



2. CASUS Annual Workshop

“Fusing Artificial Intelligence & Simulation”

“Deep Learning and Computations of PDEs”



Siddhartha Mishra is currently Professor for Applied Mathematics at SAM, D-MATH, ETH Zurich. The research interests of his group are in the design, analysis and implementation on state of the art HPC platforms, of efficient algorithms for PDE based simulation. The group applies these algorithms in the context of computational fluid dynamics, computational astrophysics, computational geophysics and climate science. For his research, Siddhartha Mishra has received the Collatz Prize of the International Council of Industrial and Applied Mathematics (ICIAM) in 2019, the Jacques Loius Lions Medal of ECCOMASS in 2018, Richard von Mises prize of GAMM in 2015 and the starting grant (2012) and consolidator grant (2017) of the European Research Council (ERC).

Date: will be announced soon

Time: will be announced soon

Location: livestream link follows

Abstract:

We present novel supervised deep learning algorithms for approximately solutions of high-dimensional parametric PDEs which arise in many query simulation tasks such as Uncertainty quantification (UQ) and PDE constrained optimization. In particular, novel training strategies, that are used to improve the accuracy of deep learning surrogates, are presented. We demonstrate the effectiveness of these algorithms with examples for UQ and PDE constrained optimization that arise in CFD. If time permits, we will also briefly describe an unsupervised learning algorithm for computing solutions of high-dimensional PDEs.