Dr. Wenxian Shen

Auburn University

USA

Wenxian Shen is a professor at Auburn University, Alabama, USA. She received her Ph.D. from Georgia Institute of Technology in 1992. Her research interests are in diffusive differential equations, especially diffusive differential equations with random or nonlocal dispersal, dynamical systems, and their applications in applied sciences. She is particularly interested in qualitative behavior and spatial propagation dynamics in diffusive differential equations in heterogenous media and in cross-diffusion systems. Dr. Shen's website is at https://www.auburn.edu/~wenxish

Title: Global existence and spatial spreading speeds in chemotaxis systems with logistic source on $\mathbb{R}^N$

Abstract:
This talk is concerned with the global existence and spatial spreading speeds in three primary chemotaxis systems with logistic source on the whole space $\mathbb{R}^N$. First, I will present a unified proof demonstrating global existence of positive classical solutions of these systems can be deduced from their uniform boundedness in $L_{\rm loc}^p(\mathbb{R}^N)$ for some $p>\max\{1,\frac{n}{2}\}$. I will then provide sufficient conditions in terms of the parameters in the systems for the global existence and boundedness of classical solutions. Next, I will discuss the spatial spreading speeds of positive solutions with compactly supported or front-like initial functions. Special attention will be given to influence of the chemotaxis sensitivity on the propagation speeds of such solutions. It will be shown that chemotaxis does not slow down the spatial spreading no matter it is positive taxis or negative taxis. Some discussion will also be given on whether chemotaxis speeds up the spatial spreading.