# Oberseminar

## Monday, July 8, 2024, 18:00 c.t.

**Axel Parmentier**, École des Ponts ParisTech, Champs-sur-Marne

**Combinatorial optimization augmented machine learning: foundations, operations research applications, and perspectives**

Combinatorial optimization augmented machine learning (COAML) is a novel and rapidly growing field that integrates methods from machine learning and operations research to tackle data-driven problems that involve both uncertainty and combinatorics. These problems arise frequently in industrial processes, where firms seek to leverage large and noisy data sets to better optimize their operations. COAML typically involves embedding combinatorial optimization layers into neural networks and training them with decision-aware learning techniques. This talk provides an overview of the field, covering its main applications, algorithms, and theoretical foundations. We also demonstrate the effectiveness of COAML on contextual and dynamic stochastic optimization problems, as evidenced by its winning performance on the 2022 EURO-NeurIPS challenge on dynamic vehicle routing.

The Oberseminar takes place in the Seminarraum, 1st floor. Participants are invited to have coffee or tea in the lounge before.

S. Held, S. Hougardy, B. Korte, V. Traub, L. Vargas Koch, J. Vygen