

Department of Numerical Analysis and Scientific Computing  
Simula Research Laboratory  
Oslo, Norway

# Optimization in Oslo

## A Seminar Series on Continuous Optimization

Date:

**Wednesday December 21, 2022 at 14:00 (GMT+1, CET)**

Speaker:

**Dr. Johannes Milz**

**Technical University of Munich**

Title:

**Consistency of Monte Carlo Estimators for Risk-Neutral PDE-Constrained Optimization**

Abstract:

Complex systems in science and engineering can often be modeled using partial differential equations (PDEs) with uncertain parameters. In order to improve the design of such systems, we formulate risk-neutral optimization problems with parameterized PDE constraints. In this talk, we apply the sample average approximation (SAA) method to the risk-neutral PDE-constrained optimization problems and analyze the consistency of SAA optimal values and SAA solutions. We review a consistency analysis framework for risk-neutral optimization problems based on uniform law of large numbers. In order to utilize the framework, we use problem structure typically found in PDE-constrained optimization problems to construct deterministic, compact sets containing the solutions to the risk-neutral problem and those to the SAA problems. We illustrate this construction on a risk-neutral semilinear PDE-constrained problem. Subsequently, we present a consistency analysis framework and discuss further examples.

Brief Bio:

Johannes Milz is currently a postdoctoral researcher at the Technical University of Munich. Johannes' research broadly lies in optimization under uncertainty with a current focus on the complexity analysis of sample-based approximations of PDE-constrained optimization problems under uncertainty.

He received his doctorate in applied mathematics from the Technical University of Munich in 2021.