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Lane E. Schultz

Research Assistant

Website: leschultz.github.io
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Extensive experience in workflow automation through Python, atomistic modeling, and material property predictions through machine learning techniques

Education

PhD Materials Science and Engineering, *University of Wisconsin-Madison* (GPA: 3.661) — May 2023
M.S. Materials Science and Engineering, *University of Wisconsin-Madison* (GPA: 3.661) — Dec 2021
B.S. Engineering, *Fort Lewis College* (GPA: 3.99) — Dec 2017

Skills

Computational	Python, Bash, Git, LaTeX, C++, Verilog, MATLAB, VASP, LAMMPS, AutoCAD, SolidWorks, Vim, Docker, Linux
Quantitative Research	Workflow Automation, Atomic Modeling, Machine Learning, Cluster Administration (OpenHPC)
Communication	English and Spanish (fluent written and verbal)

Technical Experience

Research Assistant — **Jun 2018 — Present**
Computational Materials Group, UW-Madison — *Madison, WI*

Quantifying Metallic Glass Forming Ability

- Generated ab-initio energies and forces for metallic systems to machine learn interatomic potentials
- Conducted classical, ab-initio, and machine learned molecular dynamics to model metal alloy properties and their effect on predicting glass forming ability

Machine Learning Domain of Applicability for Materials

- Implemented machine learning ensemble and bagging methods for uncertainty quantification and calibration of material data sets
- Quantified model feature space dissimilarity and the effects on predicting uncertainty

Scientific Cluster Construction and Administration

- Assisted in the construction and administration of two clusters
- Employed OpenHPC with Warewulf provisioning and OpenPBS queue management
  * 35 node machine with a total of 600 cores
  * 49 node machine with a total of 588 cores

Summer Undergraduate Research Experience — **May 2017 — Aug 2017**
Computational Nuclear Engineering Research Group, UW-Madison — *Madison, WI*

- **Presented** "Tools for Standard Visualization of DAGMC Radiation Transport Results"
- Implemented command line tool for standard, automated image generation from data

Capstone Design Project — **Sep 2016 — Apr 2017**
Undergraduate Research, Fort Lewis College — *Durango, CO*

- **Published** to the American Institute of Aeronautics and Astronautics
- Designed and built an exotic propulsion test stand with a team of 5 engineering students
- Implemented electrostatic displacement mechanism and modeled system response with MATLAB

Summer Undergraduate Research Fellowship — **May 2016 — Aug 2016**
Advanced Diagnostics and Propulsion Research Laboratory, Purdue — *Durango, CO*

- **Presented** "Optimization of a High-Speed X-Ray Imaging System for Studying Sprays"
- Operated pressure vessels, X-ray tube sources, and high-speed cameras for analysis of two dimensional sprays
- Built lead housing for X-ray tube sources

Design Project **Dec 2015 — Apr 2016**
Undergraduate Research, Fort Lewis College *Durango, CO*

- **Published** to OCEANS 16
- Designed and developed an interchangeable sensor package for measurement of water temperature, oxygen reduction potential, pH, time, and global positioning system data

Teaching Experience

Assisted in molecular dynamic labs	Graduate
Grader for Thermodynamics of Solids	Graduate
Teaching Assistant for Thermal and Fluid Systems Laboratory	Undergraduate
Teaching Assistant Engineering Fundamentals II (MATLAB)	Undergraduate

Publications

- B. Afflerbach et al., *Machine Learning Prediction of the Critical Cooling Rate for Metallic Glasses from Expanded Datasets and Elemental Features*, Chemistry of Materials, DOI: 10.1021/acs.chemmater.1c03542
- L. E. Schultz, B. Afflerbach, D. Morgan, I. Szlufarska, *Molecular Dynamics Characteristic Temperatures for Predicting Metallic Glass Forming Ability*, Computational Materials Science, January 2022, DOI: 10.1016/j.commatsci.2021.110877
- L. E. Schultz, B. Afflerbach, C. Francis, D. Morgan, I. Szlufarska, P. Voyles, *Exploration of Characteristic Temperature Contributions to Metallic Glass Forming Ability*, Computational Materials Science, August 2021, DOI: 10.1016/j.commatsci.2021.110494
- B. Afflerbach et al., *Molecular simulation-derived features for machine learning predictions of metal glass forming ability.* Computational Materials Science, November 2021, DOI: 10.1016/j.commatsci.2021.110728
- J. Xi et al., *Microalloying effect in ternary Al-Sm-X (X = Ag, Au, Cu) metallic glasses studied by ab initio molecular dynamics.* Computational Materials Science, December 2020, DOI: 10.1016/j.commatsci.2020.109958
- L. E. Schultz, T. J. Cogger, J. Schneider, R. Good, R. Rothschild, and W. Nollet, *Design of torsional test stand for micro-newton force detection.* Aerodynamic Measurement Technology and Ground Testing Conference, June 2018, DOI: 10.2514/6.2018-3737
- J. Schneider, L. E. Schultz, S. Mancha, E. Hicks, and R. N. Smith, *Development of a portable water quality sensor for river monitoring from small rafts.* OCEANS 2016 MTS/IEEE Monterey, September 2016, DOI: 10.1109/OCEANS.2016.7761392

Presentations

- *Molecular Dynamic Characteristic Temperatures for Predicting Metallic Glass Forming Ability*, 2021 Materials Science & Technology, Columbus, OH
- *Molecular Dynamics Features for Predicting Metallic Glass Critical Casting Thickness*, 2020 Virtual Materials Research Society Spring/Fall Meeting & Exhibit, virtual
- *Design of torsional test stand for micro-newton force detection*, American Institute of Aeronautics and Astronautics 2018 Conference, Atlanta, GA
- *Development of a portable water quality sensor for river monitoring from small rafts*, OCEANS 2016 MTS/IEEE Conference, Monterey, CA

Interests

Movies, shows, video games, weight lifting, LEGOs, and coding