Sheila Whitman

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EDUCATION

Aug 2026 (Expected) **Ph.D. Applied Mathematics** - *University of Arizona , Tucson AZ*
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*

RELEVANT WORK EXPERIENCE

Aug 2021 - present **Graduate Research Assistant** - *University of Arizona, Tucson, AZ*

Accelerating sustainable materials design by utilizing machine learning and vision transformers (ViTs).

Project 1: ***Computer vision for material property prediction***

- Utilizing ViTs for feature extraction to generate quantitative descriptors of microstructures.
- Training polynomial regression and linear support vector regression models on the extracted features for property prediction.

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

- Developed a hybrid human-machine learning framework 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].
- Compared the performance of a random forest model and a pre-trained convolutional neural network on a large-area artifact.

Jan 2021 - April 2021 **Computational Science Intern** - *National Renewable Energy Laboratory, Remote*

Migrated and optimized the existing modeling framework to improve lithium-ion battery design.

- Integrated Neper, an open-source modeling software, into the existing modeling framework to generate computationally efficient and representative grain architectures for lithium-ion batteries.
- Optimized the numerical framework to extract particle geometries from SEM images and generate high-quality tetrahedral meshes with a focus on improving mesh quality and scalability.

June 2019 - Aug 2019 **Computational Science Intern** - *Brookhaven National Laboratory, Upton, NY*

Developed an interface to improve the user experience of the spectroscopy beamline.

- Created a Python-based Qt Graphical User Interface (GUI) to streamline user interaction and enhance the spectroscopy capabilities of the beamline.
- Streamlined data acquisition processes, contributing to the potential adoption of the GUI framework by other NSLS-II beamlines.

SKILLS

• Python (TensorFlow/Keras, PyTorch, Scikit-learn, OpenCV), R, C++, Java, MySQL

OUTREACH

2024 - 2025 Graduate Representative, Mathematics Dept. Climate, Diversity, Equity, and Inclusion Committee

2024 Graduate Writing Consultant, Fellowship Development Program

2023 - 2024 Brown Bag Colloquium Coordinator, Applied Mathematics Graduate Program

2023 - 2024 Peer Mentor, Applied Mathematics Graduate Program

PUBLICATIONS

[1] Whitman, Sheila E., Hu, G., Taylor, H. C., Wicker, R. B., Latypov, M.I., “Automated segmentation and chord length distribution of melt pools in complex 3D printed metal artifacts.” IMMI (2023).

[2] Whitman, Sheila E., Latypov, M.I., “SR-CLD: spatially-resolved chord length distributions for statistical description, visualization, and alignment of non-uniform microstructures.” Preprint on ArXiv (2024).