

Tyler Shakibai

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EDUCATION

University of Washington

Master of Science in Applied Mathematics

Seattle, WA

2022 - present

University of Massachusetts Amherst

Bachelor of Science in Applied Mathematics

Amherst, MA

2018 - 2021

- Minor in Computer Science

EXPERIENCE

Research Assistant

TRIPODS Institute for Theoretical Foundations of Data Science

January 2022 – June 2022

Amherst, MA

- Assisted research on alternative methods of constructing multi-frontal direct solver algorithms for mesh-based computations.
- Gave LaTeX presentations on finding optimal mesh sizes for discretized numerical schemes.

Undergraduate Research Assistant

The Statistical and Applied Mathematical Sciences Institute

May 2021 – August 2021

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

Entertainment Partners

June 2021 – August 2021

Burbank, CA

- Set up computer hardware for use in an office setting.
- Addressed and resolved both hardware and software issues with workplace devices.

PROJECTS

Solar Spectra Model

- Designed convolutional neural network in PyTorch to predict the solar spectrum composed of wavelength and irradiance.
- Used over 20 years of time series weather data from Seattle including temperature, pressure, precipitation, etc.
- Maintained similar accuracy to current physics-based prediction models while reducing computational complexity.

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 the 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: HTML, CSS, Node.js, React, Django, Flask, Bootstrap

Visualization: Tableau, Power BI

ACTIVITIES AND AWARDS

Club Organizer

Math Club

2019 – 2021

UMass Amherst

- Gave and organized talks on various mathematical topics.

Jacob-Cohen-Killam Math Competition

First Place

2020

UMass Amherst

- Won math competition for first and second-year undergraduates at UMass Amherst.

Chancellor's Scholarship

2018 - 2021