

# Keynote Speech

Prof. Qianchuan Zhao

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**Prof. Qianchuan Zhao** received the B.E. degree in automatic control in July 1992, the B.S. degree in applied mathematics in July 1992, and MS and Ph.D. degrees in control theory and its applications in July 1996, all from Tsinghua University, Beijing, China. He is currently a Professor and Director of the Center for Intelligent and Networked Systems (CFINS) <http://cfins.au.tsinghua.edu.cn>, Department of Automation, Tsinghua University. His current research focuses on the modeling, control and optimization of complex networked systems. He has published more than 80 research papers in peer-reviewed journals and conferences. Dr. Zhao is an editor for the IEEE Transactions on Automation Science and Engineering and Editor-in-Chief of the journal Results in Control and Optimization. He was awarded The National Science Fund for Distinguished Young Scholars of China in 2014.

***Title:*** *Better building control strategies enabled by AI technologies*

***Abstract:*** *This talk will overview a new building control scheme that tries to treat control devices in buildings as smart agents from a Cyber Physical System point of view. We formulate a class of energy efficient building control problems as a decentralized optimization problem. The challenge to solve such problem is that the worst case of the problem is NP-hard and some time, there are privacy concerns that prohibit sharing of machine information. A random sample based algorithm is proposed and proof of convergence is outlined. Numerical examples will be provided to demonstrate the effectiveness of the solution. The solution fits the multi-agent framework well since only limited communications between neighbors are needed. We will also show how knowledge can be combined with deep learning so that fire detection can be done with low false alarm.*