# Curriculum Vitae

## Personal


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| Name | **Joseph Bail** |
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## Education

Aug 2023 - Present

**Master of Science (M.S.) Atmospheric Science**
*University of Utah, Salt Lake City, Utah*
GPA: 4.00
Hallar Aerosol Research Team (HART)
Haskins Lab

Aug 2021 - Dec 2023

**Master of Science (M.S.) Mechanical Engineering**
*University of Utah, Salt Lake City, UT*

- Cumulative GPA: 4.00
- Head Injury and Vessel Biomechanics Lab

Aug 2014 - Dec 2018

**Bachelor of Science (B.S.) Mechanical Engineering**
*Pennsylvania State University, State College, PA*

- Cumulative GPA: 3.61
- Environmental and Biological Fluid Mechanical Lab
- Second Language Acquisition Laboratory
- Technical Writing Mentor Program for Mechanical Engineering Students
- Formula SAE Chassis Team Member

## Research Experience

**Graduate Researcher, Hallar Aerosol Research Team | University of Utah** (August 2023 to current)

- Developing a recent climatology of dust events across the western United States using aerosol data from the Atwater Study Plot in Alta, Utah, Storm Peak Lab in Steamboat, Colorado, and various satellite and surface-based aerosol and aridity measurements.
- Maintaining and monitoring aerosol measurements at the Atwater Study Plot and University of Utah using GRIMM and Quant optical particle counters.
- Participating in the Utah Summer Ozone Study and S2noCliME field campaigns in Salt Lake City, Utah, and Steamboat, Colorado.

**Graduate Researcher, Haskins Lab | University of Utah** (August 2023 to current)

- Collecting soil conductivity data and converting soil measurements into chloride concentrations that we will assemble into GEOS-Chem particulate chloride inventory to enhance GEOS-Chem's capability of modeling halogen chemistry reactions and their impacts on secondary air quality effects
- Evaluating $ClNO_2$ predictions against field measurements from the NACHTT 2011 campaign to assess model improvements.

**Graduate Researcher, Brain Injury and Vessel Biomechanics Lab | University of Utah** (August 2021 to December 2023)

- Advancing a predictive model to predict how brain vessels are damaged during traumatic brain injury events through carefully dissecting, testing, and studying results of middle cerebral arteries from adolescent sheep.
- Developing a robust MATLAB script that automatically processes and organizes raw data from mechanical tests directly from LabView.
- Developing an interactive MATLAB application that allows a presenter to filter large data sets of each vessel's stress and strain results and display the selected results on figures within the application.
- Helping co-manage an undergraduate CAPSTONE project to use digital-image-correlation and optics to capture 360-degree images of the brain vessel during our axial strain tests.

**R&D Intern, Carlisle Construction Materials** (Summer 2017 & Summer 2018)

- Designed and built a roof monitor system that transmitted moisture data to a customized monitoring application.
- Prototypes a custom moisture sensor to locate leaks in roofing membranes using time-domain-reflectometry.
- Iteratively designed, simulated, manufactured, and tested extrusion devices for polyisocyanurate insulation fluid.

**Fluid Mechanics Lab Assistant, Penn State University** (December 2017 to December 2018)

- Used MATLAB's image processing tools to track and record the swimming patterns of sea animals
- Helped write scripts in MATLAB to translate and analyze the tracking data

## Teaching Experience

**Teaching Assistant for Mechanical Engineering Dynamics** (August 2021 to May 2023)

- Provided support to over 100 undergraduate engineering students (per semester) enrolled in Engineering Dynamics, a class emphasizing the comprehension of forces and accelerations in rigid body systems across various engineering applications.
- Conducted regular office hours to assist students with lecture reviews, homework problems, and exam preparation (~10 hours per week).
- Graded homework assignments, exams, and class projects.
- Delivered several lectures both in-person and remotely.

