

## Energy Colloquium

# The Power of Ensemble Control for Demand Response

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**Skoltech Energy Systems Center**

**28 March 2017, 16:00**

**Skolkovo Innovation Center**

**Technopark, Building 3, Room 402**



### **ABSTRACT:**

I describe efforts in modeling and controlling aggregated ensembles of stochastic energy loads.

The modeling part of the talk will focus on analysis of the steady state and transient behavior of the probability distribution of an ensemble of loads (thermal devices, pools, electric cars or alike) as observed by an aggregator.

Then in the control part of the talk I describe novel algorithmically tractable Markov Decision Process approach striving to achieve a balance between energy customers, individual welfare and collective (ensemble) goals, e.g. in tracking an exogenous signal of the energy system operator.

I conclude discussing new directions and open problems related to (a) data driven applications (reinforcement learning); (b) interactions between customers (mean field games) and (c) effects of ensemble of energy customers on coordinated use of multiple energy infrastructures (e.g. power systems and district heating systems).

The talk is based on a joint past and ongoing work with V. Chernyak (Wayne State University, Detroit).

**Non-Skoltech attendees should request access to the building in advance by sending their passport details to [energy.colloquium@skoltech.ru](mailto:energy.colloquium@skoltech.ru)**

**Colloquium schedule and information on how to get to the colloquium can be found at <http://www.skoltech.ru/en/energy-colloquium/>**