Tyler Shakibai

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Education

University of Washington — Seattle, WA
Master of Science in Applied Mathematics — *2022 - present*

University of Massachusetts Amherst — Amherst, MA
Bachelor of Science in Applied Mathematics — *2018 - 2021*
- Minor in Computer Science

Experience

Undergraduate Research Assistant — January 2022 – May 2022
TRIPODS Institute for Theoretical Foundations of Data Science — *Amherst, MA*
- Assisted research on alternative methods of constructing multi-frontal direct solver algorithms for mesh-based computations.
- Gave LaTeX presentation on finding optimal mesh sizes for discretized numerical schemes.

Undergraduate Research Assistant — May 2021 – August 2021
The Statistical and Applied Mathematical Sciences Institute — *Research Triangle Park, NC*
- Worked with professors and post-docs on a dynamical model for the spread of COVID-19 in North Carolina.
- Formulated systems of differential equations, determined the existence of limit cycles, and implemented the system in MATLAB.
- Presented my results to professors and graduate students.

Information Technology Intern — June 2021 – August 2021
Entertainment Partners — *Burbank, CA*
- Set up computer hardware for use in an office setting.
- Addressed and resolved both hardware and software issues with workplace devices.

Projects

Physics Inspired Neural Network
- Created and trained a neural network in TensorFlow which solves the partial differential equations for the heat and wave equations and produces a continuous function as output.
- Conditioned model to respect physical laws such as conservation of energy to reduce computational complexity of training and made adjustments to account for periodicity in the wave equation.
- Presented my finding and discussed the benefits and drawbacks compared to conventional numerical schemes.

SIR Model for COVID-19
- Simulated the evolution of a compartment model for the spread of COVID-19 accounting for population variance in MATLAB.
- Solved system of ODEs, analyzed the stability of trajectories, and used numerical methods to approximate Lyapunov exponents.

Skills

Programming Languages: Python, Java, C, JavaScript, SQL, MATLAB, R, PyTorch, TensorFlow, and LaTeX
Libraries: NumPy, Matplotlib, pandas, scikit-learn, Keras, SciPy, SymPy, OpenCV, seaborn
Web Development: Node.js, React, Django, Flask, HTML, CSS, Bootstrap
Visualization: Tableau, Power BI

Activities and Awards

Club Organizer — 2019 – 2021
Math Club — *UMass Amherst*
- Gave and organized talks on various mathematical topics.

Member — 2019 – 2021
Machine Learning Club — *UMass Amherst*
- Worked collaboratively on machine learning projects.

Jacob-Cohen-Killam Math Competition — 2020
First Place — *UMass Amherst*
- Won math competition for first and second year undergraduates at UMass Amherst.

Chancellor's Scholarship — 2018 - 2021

Dean's list — 2018 - 2021