Self-Driving Cars, Connectivity and Traffic Flow Control

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Self-Driving cars are attracting a lot of attention and excitement as they will impact driving comfort and safety as well as modify the current modes of transporting people and goods. Getting rid of the driver however will not necessarily reduce congestion whose main cause is the high volume of vehicles competing in space and time to reach destinations. Connectivity however and compliance to traffic management commands and traffic rules by vehicle autopilots will open the way for far better traffic flow control approaches with strong potential to improve capacity, manage congestion and incidents in a much more effective way. In this talk we present some of the main challenges self-driving vehicles will be facing and how connectivity with the infrastructure is far more crucial than vehicle automation when it comes to traffic flow control. We will present several designs of traffic flow control and load balancing which can bring significant benefits to traffic flow characteristics and efficiency with positive impact on the environment.

Bio: Petros A. Ioannou received the B.Sc. degree with First Class Honors from University College London, in 1978 and the M.S. and Ph.D. degrees from the University of Illinois, Urbana, Illinois, in 1980 and 1982, respectively. In 1982, he joined the Department of Electrical Engineering-Systems, University of Southern California, where he is currently a Professor and holder of the A.V. ‘Bal’ Balakrishnan Chair. He is the Director of the Center of Advanced Transportation Technologies, the Associate Director for Research of METRANS, a University Transportation Center. Dr. Ioannou received many research awards with the most recent ones been the 2012 IEEE Intelligent Transportation System Society Research Award, the 2016 IEEE Transportation Technologies Field Award and the IEEE Control System Society Transition to Practice Award for his work on the design and commercialization of Adaptive Cruise Control Systems. He is a Fellow of IEEE, IFAC, IET and AAAS and the author/co-author of 8 books and over 300 research papers.