



Colloquium

Wednesday, October 23, 2019, 4:05 p.m. (9th Period)
(in the Atrium)

Speaker: Dr. Tracy Stepien

Title: Cell migration in development, wound healing, and cancer:
Modeling, simulation, and analysis

Abstract: Beginning momentarily after we are conceived through to our final days, cells migrate within our bodies. From embryonic development to the progression of many diseases including cancer, cell migration plays an essential role in maintaining our health. To understand the mechanisms and forces involved in migration related to early embryonic development, eye and retina development, wound healing, and cancer growth, I have developed continuum mechanical models with free boundaries and reaction-diffusion equation models of the spread of tissues and tumors. Mathematical analysis and numerical simulations of the models indicate conditions for traveling wave and similarity under scaling solutions, and data and image analysis of experimental data has facilitated the estimation of model parameter values that are physically relevant.

In this talk, I will give examples of biological cell migration problems that I work on as well as an in-depth look at some of the mathematical analysis that has arisen from the model equations.