

ECE and FEEDER Distinguished Lecture

Dr. Anna Scaglione
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“Aggregator Problem for Demand Response”
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ABSTRACT

Over the past twenty years power systems and economic theory have merged to co-design of an architecture that can competitively price and dispatch in real time generators power, so as to follow the random daily electricity demand. The system is designed for reliability and to work with poor telemetry. For this reason electricity consumption is treated as being inflexible. Unfortunately, lack of control in the demand side continues to be the main bottleneck for using opportunistically abundant renewable energy, without compromising reliability. Harnessing the benefits of responsive and controllable consumption requires new technologies (hardware and software) for interacting with customers and their appliances.

The talk describes the Aggregator problem, where Aggregators are the profit maximizing entities in charge for managing large populations of appliances interacting both with the customers as well as with the market. We discuss the so called dynamic pricing and direct scheduling solutions and provide medium grained models that can be used for ex-ante planning as well as for on-line scheduling of large population of appliances, with communications and computations that scale for large populations. We also indicate how these models can be the basis for offering differentiated service tariffs, while preserving the individual customer privacy.

BIOGRAPHY

Anna Scaglione is a Professor in the Electrical and Computer Engineering Department at UC Davis, and held Associate and Assistant Professor positions before at Cornell University (2001-2008) and at the University of New Mexico (2000-2001). She is a Fellow of the IEEE, and co-recipient of the 2000 IEEE Signal Processing Transactions Best Paper Award, Ellersick Best Paper Award (MILCOM 2005), the 2013 IEEE Donald G. Fink Prize Paper Award and the 2013 IEEE Signal Processing Society Young Author best paper award, with her student. She held several editorial and technical chair positions including that of Editor in Chief of the IEEE Signal Processing Letters from 2012-2013. She is currently in the Board of Governor of the Signal Processing Society. Her expertise is in the broad area of signal processing for communication systems, networks and, more recently, power systems. Her current research focuses on studying and enabling decentralized learning and signal processing in networks of sensors and on sensor systems and networking models for the demand side management and reliable energy delivery.