Maximizing the Quality of Experience: Taking Care of Tomorrow

Speaker: **Mihaela van der Schaar**

Abstract: Recent years have seen an explosion in multimedia communication and networking systems and applications. Optimization in such applications is crucial – but existing methods intended to optimize the performance of networking algorithms and protocols are highly-inefficient and do not provide the Quality of Experience demanded by multimedia applications and systems. The failures of existing methods can be traced to their myopia: they choose actions to maximize current rewards while ignoring the future impact of these actions. Improving on myopic optimization requires foresighted optimization and control, which in turn require a priori knowledge of how the source, network, channel, application and user characteristics evolve over time and are affected by the operation of the chosen algorithms and protocols. Because such a priori knowledge is almost never available at run-time, efficient multimedia communication or networking solutions require that such knowledge be acquired online, in parallel with foresighted optimization. This talk presents a new foundation for the systematic design of such protocols that relies on a new online learning and optimization framework. This framework may be deployed in conjunction with existing protocols, standards and algorithms in order to maximize their Quality of Experience in time-varying and a priori unknown environments and achieves results that represent orders-of-magnitude improvements over current solutions.

Bio: Mihaela van der Schaar is Chancellor's Professor of Electrical Engineering at University of California, Los Angeles. She is an IEEE Fellow, was a Distinguished Lecturer of the Communications Society (2011-2012), the Editor in Chief of IEEE Transactions on Multimedia (2011-2013) and a member of the Editorial Board of the IEEE Journal on Selected Topics in Signal Processing (2011). She received an NSF CAREER Award (2004), the Best Paper Award from IEEE Transactions on Circuits and Systems for Video Technology (2005), the Okawa Foundation Award (2006), the IBM Faculty Award (2005, 2007, 2008), the Most Cited Paper Award from EURASIP: Image Communications Journal (2006), the Gamenets Conference Best Paper Award (2011) and the 2011 IEEE Circuits and Systems Society Darlington Award Best Paper Award. She received three ISO awards for her contributions to the MPEG video compression and streaming international standardization activities, and holds 33 granted US patents. She is also the founding director of the UCLA Center for Engineering Economics, Learning, and Networks (see netecon.ee.ucla.edu). Her research interests include engineering economics and game theory, multi-agent learning, online learning, decision theory, network science, multi-user networking, Big data and real-time stream mining, and multimedia.