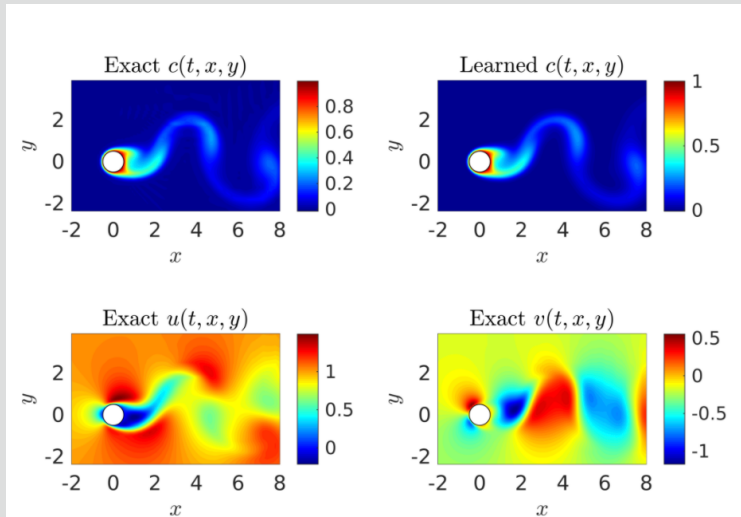


UCCS Department of Mathematics

Math Colloquium Series

DR. MAZIAR RAISSI

THE UNIVERSITY OF COLORADO AT BOULDER



DATE:

SEPTEMBER 23, 2021

TIME:

12:30PM-1:30PM

LINK:

Please visit the UCCS Math Colloquium page for a link:

<https://math.uccs.edu/research/colloquia>

Data-Efficient Deep Learning using Physics-Informed Neural Networks

ABSTRACT: A grand challenge with great opportunities is to develop a coherent framework that enables blending conservation laws, physical principles, and/or phenomenological behaviors expressed by differential equations with the vast data sets available in many fields of engineering, science, and technology. At the intersection of probabilistic machine learning, deep learning, and scientific computations, this work is pursuing the overall vision to establish promising new directions for harnessing the long-standing developments of classical methods in applied mathematics and mathematical physics to design learning machines with the ability to operate in complex domains without requiring large quantities of data. To materialize this vision, this work is exploring two complementary directions: (1) designing data-efficient learning machines capable of leveraging the underlying laws of physics, expressed by time dependent and non-linear differential equations, to extract patterns from high-dimensional data generated from experiments, and (2) designing novel numerical algorithms that can seamlessly blend equations and noisy multi-fidelity data, infer latent quantities of interest (e.g., the solution to a differential equation), and naturally quantify uncertainty in computations.

BIOGRAPHY: I am currently an Assistant Professor of Applied Mathematics at the University of Colorado Boulder. I received my Ph.D. in Applied Mathematics & Statistics, and Scientific Computations from University of Maryland College Park. I then moved to Brown University to carry out my postdoctoral research in the Division of Applied Mathematics. I then worked at NVIDIA in Silicon Valley for a little more than one year as a Senior Software Engineer before moving to Boulder. My expertise lies at the intersection of Probabilistic Machine Learning, Deep Learning, and Data Driven Scientific Computing. In particular, I have been actively involved in the design of learning machines that leverage the underlying physical laws and/or governing equations to extract patterns from high-dimensional data generated from experiments.

For more information please contact the UCCS Math Department at <http://www.uccs.edu/math>