Maud Menten Institute /
Mathematical and Statistical Biology Seminar

Monday, April 13, 2026
2:00pm CT
University of Manitoba – 225 St. Paul's College

-or-

Join Zoom meeting

Meeting ID: 699 6049 3994

Passcode: 900153

Hao Wang (Howard)

Dept of Mathematical and Statistical Sciences
University of Alberta

Theory + Data: Building Hybrid Models with Stoichiometry and Machine Learning

Stoichiometric principles provide a rigorous, law-based backbone for building mechanistic models that are robust and empirically testable through conservation and physiological constraints. In this talk, I will introduce stoichiometric models that resolve key biological paradoxes by explicitly tracking elemental and quota-driven limitations, then demonstrate how data-driven components can (i) learn missing processes, (ii) improve short-term forecasting, and (iii) enable real-time monitoring. Methane biogenesis in oil sands tailings serves as a central application: we couple stoichiometric biodegradation dynamics with ML-enabled monitoring to better predict emissions trajectories. This research contributes to the broader goal of carbon neutrality.

In Victoria: Attend the **UVic watch party (12pm PT)** Clearihue A-317

In Edmonton: Attend the **UofA watch party (1pm MT)** UComm 4-450