

# Sheila Whitman

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## EDUCATION

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- Aug 2026 **Ph.D. Applied Mathematics** - *University of Arizona, Tucson AZ*  
(Expected) Focus: Machine Learning & Computer Vision | National Science Foundation Fellow
- May 2023 **M.S. Applied Mathematics** - *University of Arizona, Tucson AZ*
- Dec 2020 **B.A. Mathematics** - *Lycoming College, Williamsport, PA*

## RESEARCH EXPERIENCE

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**Graduate Research Assistant** - *University of Arizona, Tucson, AZ* Aug 2021 - present  
Accelerating sustainable materials design by developing computer vision solutions.

Project 1: *Learning microstructure–property relationships in materials with vision transformers [3]*

- Developing a multimodal framework for learning processing-microstructure-property relationships in materials utilizing vision transformers and large language models.
- Training simple regression models for predicting elastic stiffness and Vicker’s hardness.

Project 2: *Automated segmentation and analysis of melt pools in complex 3D printed metal artifacts [1]*

- Developed a hybrid human-machine learning framework utilizing a domain-specific CNN and a random forest model for automated melt pool segmentation in 3D manufactured materials.
- Introduced a new statistical analysis tool as a robust metric for melt pool size analysis, with an additional use for image alignment (automatically aligned over 900 images) [2].

**Computational Science Intern** - *National Renewable Energy Laboratory, Remote* Jan 2021 - April 2021  
Migrated and optimized the existing modeling framework to improve lithium-ion battery design.

- Transitioned existing laboratory models for lithium-ion battery particles into a new modeling software, Neper.
- Optimized the existing framework to extract particle geometries from SEM images and generate scalable, high-quality tetrahedral meshes for large-scale modeling.

**Undergraduate Research Assistant** - *Lycoming College, Williamsport, PA* May 2018 - Dec 2020  
Investigated semi-extrapolation techniques for solving PDEs.

- Designed a novel semi-extrapolation method to enhance the stability of explicit finite difference schemes by modifying implicit schemes through unconventional extrapolation.
- Conducted numerical comparisons of semi-extrapolated methods with mainstream methods, evaluating computational costs, accuracy, and stability for the Advection and Advection-Diffusion equations.

**Computational Science Intern** - *Brookhaven National Laboratory, Upton, NY* June 2019 - Aug 2019  
Developed an interface to improve the user experience of the spectroscopy beamline.

- Created a Python-based GUI to streamline user interaction and enhance the spectroscopy capabilities of the beamline.
- Improved the data acquisition process, contributing to the potential adoption of the GUI framework by other NSLS-II beamlines.

## SKILLS

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- Programming: Python (TensorFlow/Keras, PyTorch, Scikit-learn, OpenCV), R, C++, Matlab, Java, Javascript, MySQL
- Applied Mathematics: Machine Learning, Monte Carlo Methods, Partial Differential Equations, Data Analysis
- Materials Science: Multi-scale modeling, CALPHAD

## WORK EXPERIENCE

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**Graduate Fellowship Consultant** - *University of Arizona, Tucson, AZ* May 2024 - present

- Assisting fellow graduate students in identifying and applying for graduate fellowships.
- Providing writing feedback on fellowship applications through editing personal statements and research proposals.

**Graduate Teaching Assistant** - *University of Arizona, Tucson, AZ* Aug 2021 - Aug 2023

- Taught three undergraduate mathematics classes in statistics, probability, Excel, and college algebra. As the primary instructor, I created course lectures and exams, graded, and hosted office hours for my approximately 30 students a course.
- Assisted professors with grading and classroom management as a teaching assistant for two semesters.

**Undergraduate Teaching Assistant** - *Lycoming College, Williamsport, PA* Aug 2018 - Dec 2020

- Provided tutoring support for a range of undergraduate mathematics and computer science courses.
- Assisted professors with classroom management, grading, and delivered lectures when the instructor was unavailable.

**Information Technology Summer Intern** - *The Dime Bank, Honesdale, PA* May 2020 - Aug 2020

- Migrated 50 existing queries over from an old database management system into a new system.
- Answered the phone for the IT Support Desk to support employees with resolving internet, network, and printing issues.

## OUTREACH

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2024 - 2026 Graduate Representative, Mathematics Dept. Climate, Diversity, Equity, and Inclusion Committee  
2024 - 2025 Secretary, Society for Industrial and Applied Mathematics  
2023 - 2024 Brown Bag Student Colloquium Coordinator, Applied Mathematics Graduate Program  
2023 - 2024 Peer Mentor, Applied Mathematics Graduate Program

## AWARDS

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2024 CVPR DEI Travel Grant Recipient  
2023 National Science Foundation Graduate Research Fellow

## PEER-REVIEWED JOURNAL PAPERS

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- [1] **S.E. Whitman**, G. Hu, H. C. Taylor, R. B. Wicker, M.I. Latypov, [Automated segmentation and chord length distribution of melt pools in complex 3D printed metal artifacts](#) *Integrating Materials and Manufacturing Innovation* (2023).
- [2] **S.E. Whitman**, M.I. Latypov, [SR-CLD: spatially-resolved chord length distributions for statistical description, visualization, and alignment of non-uniform microstructures](#) *Submitted to Materials Characterization* (2024).

## PEER-REVIEWED CONFERENCE PAPERS

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- [3] **S.E. Whitman**, G. Hu, M.I. Latypov, [Learning microstructure–property relationships in materials with robust features from vision transformers](#) *Computer Vision for Materials Science - CVPR Workshop* (2024).