

Laura Z. Vietz

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Education

Mechanical Engineering MS/PhD, University of Utah GPA: 3.97 December 2026

- Advisor: Ashley D. Spear
- Dissertation: *Scaling ductility from microscale to bulk by coupling crystal plasticity simulations with deep learning*

Biomedical Engineering BS, University of Utah GPA: 3.82 December 2020

Technical Skills

Python	MATLAB	FFT Simulations
Uncertainty Quantification	Deep Learning	HEDM Reconstruction

Professional Experience

University of Utah Multiscale Mechanics & Materials Laboratory June 2021 – Present

Predicting Material Properties with Machine Learning

- Utilizing a large strain elasto-viscoplastic FFT-based modeling framework and machine learning to find a relationship between sub-representative volume elements and representative volume elements to create a cost-efficient method of characterizing bulk material properties

3D Grain Mapping using High Energy X-ray Diffraction Microscopy

- Reconstructed high-energy X-ray diffraction (HEDM) data from the Advanced Photon Source to study microstructure and micromechanics of additively manufactured metals for nuclear and aerospace applications

Sandia National Laboratory – R&D Materials March 2023 – Present

Post-processing of High Resolution Electron Backscatter Diffraction Data

- Calculated stress fields from strain fields around second-phase particles in aluminum alloys using high-resolution electron backscatter diffraction (HREBSD) data to investigate the cause of particle fracture

University of Utah Department of Mechanical Engineering – Teaching Assistant

Statics ME EN 2010 January 2024 – May 2024

- Lead discussion sessions for 60 undergraduate students to review additional statics problems and answer homework questions

Continuum Mechanics ME EN 5530/6530 August 2022 – December 2022

- Graded and occasionally taught continuum mechanics to graduate students

Battelle Energy Alliance, LLC – Idaho National Laboratory

Explainability of Vision Transformer January 2023 – August 2024

- Finetuned and implemented explainability techniques to a pre-trained vision transformer to investigate how the model identified 11 types of critical infrastructures from satellite imagery

Thermoelectric Modeling June 2022 – August 2022

- Modeled heat transfer through a thermoelectric leg using Multiphysics Object-Oriented Simulation Environment (MOOSE) to analyze the combination of thermoelectric generators with heat exchangers

Fluor Idaho, LLC – Idaho National Laboratory June 2020 – August 2020

Electronic Dosimeter Comparison Study

- Designed and implemented experiments to compare two electronic dosimeters to prevent radiation overexposure to radiological workers

University of Utah Preclinical Imaging Core

May 2018 – January 2020

Tracing White Matter Pathways in an Alligator Brain (Senior Thesis)

- Demonstrated that white matter pathways in alligator brains could be traced using diffusion tensor magnetic resonance imaging (DTI) to improve our understanding of DTI

Determination of Bone Density in Birds using X-rays

- Segmented CT scans to analytically determine if the bone density in birds can be calculated using X-rays to find an inexpensive alternative to diagnose osteoporosis

University Orthopaedics Research Lab

May 2019 – December 2019

Determining the Proteoglycan Concentration in Athletes

- Used segmentation and image registration techniques to determine the proteoglycan content in acetabular cartilage in collegiate athletes to prevent symptomatic femoroacetabular impingement

Publications

L.Z. Vietz, K.S. Otis, S.N. Elliott, A.D. Spear, “Classification of critical infrastructures with varying resolution satellite images using a pre-trained vision transformer”, *SWC 2025*, Aug. 2025

M.B. Pritz, **L.C. Ziegler (Vietz)**, T.N. Thompson, and E.W. Hsu, “Magnetic resonance diffusion tensor tractography of a midbrain auditory circuit in Alligator”, *Neuroscience Letters*, vol. 738, p. 135251, Nov. 2020, doi: [10.1016/j.neulet.2020.135251](https://doi.org/10.1016/j.neulet.2020.135251).

Presentations (speaker underlined)

- **L.Z. Vietz**, T.J. Bennett, T. Ruggles, W.G. Gilliland, P.J. Noell, “Using HREBSD to measure strain of second phase particles in aluminum alloy 2219,” *M&M 2025*, SLC, UT, July 2025. (Poster)
- **L.Z. Vietz**, R.G. Divine, C.K. Cocke, A.D. Spear, “Scaling ductility from microscale to bulk by coupling crystal plasticity simulations with deep learning,” *TMS Specialty Congress 2025*, Anaheim, CA, June 2025.
- Q. Johnson, J. Plumb, P. Kenesei, H. Sharma, J.S. Park, D. Zhao, **L.Z. Vietz**, A.D. Spear. “3D characterization of grain structure in-situ deformation of open-cell metal foam using micro-computed tomography and high-energy X-ray diffraction microscopy”, APS Users Meeting, Lemont, IL, May 2024. Invited.
- **L.Z. Vietz**, R.G. Divine, C.K. Cocke, A.J.B. Shields, A.D. Spear. “Scaling ductility from microscale to bulk by coupling crystal plasticity simulations with 3D convolutional neural networks”, TMS 2024, Orlando, FL, March 2024.
- **L.C. Ziegler (Vietz)**, C.K. Cocke, M.R. Kunz, A.D. Spear. “Scaling microstructure-dependent mechanical properties to bulk material properties using 3D convolutional neural networks”, TMS 2023, San Diego, CA, March 2023. (Poster)
- **A.D. Spear**, C.K. Cocke, B.R. Phung, **L.C. Ziegler (Vietz)**, E.S. Marsden, V.B. Rao. “Predicting microstructure-sensitive fracture behavior in AM IN625 using a damage-enabled elasto-viscoplastic FFT framework”, TMS 2023, San Diego, CA, March 2023. Invited.
- **L.C. Ziegler (Vietz)**, A.A. Richards, A.D. Spear. “High energy X-ray diffraction microscopy for 3D grain mapping of polycrystalline materials”, University of Utah, Salt Lake City, UT, April 2022.

Selected Awards

NIST - AM Bench Challenge 2022 First Place

August 2022

- Performed model calibration to predict subcontinuum tensile behavior of as-built Inconel 625

BD Bard Undergraduate Scholarship

August 2020 – December 2020

Undergraduate Research Opportunity Program Scholar

August 2019