ETH kfmResearch

Center for Augmented Computational Design in Architecture, Engineering and Construction

Scientific Machine and Deep Learning for Design and Construction in Civil Engineering

Main Lecturer: Dr. Michael Kraus | kraus@ibk.baug.ethz.ch
Guest Speaker: Dr. Mohammad Nabian

Nvidia Modulus: A Framework for Developing Physics ML Neural Network Models

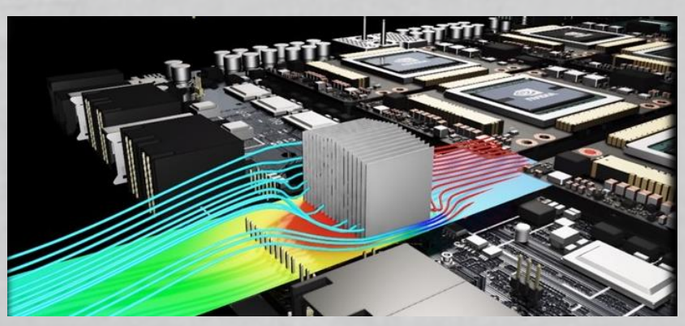
Guest Lecture: Monday, 21.11.2022, 4:30 pm – 6 pm (CET)
Location: ETH Zurich (Hönggerberg), HCI E 8
Zoom Link: https://ethz.zoom.us/j/69286271661 (registration is not required)

Abstract: We present Nvidia Modulus, a neural network framework that offers building blocks for developing physics machine learning surrogate models trained using both physics and data. Modulus accelerates simulations across a wide range of disciplines in science and engineering and addresses a wide range of use cases - coupled forward simulations without any training data, inverse and data assimilation problems, parameterized simulations, super-resolution, etc. Modulus is customizable with APIs that enable user extensions to geometry, physics, and network architecture. It has advanced network architectures that are optimized for high-performance GPU computing and offers scalable performance for multi-GPU and multi-Node implementation.

NVIDIA Modulus is a neural network framework that blends the power of physics in the form of governing partial differential equations (PDEs) with data to build high-fidelity, parameterized surrogate models with near-real-time latency.

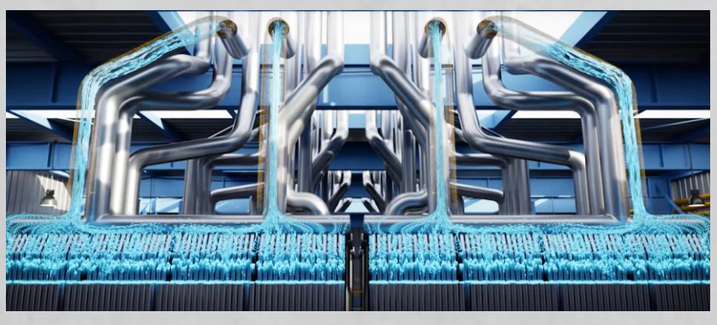
https://developer.nvidia.com/modulus

Bio: Mohammad Amin Nabian is a Senior Software Engineer, AI-HPC at NVIDIA. The overarching objective of his efforts at NVIDIA is to enable efficient computational design and control of engineering systems by developing novel physics-driven and AI-accelerated tools for design optimization and digital twins. Mohammad received his Ph.D. degree from the University of Illinois at Urbana-Champaign with a focus on computational science and engineering.



FPGA Design Optimization

Extreme Weather Prediction



Industrial Digital Twin