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## Personalized Optimization in a Time-varying World

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Optimization and control group  
IBM Research Ireland

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Aula 5.5, DEI

### About the speaker

Andrea Simonetto is a research staff member in the optimization and control group of IBM Research Ireland, in Dublin. He received his PhD in systems and control from Delft University of Technology, The Netherlands in 2012, and spent 3+1 years as postdoc, first in the signal processing group in the electrical engineering department in Delft, then in the applied mathematics department of the Universit catholique de Louvain, in Belgium. He was a visiting researcher at Carnegie Mellon University, University of Pennsylvania, and KTH, Sweden. He joined IBM Research in February 2017. His interests span optimization, control, and signal processing, with applications in smart energy, smart transportation, and personalized health.

### Abstract

Optimization is the cornerstone of many engineering systems and cyber-physical systems including smart homes, energy grids, and intelligent transportation systems. In many situations however, state-of-the-art optimization algorithms may fail to provide acceptable (and feasible) solutions e.g. because of the scale of the problem, because the problem is continuously changing in time, or because the problem is ill-posed (i.e., depends on a cost function that is unknown).

In this talk, I will focus on how to build an online algorithm to solve a time-varying optimization problem with an objective that comprises a known time-varying cost and an unknown function. This problem structure arises in systems where the known function captures time-varying engineering costs, and the unknown function models user's satisfaction; in this context, the objective is to strike a balance between given performance metrics and user's satisfaction that has to be learned online and concurrently with the execution of the optimization algorithm. I will then touch upon applications in this area stemming from smart energy grids and vehicle control.

Finally, I will give a brief overview on IBM Research in general, and the focus of the optimization and control group in IBM Research Ireland.

The talk main references is the paper: <https://arxiv.org/abs/1905.00775>

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