BiophysTO Lunchtime Seminar Series

Date

Thursday, November 8, 2018
11:00 am

Location

McLennan Physical Labs, MP606
60 St George Street

Coffee & cookies provided

Prof. Armita Nourmohammad

University of Washington

Statistical physics of molecular evolution across scales

A venerable question in evolutionary biology is: if the tape of life was replayed, would the outcome be the same? We do not know how evolutionary predictability relates to molecular scales, ranging from genotypes to molecular phenotypes and function. I discuss universal properties of molecular phenotypes, encoded by high-dimensional genotypes, which allow for the predictive description of their evolution. I introduce a non-equilibrium framework for adaptation of populations in time-dependent environments. I present strong evidence that environmental fluctuations drive the evolution of gene expression levels in Drosophila. Co-evolving populations reciprocally affect the fitness of each other, acting as time-dependent environments with feedback. I show evidence of co-adaptation between interacting cellular populations of HIV and the antibody repertoire of a patient during infection.

Bio: *Armita Nourmohammad is an assistant professor of physics at the University of Washington, Seattle and a Max Planck Research Group Leader at the MPI for Dynamics and Self-Organization in Göttingen, Germany. She received her Ph.D. in Physics from University of Cologne in 2012, and was subsequently a James S. McDonnell Postdoctoral Fellow and an associate research scholar at Princeton University, affiliated with both the department of physics and the Lewis-Sigler Institute for Integrative Genomics. Her research interests are in the areas of non-equilibrium statistical physics, information theory and population genetics. Her current research focuses on modelling and control of immune-pathogen coevolution, information processing in evolutionary biology and machine leaning from molecular data.*

Host: Prof. Sid Goyal

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