



Digital Twins Lab Virtual Workshop



Dr. Ján Drgoňa is an incoming associate research professor in the Johns Hopkins University's Department of Civil and Systems Engineering and a member of the Ralph S. O'Connor Sustainable Energy Institute. Drgoňa was a senior data scientist and the principal investigator in the Physics and Computational Sciences Division at Pacific Northwest National Laboratory (PNNL). He has a PhD in Control Engineering from the Slovak University of Technology in Bratislava, Slovakia, and before joining PNNL, he was a postdoc at the mechanical engineering department at Katholieke Universiteit (KU) Leuven in Belgium. His current research is focused on differentiable programming for scientific machine learning, constrained optimization, and model-based optimal control with applications in the energy sector, including building control and power systems optimization.

Neuromancer: Differentiable Programming Library for Data-Driven Modeling and Control

Neural Modules with Adaptive Nonlinear Constraints and Efficient Regularizations (NeuroMANCER) is an open-source differentiable programming library for solving parametric constrained optimization problems, physics-informed system identification, and parametric model-based optimal control. NeuroMANCER is written in PyTorch and allows systematic integration of machine learning with scientific computing to create end-to-end differentiable models and algorithms embedded with prior knowledge and physics. Strong emphasis is given to extensibility and interoperability with the PyTorch ecosystem, as well as quick adaptability to custom domain problems. Our open-source repository contains numerous tutorial examples demonstrating the use of physics-informed neural networks for differential equations, learning to optimize methods with feasibility restoration layers, nonlinear system identification, and learning to control with differentiable system models. We demonstrate the utility of the library in engineering case studies, including modeling of networked dynamical systems, building control, and dynamic economic dispatch problems.

Host: Suparno Bhattacharyya, Assistant Research Scientist, TAMIDS

January 28 | 2:00 - 4:00 pm

Online via Zoom

Meeting ID: 976 2528 6192

Passcode: 873550



<https://u.tamu.edu/dtl-neuromancer>