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# LECTURE SERIES

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**PRESENTED BY THE WATERLOO INSTITUTE FOR SUSTAINABLE ENERGY**

**Monday June 26, 2017**
**11:00 am – 12:00 pm**
**CPH 4333**

## SMARTER CITIES: NEW SERVICES, NEW APPLICATIONS FOR CONTROL

**Robert Shorten,** Professor & Chair, Control Engineering & Decisions Science, University College Dublin

The automotive industry is probably experiencing its most disruptive period since the invention of the diesel engine. Driven by new technologies, advances in mathematics, increasingly stringent regulation, new and disruptive business models, changing consumer demands, as well as a desire to make our cities smarter, more efficient, and cleaner, automotive companies are searching for new ways to re-imagine their products. At the forefront of this innovation is the search for new Smart Mobility and Smart City services that can be delivered to and from vehicles, and the resulting partnerships between traditional automotive and other non-traditional automotive industries. Research questions arising in this context are driving exciting new activities in a number of disciplines. Among these, Control Theory has much to offer, and much to gain as a discipline, by embracing some of the questions that are of concern as planners and municipalities re-imagine our cities. In this talk, I will discuss several such applications. Topics to be covered include: energy management systems for hybrid vehicles; the design of electric charge points in the context of collaborative consumption (shared economy) models; and some new work on pedelecs. Partially distributed control algorithms will be presented and time permitting, several open challenges will be enunciated and the suitability of classical controllers discussed for smart city applications.

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**Biography**



Professor Shorten graduated from UCD, with a B.E. degree in Electronic Engineering in 1990, and a Ph.D. degree in 1996. From 1993 to 1996, Professor Shorten worked at Daimler-Benz research labs in Berlin where completed his Ph.D. work, and was also the holder of a Marie Curie Fellowship. Since returning to Ireland in 1997 as the recipient of a European Presidential Fellowship, Professor Shorten has been active in a number of theoretical and applied research areas including: computer networking; classical automotive research; collaborative mobility (including smart transportation and electric vehicles); as well as basic control theory and linear algebra. Professor Shorten is a co-founder of the Hamilton Institute, National University of Ireland, Maynooth, where he was a Full Professor until March 2013, and was also the holder of a Visiting Professorship at TU Berlin in 2011-2012. From 2013 to 2015 he led the Control and Optimization activities at IBM Research Ireland in the area of Smart Cities. He is currently Professor of Control Engineering and Decision Science at University College Dublin.

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