

Education

M.S./Ph.D. Mechanical Engineering 3rd Year

Expected May 2026

University of Utah

Advisor: Dr. Ashley Spear

Specialization: Simulation of damage evolution and failure in additively manufactured metal matrix composites

Honors B.S. Mechanical Engineering | Emphasis: Robotics

December 2021

University of Utah

GPA: 3.936 | Dean's List

Awards

ICAM Student Presentation Competition 1st Place

2024

ARCS Scholar Award

2022-2026

Relevant Graduate Coursework

Continuum Mechanics

Fracture and Fatigue

Applied Finite Element Analysis

Image Processing

Advanced Finite Element Analysis

Composites

Skills and Qualifications

Computer Programing Skills

Python

MATLAB

Paraview

DREAM3D

Dragonfly

ImageJ

SOLIDWORKS (CSWA
Academic)

Creo Parametric

ANSYS

Thermal Desktop with RadCAD

Arduino

Laboratory Skills

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)

DNA polymerase chain reaction

Polymer handling

Gel Electrophoresis

Cell Culture

Microsurgery

Immunohistochemistry

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

Graduate Research Intern

January 2023-Present

Sandia National Laboratory Materials Mechanics & Tribology Laboratory with Dr. Philip Noell

- Currently studying relationships between void growth rate and grain orientations within additively manufactured aluminum alloys using data analysis tools such as Dragonfly, python packages, and machine learning algorithms

Research Assistant

May 2022-August 2022

University of Utah Magnetic and Medical Robotics Laboratory

- Created a control system for 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 vibe 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-December 2021

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 aide 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 affects that B vitamins had on persister cell colonies when treated with antibiotics by running a series of experiments with multiple E-coli cell colonies

Conference Presentations

C.M. Ticknor, J. Khanfri, A. Butler, J. Kacher, A. Stebner, A.D. Spear. "Modeling the hardening and damage of additively manufactured metal matrix composites in a large-strain elasto-viscoplastic FFT-based framework", TMS24, Orlando, FL, March 2024.

C.M. Ticknor, J. Khanfri, A. Butler, J. Kacher, A. Stebner, A.D. Spear. "An expanded large-strain elasto-viscoplastic FFT-based framework to model the hardening and damage of additively manufactured metal matrix composites.", ICAM24, Atlanta, GA, October 2024.

C.M. Ticknor, H. Lim, P. Noell. "Role of crystallographic orientation and other mechanisms on heterogeneous void growth during ductile fracture.", SEM25, Milwaukee, WI, June 2025.

C.M. Ticknor, J. Khanfri, A. Butler, J. Kacher, A. Stebner, A.D. Spear, "Modeling the hardening and damage evolution of additively manufactured metal matrix composites using an elasto-viscoplastic FFT-based framewrok", 3DMS25, Anaheim, CA, June 2025.

Affiliations

Tau Beta Pi Engineering Honor Society
Golden Key International Honor Society

Phi Eta Sigma Honor Society
Society of Women Engineers (SWE) Outreach