**Engineering Writing Mentor** (August 2018 to December 2018)

- Led round-table critique session on engineering documents such as proposals
- Assessed the style and form of engineering documents
- Assisted in teaching of grammar workshops for engineering undergraduates
- Served in new effort to scale teaching of engineering writing through using undergraduate mentors

## Work experience

Jan 2019 - Jun 2021

**Mechanical Project Engineer**

*Carlisle Construction Materials, Carlisle, Pennsylvania*

- Authored and co-authored comprehensive engineering proposals with approved budgets ranging from $66,000 to $4.7 million.
- Led the conceptualization and management of a $1.4 million project, which successfully automated a labor-intensive process involving the manual conveyance, cutting, and stacking of 200-pound rubber mats. This transformative initiative not only bolstered production throughput and employee safety but also resulted in a discernible reduction in production costs.
- Co-authored and managed the execution of a $1.2 million project aimed at upgrading manufacturing equipment and optimizing the layout for a rubber flooring mat plant.
- Led research efforts to evaluate diverse mixing technologies for dry rubber and polyurethane and used the results of the field research to write two successful proposals that facilitated the enhancement of CCMs mixing equipment.
- Contributed as a project manager and supporting engineer across various cross-functional teams, collaborating to enhance the production processes of EPDM rubber products in facilities spanning Ohio, Oregon, Utah, Pennsylvania, and the Netherlands.

May 2018 - Aug 2018

**Quality Services Intern**

*Carlisle Construction Materials, Carlisle, Pennsylvania*

- Developed a proof-of concept prototype to detect leaks in CCM's roofing system. This project involved experimenting with Time Domain Reflectometry and applying its principles to detect the magnitude and location of leaks in a roof.
- Built and programmed a functioning roof-monitoring system to automatically monitor for roof leaks. This project involved wiring and assembling different moisture sensors onto a model roof and programming a custom user interface to analyze the data in real-time, using MATLAB software.

## Publications

Bail, J. D. (2023). *Comparative Analysis of the Softening Effects of Collagen Digestion and Overstretch in Middle Cerebral Arteries* (Order No. 30813267). Available from Dissertations & Theses @ University of Utah; ProQuest One Academic. (2972427666). https://login.ezproxy.lib.utah.edu/login?url=https://www.proquest.com/dissertations-theses/comparative-analysis-softening-effects-collagen/docview/2972427666/se-2

Hopp, H., Bail, J., & Jackson, C. N. (2020). Frequency at the syntax–discourse interface: A bidirectional study on fronting options in L1/L2 German and L1/L2 English. Second Language Research, 36(1), 65-96. https://doi.org/10.1177/0267658318802985

## Conference Presentations

**Global Change and Sustainability Center & the Wilkes Center for Climate Science Symposium** (May 2024)
Presented Poster: Climatology of Dust Events for the Salt Lake Valley and Wasatch Front

**11th International GEOS-Chem Meeting, IGC11** (June 2024)
Presented Poster: Implementing Playas as Sources for Particulate Chloride in GEOS-Chem

## Research Field Campaigns

**S2noCliME** (January 2025 to current)
- Designing and collaborating with local machine shop to produce a custom mount for Cloud Droplet Probe that will be installed at the Stormpeak Mountain Laboratory within the Steamboat Ski Resort
- Helping launch radiosondes at Sleeping Giant Elementary in Steamboat, Colorado during winter storm events
- Helped with manual labor required to calibrate radar stationed at Sleeping Giant Elementary
- Helped install Lidar and radars at the Mid Mountain site of Steamboat Ski Resort.
- Helped install various instruments at the Stormpeak Mountain Laboratory, which included a Picarro and Pine

**Utah Summer Ozone Study** (Summer 2024)
- Developed and presented daily forecasting briefings to the USOS science team that were used to strategize optimal drive routes for a van and flight paths for a Twin Otter airplane, guiding surface and atmospheric measurement operations
- Prepared and launched radiosonde daily

## Achievements

**Research Grant** (September 2023)
University of Utah | Global Change and Sustainability Center & the Wilkes Center for Climate Science & Policy
"Linking Water Usage & Climate Change to Future Air Quality: Adding a Playa Dust Source to GEOS-Chem"

**Research Grant** (May 2015)
Pennsylvania State University | Partnerships for International Research and Education
"Frequency at the syntax–discourse interface: A bidirectional study on fronting options in L1/L2 German and L1/L2 English"

## Skills

**Python** ●●●●○

**MATLAB** ●●●●○

**Autodesk Inventor** ●●●●●

**Solidworks** ●●●●○

**GEOS-Chem** ●●○○○

**HYSPLIT** ●●●○○

Machining

Finite Element Analysis

German