

College of Arts and Sciences
Department of Mathematics
University of South Carolina

Math Colloquium

*Bounds and Asymptotic Dynamics
for Nonlinear Evolution Equations*

Andrei Tarfulea, University of Chicago



Thursday
February
15th

4:30 PM
LeConte 412

Understanding the behavior of solutions to physically motivated evolution equations is one of the most important areas of applied analysis. Developing strong bounds and asymptotics are crucial for anticipating the behavior of simulations, simplifying the methods needed to model the physical phenomena.

The focus will be on recent results in three physical models: homogenization and asymptotics for nonlocal reaction-diffusion equations, a priori bounds for hydrodynamic equations with thermal effects, and the local well-posedness for the Landau equation (with initial data that is large, away from a Maxwellian, and containing vacuum regions). Each problem presents unique challenges arising from the nonlinearity and/or nonlocality of the equation, and the emphasis will be on the different methods and techniques used to treat these difficulties in each case. The talk will touch on novelties in viscosity theory and precision in nonlocal front propagation for reaction-diffusion equations, as well as the emergence of "dynamic" self-regularization in the thermal hydrodynamic and Landau equations.