Liam Doherty

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PERSONAL PROFILE

Third year PhD Candidate in Applied Mathematics at Drexel University. Zealous about uncertainty quantification (UQ) and machine learning (ML), especially physics-informed deep learning. 3+ years of experience with machine learning, Julia and Python development, and high-performance computing. Seeking internship positions utilizing UQ for ML robustness in an interdisciplinary group.

EDUCATION

Ph.D. in Applied Mathematics | Drexel University, Philadelphia, PA | Jun 2025

- Supported by grants from National Science Foundation and Army Research Office

M.S. in Mathematics | Drexel University, Philadelphia, PA | Jun 2022

- GPA: 3.98/4.0

B.S. in Mathematics | Rowan University, Glassboro, NJ| May 2020

- Minor in **Applied Mathematics** | GPA: 3.74/4.0

A.S. in Mathematics | Rowan College at Burlington County, Mount Laurel, NJ | Dec 2018

High School Diploma | Burlington County Institute of Technology, Medford, NJ | Jun 2018

- Specialization in Electronics Engineering including coursework in analog and digital circuits, signal processing, and power system design

SKILLS

Computational: Julia (SciML stack, Flux, Turing, DataFrames, MLJ, Plots), Python (NumPy, SciPy, TensorFlow, PyTorch, Pandas, Matplotlib, Scikit-Learn), MATLAB, Bash, Slurm, Git
Mathematical: Uncertainty Quantification, Monte Carlo Simulation, Information Theory, Large Deviation Theory, Probability Theory

EXPERIENCE

Graduate Uncertainty Quantification Research and Teaching Assistant | Drexel University | Philadelphia, PA | Sep 2020 – Present

- Apply information theory and theory of large deviations to derive theoretical UQ tools
- Develop and analyze specialized Markov Chain Monte Carlo (MCMC) methods to improve computational tractability of theoretical UQ tools
- Investigate robustness of machine/deep learning algorithms subject to biased or noisy data using UQ tools
- Lead students in course recitations with problem-solving sessions
- Communicate abstract mathematics in digestible manner
- Enable students in problem solving through individual and small group tutoring sessions
- Selected courses: Numerical Analysis, Multivariate Calculus, Differential Calculus

Machine Learning Research Assistant | Center for Research and Education in Advanced Transportation Engineering Systems (CREATES), Rowan University | Glassboro, NJ| Jun 2019 – Feb 2020

- Developed computer vision system with Convolutional Neural Networks in TensorFlow for detection of potholes and other road deformities
- Deployed algorithm on Raspberry Pi computer; tested with several low size, weight and power (SWaP) machines
- Collaborated with civil, mechanical, and electrical engineers to develop enclosure for system to be attached to New Jersey Department of Transportation service vehicles
- Conducted comparative analysis of machine learning and classical statistical approaches to predicting phase of flight from aircraft trajectory data using PyTorch
- Co-authored publication reporting results comparing classical statistical methods with Long-Short Term Memory (LSTM) networks and Neural Differential Equations

Undergraduate Mathematics Tutor | Rowan University
Glassboro, NJ | Sep 2018 – May 2020

- Distilled advanced mathematical concepts to students through small group tutoring sessions
- Enabled students to gain autonomy in problem-solving process
- Selected courses: Differential and Integral Calculus, Multivariate Calculus, Discrete Mathematics, Ordinary Differential Equations, Partial Differential Equations, Linear Algebra, Real Analysis, Complex Analysis, Abstract Algebra

Electronics Technician | Radwell International
Willingboro, NJ | Jan 2018 – May 2018

- Troubleshot, diagnosed, and repaired defective printed circuit board (PCB) and programmable logic controller (PLC) devices at component level
- Communicated findings and repair process to team leader for reporting to clients