ICB seminar series 2019/20
chairman: Prof. Dr. Paolo Arosio

ARTIFICIAL INTELLIGENCE APPROACHES TOWARDS HYBRIDIZING ANALYTICAL & DATA-DRIVEN DECISION-MAKING

Dr. Ruth Misener
Imperial College London

ETH Hönggerberg, HCI J 4
Wednesday, 20/11/2019, 15.00 h
The Seminar will be followed by an Apéro

Abstract: The AI community typically focuses on models learned solely from data. But chemical engineering applications may also require explicit, parametric models, e.g. modeling process constraints, operations constraints and cost objectives. So we consider integrating AI-based approaches together with more traditional process engineering strategies:
Design of experiments for model discrimination. We bridge the gap between classical, analytical methods and Monte Carlo-based approaches with surrogate models.
Optimizing regression trees. We quantify the risk of evaluating a new data point and integrate tree models into larger decision-making problems.
Scheduling under uncertainty. For processes with equipment degradation, historical data and Bayesian optimisation approximate the uncertainty set. We use explainable AI tools to develop a theoretical and practical framework for explainable scheduling.This presentation highlights ongoing collaborations with BASF, Royal Mail and Schlumberger.

Bio: Dr Ruth Misener is a Senior Lecturer in Computational Optimization in the Imperial College London Department of Computing. Ruth received an SB from MIT and a PhD from Princeton under the direction of Prof C A Floudas. Foundations of her research are in numerical optimization algorithms. Applications include bioprocess optimization under uncertainty and petrochemical process network design and operations. Ruth has co-authored software including ANTIGONE for mixed-integer nonlinear optimization. Ruth received the 2017 Macfarlane Medal from the Royal Academy of Engineering and the 2014 Smith Publication Award from the AIChE Computing & Systems Technology Division. She serves on the editorial boards of Computers & Chemical Engineering, INFORMS Journal on Computing, Journal of Global Optimization, and Mathematical Programming B.

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