

**The Hong Kong Polytechnic University  
Department of Applied Mathematics****Colloquium****Complex Adaptive Systems Modeling: Application in Dynamics of Social Insect Colonies and Human-Robotic Teaming****By****Prof. Yun KANG  
Arizona State University****Abstract**

A complex adaptive system (CAS) is a system that is complex in that it is a dynamic network of interactions, but the behavior of the ensemble may not be predictable according to the behavior of the components. Social insect colonies; the brain; the immune system; and human social group-based endeavors are excellent examples of complex adaptive. Mathematical models are powerful tools that can provide us quantitative approaches to elucidate complicated ecological and evolutionary processes on the numerous spatial, temporal and hierarchical scales at which CAS such as social insect colonies and/or human groups operate. In this talk, I will review some of our recent collaborative work with biologists and psychologists regarding important and interesting questions of CAS such as how information spreads in the social insect colonies? How may we define and model trust dynamics in human and robotic teaming? I will particularly present one specific example of our modeling work through ODE, SDE modeling approaches to explore: (1). How do task organization and work performance scale with colony size and metabolism? and (2). How does environment impact task allocation?

**Biography**

Dr. Yun Kang is a professor of Applied Mathematics in the sciences and mathematics faculty group of the College of Integrative Sciences and Arts (CISA) at Arizona State University. Dr. Kang joined ASU as an assistant professor in 2008, immediately after completing her doctorate in mathematics from ASU. She has published more than 90 articles in high profile journals of mathematical biology. Her current research areas are Mathematical Modeling of Complex Adaptive Systems with Data.

Dr. Kang established well-funded research programs in the area of Mathematical Biology and Complex Adaptive Systems; cultivated and launched ASU's new Undergraduate Program in Applied Mathematics in CISA; mentored numerous graduate and undergraduate students (many of whom are underrepresented and minorities); piloted summer programs to increase minority engagement; and implemented new courses in her college unit. Dr. Kang has been actively involved in encouraging women and girls to study and to have active careers in the mathematical sciences. For example, she serves as American Mathematical Society (AMS) Representative to the Joint Committee on Women in the Mathematical Sciences. Dr. Kang also serves as the treasure and the board of directors of International Society of Difference Equations.

**Date: 25 April 2022 (Monday)****Time: 10:00-11:00 (Hong Kong Standard Time GMT +8)****Venue: Online Talk via Zoom (Meeting ID: 973 5222 1007)****Speaker: Prof. Yun Kang, Arizona State University****Host: Dr. Yijun Lou, The Hong Kong Polytechnic University****Click to join:****<https://polyu.zoom.us/j/97352221007?pwd=ODNDdm53ZnE0ajN4M1ZNZjN2VUJaZz09>****Click to join****\* \* \* ALL ARE WELCOME \* \* \***For enrolment, please send your name and email to [wai-yan.moon@polyu.edu.hk](mailto:wai-yan.moon@polyu.edu.hk) on or before 24 April 2022