



ICCC 2026

April 16-18, 2026 * Brisbane, Australia

IEEE 13th International Joint Conference on Cybernetics and Computational Cybernetics, Cyber-Medical Systems

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PLENARY TALK

How Vulnerable are Cyber-Physical Systems?

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Abstract:

Cyber-physical systems (CPS) are everywhere around us—from smart grids that power our cities to intelligent transportation systems that keep traffic moving. These systems work by tightly combining software, communication networks, and physical equipment. But that same tight integration comes with a downside: it also creates new opportunities for cyber-attacks. And when CPS are attacked, the consequences can be far more serious than in traditional IT systems—impacting not only money and infrastructure, but potentially public safety as well.

In this talk, I will look at CPS security from an attacker's point of view. I will begin with a brief introduction to what CPS are, why they are vulnerable, and what kinds of cyber-attacks have already been studied and observed. I will then share our recent work on stealthy hybrid attacks—a class of attacks that combine multiple cyber techniques to cause maximum disruption while staying as hidden as possible. These attacks are designed to degrade system performance significantly, yet avoid triggering existing detection mechanisms. By understanding how such attacks can be constructed, we can better identify the weaknesses of current defense methods and, more importantly, develop new strategies for detection, resilience, and secure operation. The goal is to help future CPS remain not only smart and efficient, but also safe, reliable, and trustworthy.



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Short CV:

Peng Shi is now a Distinguished Professor at the School of Electrical and Mechanical Engineering, and the Director of Advanced Unmanned Systems Laboratory, at Adelaide University, Australia. His research interests include systems and control theory and applications to autonomous and robotic systems, cyber-physical systems, and multi-agent systems. His accolades include the Lotfi Zadeh Pioneer Award (2025), and Nibert Wiener Emerging Technologies Award (2024) from IEEE Systems, Man and Cybernetics Society (SMCS), the Annual Scientific Award (2024) and Ramesh Agarwal Life-time Achievement Award (2023) from the International Engineering and Technology Institute, the MA Sargent Medal Award from Engineers Australia in 2022; the recognition of Life-time Achiever Leaderboard and Field Leader from The AUSTRALIAN Research Review from 2019-2024, selected as a Highly Cited Researcher from Thomson Reuters from 2014-2025, the Outstanding Achievement Award from The University of Adelaide in 2020, and the Chancellor's Gold Medal for Outstanding Research Performance from Victoria University in 2018. Currently he serves as the Editor-in-Chief of IEEE Transactions on Cybernetics, a Senior Editor of IEEE Access, and IEEE SMCS Distinguished Lecturer. He was a Member-at-Large of Board of Governors (2018-2020), and the Vice President of IEEE SMC Society (2021-2022). He is a Fellow of Australian Academy of Technological Sciences and Engineering, a Foreign Member of Engineering Academy of Japan, Academy of Europe, Romanian Academy of Scientists, and a Fellow of IEEE, IET, IEAust.



He received the PhD degree in Electrical Engineering from the University of Newcastle, Australia in 1994, the Doctor of Science degree from the University of Glamorgan, Wales in 2006, and the Doctor of Engineering degree from the University of Adelaide, Australia in 2015.



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