



**THE CHINESE UNIVERSITY OF HONG KONG**  
Department of Information Engineering  
*Seminar*

**Synesthesia of Machines (SoM) Enabled Proactive Beamforming  
via Multi-Modal Feature Fusion (MMFF)**

by

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**Date : 25 July 2023 (Tuesday)**

**Time : 10:00am – 11:00am**

**Venue : Rm 833, Ho Sin Hang Engineering Building, CUHK**

Abstract

Inspired by synesthesia of humans, we propose the so-termed synesthesia of machines (SoM) to facilitate the integration of a variety of multi-modal sensing data with wireless communications. As an example, I will introduce a novel proactive beamforming scheme that coherently orchestrates physical information, multi-modal sensing and learning networks. Verifications on the ViWi dataset, which we enriched with realistic vehicle drifting behavior, demonstrate that our proposed MMFF achieves more accurate and stable angle prediction, which in turn increases the achievable rates and reduces the communication system outage probability. Even in complex dynamic scenarios, robust prediction results can be guaranteed, validating the feasibility and practicality of the proposed proactive beamforming approach.

Biography

Liuqing Yang (S'02-M'04-SM'06-F'15) received her Ph.D. degree in Electrical and Computer Engineering from the University of Minnesota, Minneapolis, in 2004. She has been a faculty member with the Department of Electrical and Computer Engineering, at University of Florida, Colorado State University, and University of Minnesota, and is presently a Chair Professor with Hong Kong University of Science and Technology (GZ). She is also the Acting Head of the Intelligent Transportation (INTR) thrust and the director of the Guangzhou Municipal Key Laboratory of Seamless Connectivity and Connected Intelligence (SC2I). Her general interests are in communications, sensing, and connected intelligence – subjects on which she has published more than 380 journal and conference papers, 4 book chapters and 6 books. Dr. Yang became an IEEE Fellow in 2015. She was the recipient of the ONR Young Investigator Program (YIP) award in 2007, and the NSF Faculty Early Career Development (CAREER) award in 2009, the Best Paper Award at IEEE ICUBW'06, ICC'13, ITSC'14, GLOBECOM'14, ICC'16, WCSP'16, GLOBECOM'18, ICCS'18 and ICC'19. She is the Editor in Chief for IET Communications, Executive Editorial Committee (EEC) member for IEEE Transactions on Wireless Communications, and Senior Editor for IEEE Transactions on Signal Processing. She has also served as editor for IEEE Transactions on Communications, IEEE Transactions on Intelligent Transportation Systems, IEEE Intelligent Systems, and PHYCOM: Physical Communication, and as program chair, track/symposium or TPC chair for many conferences.

**\*\* ALL ARE WELCOME \*\***