

Education

M.S./Ph.D. Mechanical Engineering

Expected May 2026

University of Utah

Advisor: Dr. Ashley Spear

Specialization: Simulation and Failure of Additively Manufactured Metal

Matrix Composites

Honors B.S. Mechanical Engineering | Emphasis: Robotics

December 2021

University of Utah

GPA: 3.936 | Dean's List

Awards

ARCS Scholar Award	2022-2026
Undergraduate Research Scholar Designation	2021
Undergraduate Research Opportunities Program	2021
University of Utah Research Fellowship	2019-2021
Earl C. Watson Endowed Scholarship	2020-2021
Christopher Flint Scholarship	2020-2021
Undergraduate Research Opportunities Program	2019
Summer Program for Undergraduate Research	2018
Academic Commendation Scholarship	2017-2018

Skills and Qualifications

Computer Programming Skills

- Python
- MATLAB
- Paraview
- DREAM3D
- ImageJ
- SOLIDWORKS (CSWA Academic)
- Creo Parametric
- ANSYS
- Thermal Desktop with RadCAD
- Arduino

Laboratory Skills

- DNA polymerase chain reaction
- Polymer handling
- Gel Electrophoresis
- Cell Culture
- Microsurgery
- Immunohistochemistry
- Mounting, Grinding, and Polishing metal samples
- 3D-Printing – PLA and metal infused PLA
- Vickers Hardness Testing
- Optical Microscopy (Keyence VHX-5000)
- Nanoindenter (Hysitron TI Premier)

Research Experience

Graduate Researcher

August 2022-Present

University of Utah Multiscale Mechanics of Materials Laboratory with Dr. Ashley Spear

- Currently modeling additively manufactured metal matrix composites utilizing a large-strain elastovisco-plastic Fast fourier transform (LS-EVPFFT) framework incorporating work hardening and triaxiality-based damage.
- Currently studying relationships between pores and microstructural features using the LS-EVPFFT framework.

Research Assistant

May 2022-August 2022

University of Utah Magnetic and Medical Robotics Laboratory

- Created a control system for using spinning electromagnets to move magnetic material.
- Helped design a stand and housing for a robotic arm to control the magnets.

Summer Internships

May 2019-August 2019 & May 2020-August 2020

Los Alamos National Laboratory: Space Research and Intelligence Division with Dr. Justin McGlown

- Created a thermal model using ANSYS to model SuperCam's Body Unit to be deployed on the 2020 Mars Rover to ensure thermal stability of batteries.
- Designed parts using CREO Parametric to use in: CubeSats, shock and vibrate testing, and thermal testing, wide plasma spectrometry, gamma ray detection technology, and new reflectarray technology
- Utilized Thermal Desktop to create a thermal model of my team's CubeSat that will orbit Earth. This model tested for potential radiation and heating effects our design will experience

Research Assistant

January 2020-Present

University of Utah Departments of Mechanical Engineering-Laser Based Manufacturing with Dr. Wenda Tan

- Research to study the 3D printing and sintering of copper and stainless steel printed in a gradient pattern
- Performed literature review and multiple rounds of printing and sintering processes of pure copper metal
- Performed post processing steps including mounting, grinding and polishing, visualization with optical microscopes and SEM, and hardness testing using nanoindentation and Vickers hardness tests
- Final report consists of a presentation and Honors Thesis

Research Assistant – SPUR and UROP

May 2018-May 2019

University of Utah Departments of Surgery and Biomedical Engineering with Dr. Jill Shea

- Awarded funding for this project through SPUR (Summer Program for Undergraduate Research) and UROP (Undergraduate Research Opportunities Program)
- Designed and manufactured synthetic drug delivering peripheral nerve conduits to aid in nerve regeneration using poly-L-lactic acid (PLLA) and polycaprolactone (PLC)
- Performed release tests using fluorescently labeled dextran in PBS and analyze data using Excel
- Aided in microsurgery with implantation and harvesting of conduits in the severed sciatic nerve of mice
- Performed immunohistochemistry on nerve segments and quantify regenerated axons using microscopes and ImageJ

Research Assistant

May 2016-August 2017

Los Alamos National Laboratory: Biosciences Division with Dr. Sofiya Micheva-Viteva.

- Study of antibiotic resistance in dormant cell populations
- Tested the effects that B vitamins had on persister cell colonies when treated with antibiotics by running a series of experiments with multiple E-coli cell colonies

Relevant Coursework

Continuum Mechanics

Image Processing (Fall 2023)

Fracture and Fatigue

Intro to Optimization (Fall 2023)

Applied Finite Element Analysis

Leadership

Undergraduate Research Leader

August 2019-Present

University of Utah Office of Undergraduate Research under Shiver and Annie Fukushima

- Assisted students in finding and beginning research and aid with applications for programs such as the Undergraduate Research Opportunities Program (UROP) and the Summer Program for Undergraduate Research (SPUR).
- Acted as a first point of contact for any student participating in UROP or SPUR
- Hosted a podcast episode on OUR Pod interviewing two other students who completed SPUR

Honors Ambassador

August 2019-Present

University of Utah Honors College under Jennifer Wiseman

- Conducted outreach and honors college tours for incoming freshmen, transfer students, and prospective students

Presentations

Virtual Fall Symposium at the University of Utah “Sintering of 3D-printed Copper-Steel Functionally Graded Materials”	December, 2021
Design Day – University of Utah “Robot Arm Controlled by Supercoiled Polymer Muscle Fibers”	November, 2021
Summer Programs Presentation – Undergraduate Research Leaders “Summer Research Programs for Undergraduate Students”	November 2019
Undergraduate Research Symposium – University of Utah “Constructing Neurotrophic Gradient-Generating Peripheral Nerve Conduits”	May 2019
Summer Symposium – University of Utah “Constructing Neurotrophic Gradient-Generating Peripheral Nerve Conduits”	August 2019

Affiliations

Tau Beta Pi Engineering Honor Society
Golden Key International Honor Society
Phi Eta Sigma Honor Society
Society of Women Engineers (SWE) Outreach