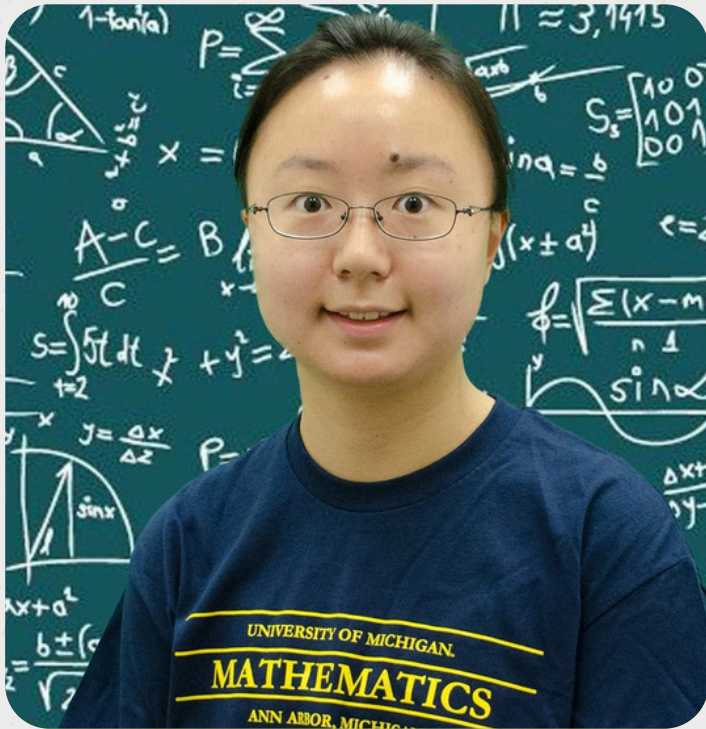




Colloquium



MONDAY, OCT 19, 2026

3:30 PM - 4:30 PM | 2048 CB

**PHASE AS AN ORGANIZING
PRINCIPLE FOR BIOLOGICAL
OSCILLATORS**

Speaker: Yangyang (Alexandra) Du

Bio

Yangyang (Alexandra) Du is a Ph.D. student in Applied & Interdisciplinary Mathematics (AIM) and Scientific Computing at the University of Michigan-Ann Arbor. She completed her undergraduate study at Oberlin College. Her research focuses on applied dynamical systems and computational neuroscience.

Abstract

Oscillations are ubiquitous in biological systems—from action potentials in neurons and cardiac cells to circadian rhythms, they occur across a wide range of time scales. As with other periodic motions, we can describe these biological rhythms by introducing a “phase” variable that indicates where the system is in its oscillatory cycle. Because physiological systems are often high-dimensional, phase reduction provides a powerful way to simplify their dynamics. In more realistic settings, however, biological oscillators are subject to noise, interactions with other oscillators, and changing environments. Does the concept of phase persist under these complications? Can phase still provide a faithful reduced description of observable dynamics? In this talk, I will discuss how my research approaches these questions from several perspectives. In particular, I will show how phase-based methods can simplify the simulation of stochastic oscillators, enable real-time tracking of biological rhythms, and help us understand synchronization and symmetry breaking in coupled oscillator populations.

Refreshments will be provided!