1163-65-277   **Ethan Jensen*** (`ejensen18@georgefox.edu`) and **Corban Harwood**. *Existence and Shape of Numerical Oscillations in Solving Parabolic PDE.*

In this talk, we employ linear algebra and functional analysis to determine necessary and sufficient conditions for oscillation-free and stable solutions to linear and nonlinear parabolic partial differential equations. We apply singular value decomposition and Fourier analysis to various finite difference schemes to extract patterns in the eigenfunctions (sampled by the eigenvectors) and the shape of their eigenspectrum. Through these, we share how the initial and boundary conditions affect the frequency and long term behavior of numerical oscillations, as well as the solution regions most sensitive to them. (Received August 31, 2020)