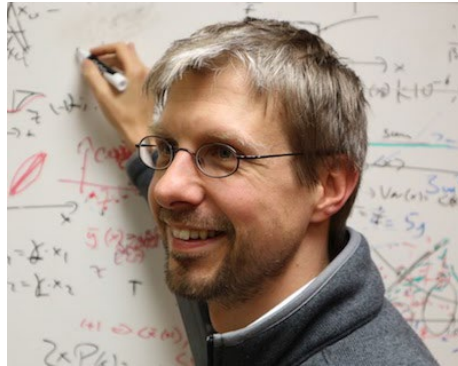# PHYSICAL MATH SEMINAR

Understanding complex cellular processes through fluctuation constraints

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ABSTRACT:

Cellular processes are complex and involve many components whose interactions are stochastic and only partially characterized. Instead of guessing unknown details our work focuses on analyzing classes of biochemical reaction networks that share some features but are left to vary arbitrarily in all unknown features. This allows us to derive impossibility constraints that can guide the design of synthetic biology applications and help us understand the operating principles of cellular processes. I will also discuss how invariants for classes of incompletely specified systems can be exploited to infer rate functions and causal interactions in complex systems from observing stochastic fluctuations of a small subset of components. Such approaches have the potential to turn quantitatively intractable complex systems into a sequence of solvable inference problems.

TUESDAY, NOVEMBER 26, 2024
2:30 PM – 3:30 PM
Building 2, Room 449

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