

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

Optimization in Oslo

A Seminar Series on Continuous Optimization

Date:

Wednesday November 23, 2022 at 14:00 (GMT+1, CET)

Speaker:

Prof. Brendan Keith
Brown University

Title:

Adaptive Sampling for Constrained Optimization under Uncertainty

Abstract:

Stochastic optimization problems with deterministic constraints commonly appear in machine learning, finance, and engineering applications. This talk presents an improved adaptive solution strategy for this important class of problems. The aim is to decrease the computational cost while maintaining an optimal convergence rate. The guiding principle is to adjust the batch size (or sample size) on the fly so that the error in the gradient approximation remains proportional to the error in the underlying optimization problem. After providing motivation and context, I will present new adaptive sampling algorithms that simultaneously maintain optimal sample efficiency and iteration complexity for risk-neutral and risk-averse optimization under uncertainty with deterministic constraints. I will then demonstrate the efficacy of these algorithms in multiple applications, drawing mainly from use cases found in engineering design. This talk will provide an introduction to adaptive sampling that aims to be accessible to a broad audience as well as showcase ongoing work in collaboration with Lawrence Livermore National Laboratory and UT Austin.

Brief Bio:

Brendan Keith is an Assistant Professor in the Division of Applied Mathematics at Brown University in Providence, Rhode Island. His research interests are mainly related to the modeling and simulation of problems arising in natural sciences and engineering, focusing on numerical methods for partial differential equations, scientific machine learning, and PDE-

constrained optimization. In 2018, Brendan received his Ph.D. in Computational Science, Engineering, and Mathematics from the Oden Institute for Computational Engineering and Sciences at the University of Texas at Austin. He has held postdoctoral positions at TU Munich, ICERM, and Lawrence Livermore National Laboratory.