



CoMFoS-NASC International Conference 2026

20–23 June 2026 | Lapu-Lapu City, Cebu, Philippines 6015

<https://comfos-nasc2026.github.io/CoMFoS-NASC2026/>

comfos-nasc2026@math.upd.edu.ph

Shape Optimization Under Uncertainty

Helmut Harbrecht

Department of Mathematics & Computer Science, University of Basel, Switzerland

*contact: helmut.harbrecht@unibas.ch

This presentation aims to provide an overview of shape optimization in case of random input parameters. Besides the minimization of the expected objective, we also consider the minimization of failure probabilities. We show that in some situations the objective and its gradient are deterministic despite the random input. We can thus derive cheap, deterministic algorithms to minimize the objective. Several applications and numerical computations are given.

Keywords: Shape optimization, uncertainty quantification, high-dimensional approximation

MSC2020: 49Q10, 49J55, 60D99, 60H25, 65C20