

Param-Intelligence (π) Seminar Series

Virtual Talk: Join Zoom Meeting <https://wpi.zoom.us/j/91319747405>

November 7th, Thursday 12 - 1 pm ET

[Param-Intelligence Lab](#) located in the Department of Aerospace Engineering, WPI, and led by Prof. Ameya D. Jagtap, is at the forefront of developing **explainable, interpretable, trustworthy, and scalable scientific machine learning (SciML) algorithms**. Our **Param-Intelligence (π) seminar series** provides a platform for researchers, engineers, and students to explore and discuss the latest advancements in integrating machine learning techniques with scientific computing.

Speaker: Romit Maulik, Pennsylvania State University, USA

Title: Neural ordinary differential equations for scientific machine learning

Abstract: In this talk, I will discuss recent advancements in the construction and training of neural ordinary differential equations (Neural ODEs) for learning complex dynamical systems characterized by chaotic and multiscale behavior. In particular, my talk will discuss the challenges associated with learning invariant statistics of dynamical systems given solely short-term predictive performance based objective functions. We will introduce neural architectures and algorithms in the neural ODE paradigm that leverage partial knowledge of the underlying dynamics to obtain surrogate models that can recover correct chaotic dynamics for a wide range of systems ranging from the 1D Kuramoto-Sivashinsky equations to turbulent Navier-Stokes equations and the planetary atmosphere and ocean systems.

Speaker's Biography: Romit Maulik is an Assistant Professor in the College of Information Sciences and Technology at Penn State. He is also a co-hire in the Institute for Computational and Data Sciences at Penn State and a Joint Appointment Faculty at Argonne National Laboratory. He obtained his PhD in Mechanical and Aerospace Engineering at Oklahoma State University (in 2019) and was the Margaret Butler Postdoctoral Fellow (from 2019-2021) before becoming an Assistant Computational Scientist at Argonne National Laboratory (from 2021-2023). His group studies high-performance scientific machine learning algorithm development with applications to various multiphysical nonlinear dynamical systems such as those that arise in fluid dynamics, weather and climate modeling, nuclear fusion, and beyond. He is an Early Career Awardee from the Army Research Office.

