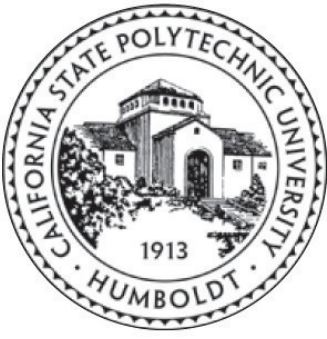




DEPARTMENT OF MATHEMATICS & DATA SCIENCE
Fall 2026 MATH & DATA SCIENCE Colloquium Series

Discovering Governing Equations from Biological Data: Deterministic and Stochastic Perspectives

Dr. Suzanne Fernandes-Sindi

**Department of Applied Mathematics
UC Merced**



What does it take to recover the underlying rules of a complex biological system directly from data? I describe two distinct approaches to this problem, one deterministic and one stochastic. The first, Multi-Experiment Equation Learning (ME-EQL), recovers generalizable governing equations from agent-based model simulations. By training simultaneously across multiple parameter regimes rather than a single one, this approach substantially improves the accuracy of parameter recovery relative to standard methods.

The second addresses a different challenge: reconstructing the structure and rate parameters of a chemical reaction network from just a single stochastic trajectory. Using a Bayesian approach built on spike-and-slab priors, I discuss how identifiability can be established and posterior consistency proven, yielding sparser and more accurate network reconstructions than existing frequentist methods allow.

Taken together, these two approaches highlight the range of mathematical and statistical tools available for extracting interpretable, predictive structure from complex biological data — whether the underlying dynamics are deterministic or governed by chance.

THURSDAY
Oct. 1, 2026

4:00 PM
Sci B #135

FOR MORE INFO GO TO <https://math.humboldt.edu/get-involved/mathematics-colloquium>

**We cordially invite you to the PRE-COLLOQUIUM TEA in BSS#312
at 3:30 PM**