

Mathematics Colloquium

University of Texas at Arlington - Department of Mathematics

Proudly Presents:

Dr. Yang Kuang

Arizona State University

Friday, October 9th, 2026

2 pm – 3 pm

PKH 311

“Modeling a cancer combination immune-therapy with certainty: an immune checkpoint inhibitor and its synergy with an immunostimulant”

Abstract:

Immune checkpoint inhibitors (ICIs) are a novel cancer therapy that may induce tumor regression across multiple types of cancer. There has recently been interest in combining the ICIs with other forms of treatments, as not all patients benefit from monotherapy. We propose a mathematical model consisting of ordinary differential equations to investigate the combination treatments of the ICI avelumab and the immunostimulant NHS-mu12. We validated the model using the average tumor volume curves provided in Xu et al. (2017). This mathematical model produce insightful conditions for local stability for both the tumorous and tumor-free steady states. Additionally, we conducted systematic mathematical analysis for the case that both drugs are applied continuously. Numerical simulations suggest that the two drugs act synergistically. Compared to monotherapy, about one-third the dose of both drugs is required in combination for tumor control.

Short Bio: Yang Kuang is a Professor in the School of Mathematical and Statistical Sciences at Arizona State University and a leading expert in mathematical biology and oncology. He has authored more than 220 research articles and 12 books, including *Introduction to Mathematical Oncology*, and is the founder and editor of the journal *Mathematical Biosciences and Engineering*. His research has made significant contributions to delay differential equations, cancer modeling, and the mathematical study of disease dynamics and treatment responses. Through the development of biologically grounded and computationally tractable models, his work seeks to advance personalized medicine and improve outcomes for patients with complex diseases.

Local Host: Dr. Hristo Kojouharov

Refreshments before the talk and socializing following the talk

<http://www.uta.edu/math/seminars>