# Nathan Whybra

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## Summary

I am a Mathematician with a strong background in algorithms, data science, software development, and teaching. I have experience with robot-assisted optical manufacturing, designing algorithmic solutions and developing software tools. Skilled in Python, MATLAB, C++, Java, and Unix. I have hands on technician experience in optical coatings and and optical manufacturing.

## Education

**University of Washington**, Seattle, WA

*M.S. in Applied Mathematics*                                      June 2025

Fully funded by a Teaching Assistantship

Coursework in *Numerical Methods, Machine Learning, Computational Modeling, C++ for Scientific and Parallel Computing*

**University of Rochester**, Rochester, NY

*B.S. in Mathematics with Honors, Minor in Physics*                                      May 2022

Coursework in *Advanced Mathematics, Data Structures and Algorithms, Data Analysis, Quantum Physics/Computing, Thermodynamics*

## Experience

**Software and Algorithms Engineer**, Optimax Systems, Inc.          May 2023 – June 2025

- Designed and implemented algorithmic solutions for precision optical fabrication using robotic arms, deploying software packages in Python and MATLAB to production environments. Familiarity with ROS (Robot Operating System).

- Optimized a manufacturing algorithm, reducing runtime from nearly an hour to on the order of seconds to minutes, enabling integration into production workflows.

- Collaborated with engineering teams to translate mathematical models into scalable software.

**Teaching Assistant**, University of Washington          September 2024 – June 2025

- Held workshops and coding labs, graded assignments, proctored exams, and held weekly office hours for *AMATH 301: Beginning Scientific Computing, MATH 125: Integral Calculus*, and *MATH 126: Multivariable Calculus.*

- My instruction was part of a Teaching Assistantship which funded my Master's Degree.

**Optical Coating Technician**, Optimax Systems, Inc.          December 2021 – May 2023

- Working in a clean-room environment, I ran and performed maintenance on optical coating chambers, including evacuation chambers and ion-beam chambers.

**Research Assistant**, University of Rochester          Summers 2020, 2021, 2023

- I participated in the *STEMForAll REU in Data Science*, collaborating with faculty and student teams on summer projects involving statistical analysis and scientific computing.

- Projects included building neural networks from scratch in Python, using TensorFlow and PyTorch neural network models to learn fractal curves, making multi-task learning models, studying image processing techniques, and predicting future sales prices using LSTM networks.

## Certifications

**Data Science Bootcamp**, The Erdős Institute          Fall 2025

- Collaborated in a 5-person team to develop predictive models for traffic delays using planned road event and traffic flow data on the I-10 corridor in Phoenix, AZ.

## Technical Skills

**Languages:** Python, MATLAB, C++, Java
**Scientific Computing:** NumPy, SciPy, PyTorch, TensorFlow, Pandas
**Systems & Tools:** Unix/Linux, Git
**Mathematics:** Numerical Methods, Optimization, Machine Learning, Signal Processing, Inverse Problems

## Publications

- Jennifer Coniglio, Daniel R. Brooks, Steve Murty, Nate Whybra, Brittany Cox, Brian Myer, Brendan McDermott, Mike Hyman. "Advancements in robotic smoothing of high precision optics." *Proceedings Volume 13100, Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation VI;* 131000E, SPIE Astronomical Telescopes + Instrumentation, Yokohama, Japan, August 26, 2024. DOI: 10.1117/12.3018030.