

AIPHA/LIAM WEEKLY SEMINAR

Presented by : Dr. Yueping DONG

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Associate Professor and Doctoral Supervisor



Title : Complex dynamics in tumor–immune system interactions

Time : 11:00 AM – 12:30 PM, Friday, October 9, 2026

Abstract

The dynamics of tumor–immune responses are highly complex, and the mechanisms underlying tumor–immune system interactions remain incompletely understood. Mathematical models can be used to investigate tumor–immune system interactions across multiple biological scales, including the molecular, cellular, and tissue levels. In recent years, we have developed a series of mathematical models that incorporate various types of immune cells and cytokines, such as helper T cells, regulatory T cells, macrophages and transcription factor TGF- β , to investigate the complex dynamics of tumor–immune interactions. By analyzing the model dynamics, we have identified several interesting and biologically relevant phenomena including multistability, supercritical and subcritical Hopf bifurcation, Bogdanov–Takens bifurcation. Our findings highlight the complex regulatory role of the immune system and provide a theoretical framework for understanding its impact on tumor progression and identifying potential therapeutic targets.

About The Speaker

Dr. Yueping DONG, an associate professor at Central China Normal University and a doctoral supervisor. He is a member of Expert Committee of the Chinese Society of Mathematical Biology, and a member of Expert Committee of the Chinese Society of Mathematical Life Sciences. In 2014, he obtained the Ph.D. degree from Shizuoka University in Japan and worked as a post-doctoral fellow in the Faculty of Medicine at the University of Tokyo. His research focuses on Mathematical Biology, Differential Equations, and Applied Dynamical Systems. In recent years, he has published over 40 scientific papers in peer reviewed journals such as *SIAM J. Appl. Math.*, *SIAM J. Appl. Dyn. Syst.*, *Nonlinearity*, *Am. Nat.*, *Infect. Dis. Model.*, *J. Math. Biol.*, *J. Theor. Biol.*. Besides, he has successively led two projects funded by the National Natural Science Foundation of China and several research projects funded by the Natural Science Foundation of Hubei province.