

KIOS Distinguished Lecture Series



Prof. Zhong-Ping Jiang

New York University, USA

Friday, **4 November 2022**, at **12:00** | Amphitheatre **B108**

Small-Gain Theory for the Stability and Control of Nonlinear Network Systems

LECTURE ABSTRACT

The world is nonlinear and linked. Small-gain theory is one of the most important tools to tackle fundamentally challenging control problems for interconnected nonlinear systems. In this talk, I will first review our early work in nonlinear small-gain theorems and associated nonlinear control design. Then, I will present recent developments in network small-gain theorems for complex large-scale nonlinear systems, with applications to networked and event-triggered control under communications and computation constraints. Finally, I will discuss how small-gain methods can be integrated with reinforcement learning techniques to solve real-time decision-making problems, when the system model is completely unknown. Autonomous driving and human motor control will be used to illustrate our recent research in learning-based control, a new direction in control theory.

BRIEF BIO

Zhong-Ping JIANG received the M.Sc. degree in statistics from the University of Paris XI, France, in 1989, and the Ph.D. degree in automatic control and mathematics from the Ecole des Mines de Paris (now, called ParisTech-Mines), France, in 1993, under the direction of Prof. Laurent Praly. Currently, he is a Professor of Electrical and Computer Engineering at the Tandon School of Engineering, New York University. His main research interests include stability theory, robust/adaptive/distributed nonlinear control, robust adaptive dynamic programming, reinforcement learning and their applications to information, mechanical and biological systems. In these fields, he has written six books and is the author/co-author of over 500 peer-reviewed journal and conference papers.

Prof. Jiang is a recipient of the prestigious Queen Elizabeth II Fellowship Award from the Australian Research Council, CAREER Award from the U.S. National Science Foundation, JSPS Invitation Fellowship from the Japan Society for the Promotion of Science, Distinguished Overseas Chinese Scholar Award from the NSF of China, and several best paper awards. He has served as Deputy Editor-in-Chief, Senior Editor and Associate Editor for numerous journals. Prof. Jiang is a Fellow of the IEEE, IFAC, and CAA, a foreign member of the Academia Europaea (Academy of Europe), and is among the Clarivate Analytics Highly Cited Researchers. In 2022, he received the Excellence in Research Award from the NYU Tandon School of Engineering.

