with the computational cost increasing with the number of models considered. We show that the large-deviation theory applied to the time-averaged mean-squared displacements provides a simple-yet-efficient tool for the construction of decision trees to reject certain models. This facilitates the reduction of the list of feasible models and thereby complements Bayesian and machine-learning methods. We show how we can use this large-deviation theory based approach to uncover additional information from measured trajectories in complex liquids as well as climate data.

Primary author: Dr THAPA, Samudrajit (Tel Aviv University)

Co-authors: Prof. WYŁOMAŃSKA, Agnieszka (Faculty of Pure and Applied Mathematics, Hugo Steinhaus Center, Wrocław University of Science and Technology, Wrocław, Poland); Dr SIKORA, Grzegorz (Faculty of Pure and Applied Mathematics, Hugo Steinhaus Center, Wrocław University of Science and Technology, Wrocław, Poland); Dr WAGNER, Caroline (Department of Bioengineering, McGill University); Prof. KRAPF , Diego (Department of Electrical and Computer Engineering, Colorado State University); Prof. KANTZ, Holger (Max Planck Institute for the Physics of Complex Systems, Dresden); Prof. CHECHKIN, Aleksei (Institute for Physics & Astronomy, University of Potsdam); Prof. METZLER, Ralf (Institute for Physics & Astronomy, University of Potsdam)

Presenter: Dr THAPA, Samudrajit (Tel Aviv University)

Session Classification: S9