DEPARTMENT OF MATHEMATICAL SCIENCES

Colloquium

Michal Balcerak

Harvard University

Title: Optimization-Based Generative Modeling

Abstract: Generative modeling can be viewed as a search for states consistent with data, prior knowledge, and constraints. I will discuss how to learn scalar energy landscapes in which solution-like states occupy low-energy regions, and how to generate samples by navigating these landscapes at inference time.

Drawing on optimal transport and gradient flows, I will describe how to shape these landscapes so that gradient-based methods guide exploration toward promising basins, while stochastic dynamics support sampling within and between them. Energy Matching (NeurIPS 2025) and Graph Energy Matching (NeurIPS 2026) will illustrate this perspective in continuous spaces and discrete structures.

Friday, December 4

11:00 – 12:00 pm

Stratton 202

WPI