

Title: **Towards a new era for control design over networks**

Abstract:

The last two decades have seen a significant research effort devoted towards the convergence of control and communication technology. While traditional feedback control techniques assumed co-location of plants, sensors and controllers, distributed control systems spread over a large area soon led to sensors, plants and controllers being connected via networks, first with wired and then with wireless networks, especially in applications such as mobile robotics, connected vehicles etc. In this talk, we will review some of the fundamental challenges and results that control engineers face in designing effective control algorithms over wireless networks due to the network induced delays, bandwidth restrictions and random variations. We will describe some existing wireless networking solutions for wireless control design, and their limitations. Finally, we will provide a vision for the important research challenges that control engineers face over the next decade, when we expect a convergence of control, communications and flexible computing platforms (such as edge-cloud computing) to provide a new paradigm, and how machine learning and traditional model-based control can be successfully integrated in this context.

Brief Bio:

Subhrakanti Dey received the Ph.D. degree from the Department of Systems Engineering, Research School of Information Sciences and Engineering, Australian National University, Canberra, in 1996.

He is currently a Professor and Head of the Signals and Systems division in the Dept of Electrical Engineering at Uppsala University, Sweden. He has also held professorial positions at NUI Maynooth, Ireland and University of Melbourne, Australia. His current research interests include networked control systems, distributed machine learning and optimization, and detection and estimation theory for wireless sensor networks. He is a Senior Editor for IEEE Transactions of Control of Network Systems and IEEE Control Systems Letters, and an Associate Editor for Automatica. He is a Fellow of the IEEE.