Talk Title: Consensus-Based Distributed Data Analysis: Learning, Fusion and Optimization

Abstract: Huge amount of data are collected by various systems every day, and how to effectively analysing the data collected in various geographic locations remains a huge challenge in engineering and even in our daily life. Due to the distributed nature of collected data, and ever-increasing sensitivity in privacy protection, analysing data locally in a distributed manner over a network is more appealing. In this talk, some fundamental analytical methods will be presented, in particular, the methods based on consensus principles over communication networks. The talk will fundamental description network connections, and certain dynamic considerations over the networks. From an application point of view, consensus principles are demonstrated for machine learning, through certain consensus mechanism in dealing with learning parameters. The talk also covers applying consensus principles in sensor fusion and distributed optimization based on data.

Biosketch: Zhengtao Ding received B.Eng. degree from Tsinghua University, Beijing, China, and M.Sc. degree in systems and control, and the Ph.D. degree in control systems from the University of Manchester Institute of Science and Technology, Manchester, U.K. After working as a Lecturer with Ngee Ann Polytechnic, Singapore, for ten years, he joined the University of Manchester in 2003, where he is currently Professor of Control Systems with the School of Electrical and Electronic Engineering. He is the author of the book: Nonlinear and Adaptive Control Systems (IET, 2013) and has published over 260 research articles. His research interests include nonlinear and adaptive control theory and their applications, more recently network-based control, distributed optimization and distributed learning, with applications to power systems and robotics. Prof. Ding has served as an Associate Editor for the IEEE Transactions on Automatic Control, IEEE Control Systems Letters, Transactions of the Institute of Measurement and Control, Control Theory and Technology, Mathematical Problems in Engineering, Unmanned Systems, and the International Journal of Automation and Computing, etc. He is a member of IEEE Technical Committee on Nonlinear Systems and Control, IEEE Technical Committee on Intelligent Control, and IFAC Technical Committee on Adaptive and Learning Systems.