

# Population Dynamics Virtual Seminar



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## **Statistical physics of microbial growth: fluctuations, phase transitions and large deviations**

The observation that non-genetic variability is ubiquitous in microbial populations has led to a multitude of experimental and theoretical studies seeking to probe the causes and consequences of this variability. Whether it be in the context of antibiotic treatments or exponential growth in constant environments, variability has significant effects on population dynamics.

I will present a coarse-grained model for cell growth showing that growth-rate fluctuations typically lower the population growth. Analogous results are derived in the case where the variability arises from the asymmetric partitioning of a cellular resource, where we find a phase transition between a regime where variability is beneficial to one where it is detrimental. We will also show that a population's growth rate can be inferred from a single lineage, with intriguing relations to large deviation theory.