

The College of Arts & Sciences
Department of Mathematical Sciences

Candidate Colloquium

Anna Nelson

Duke University

Tuesday, January 23, 2024

Swift Hall, Room 819

4:00 – 5:00 pm

***Mathematical modeling of
polymerization processes in physiology***

Polymerization, or aggregation, is essential for many physiological systems. For example, the emergence of a fibrin polymer mesh during the formation of a blood clot is required for a stable clot and long-term, sustained intracellular transport in neurons rely on persistent yet dynamic polymers that comprise the microtubule cytoskeleton. In this talk, I will discuss efforts I have made towards understanding polymerization processes in physiology, as well as new research directions. In the first part, I will discuss a mathematical model that represents the formation of a fibrin polymer mesh with interactions with its precursor molecule, fibrinogen. We investigate how these interactions can impact gel structure and gel time. In the second part, I will introduce a stochastic mathematical model of microtubule growth in the dendrite of a neuron. Using parameters informed by experimental data, we explore what mechanisms could control the equilibrium microtubule length and validate these mechanisms using fluorescence microscopy data.

**Refreshments will be served 3:15 – 3:45 pm in the Faculty Lounge
4118 French Hall West**