

# Leo J. Beck

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## EDUCATION

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University of Colorado Boulder

**Doctor of Philosophy in Materials Science & Engineering**

Aug 2023 – Present

**Master of Science in Materials Science & Engineering**

Aug 2023 – May 2025

GPA: 3.90/4.00

Clemson University

**Bachelor of Science in Materials Science and Engineering**

Aug 2019 - May 2023

**Bachelor of Science in Mathematical Sciences**

GPA: 3.84/4.00

## RESEARCH EXPERIENCE

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### Graduate Researcher

*Interfaces Laboratory – Dr. Hendrik Heinz*

Dec 2023 - Present

- Simulate hybrid organic-inorganic perovskites to determine stability and crystal structure descriptors for thin-film solar cells using LAMMPS
- Calculate thermal and mechanical properties of dopamine binding to  $\text{Ti}_3\text{C}_2\text{T}_x$  MXenes using NAMD and VMD
- Develop high-throughput workflows and automations for model setup, simulation, and analysis using Python, bash, Packmol, and C++
- Aggregate data from chemical databases to train machine learning models for predicting structural properties of hybrid perovskites
- 3 coauthor publications submitted for review

*Materials & Manufacturing Directorate – Air Force Research Lab*

May 2024 – Aug 2024

- Simulated  $\text{Ti}_3\text{C}_2\text{T}_x$  MXenes using LAMMPS to determine inter-sheet shear strength

### Undergraduate Researcher

*Materials Computation and Data Science Group – Dr. Dilpuneet Aidhy*

Aug 2022 – Jun 2023

- Performed point defect energy simulations on high entropy alloys using VASP
- Trained Machine Learning models from simulation data to predict material properties

*Dr. Margaret Wieczek and Dr. Hyesuk Lee Group*

Jan 2022 – Dec 2022

- Programmed in MATLAB and used high-performance computing to perform bi-objective optimization of fourth order partial differential equations

*Texas A&M Center for the Mechanical Control of Chemistry – Dr. Jonathan Felts*

May 2022 - Aug 2022

- Designed a normal and shear force controlled mechanochemical reactor using SolidWorks

*Foulger Research Group - Dr. Stephen Foulger*

May 2021 - Aug 2021

- Fabricated 3 terminal thin film organic memristors
- Coauthor – Nonconformal Electrochemical Memristor through Vapor Phase Polymerization of Pyrrole

## WORK EXPERIENCE

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- Classical Simulations Consultant, FAIRmat** May 2025-Aug 2025  
Berlin, DE
- Updated NOMAD LAMMPS parser in Python to handle a wide variety of input and output formats
  - Consulted on LAMMPS methods, options, and packages
  - Curated set of LAMMPS input and output files for future test cases
- Engineering and Planning Intern, Benore Logistic Systems, Inc.** May 2023 – Aug 2023  
Erie, MI
- Created a visualizing tool to track hour-by-hour driver utilization
  - Implemented first-fit decreasing algorithm in Visual Basic to sort pallets into trucks
  - Automated splitting process and daily analytics using Visual Basic and Power Automate
- Programming Tutor, Code Ninjas** Sep 2018 - Aug 2019  
Fort Mill, SC
- Taught children ages 6-14 JavaScript and Scratch
- Carhop, Sonic Drive-In** Jun 2018 – Sep 2018
- Managed drive-thru, dining room, and drive-in
  - Took orders, made drinks and dairy items, maintained clean workspace

## TEACHING EXPERIENCE

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- University of Colorado Boulder
- Phys 1140 – Experimental Physics 1 – 1 credit hour Spring 2026
- Led 2 sections of lab with 35 students each, graded lab notebooks
- Phys 2210 – Classical Mechanics and Math Methods 1 – 3 credit hours Spring 2026
- Graded homework, proctored and graded exams
- Phys 1110 – General Physics 1 – 4 credit hours Fall 2023
- Led 4 recitations of 25 students each, graded homework, proctored exams

## PROJECTS & EXTRACURRICULAR ACTIVITIES

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- Financial and Logistics Officer, Clemson Formula SAE** May 2021 - Jun 2022
- Increased team yearly Clemson revenue from \$30,000 to \$70,000
  - Managed a \$100,000 budget and logistics of 30 members
- Head of Procurement, Clemson Formula SAE** May 2020 – May 2023
- Ordered and tracked hundreds of purchase requests from 8 divisions per year
- Electrical Division Member, Clemson Formula SAE** Aug 2019 – May 2023
- Wired vehicle electrical harness and sensors
  - Assisted test days and general vehicle assembly
- Member, Clemson Adopt-a-Stream** Dec 2019 – May 2023
- Member, Clemson Materials Advantage** Nov 2021 – May 2023

## SKILLS

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Programming: Python, MATLAB, bash, C/C++, Visual Basic, Julia  
Simulation: LAMMPS, NAMD, VMD, Materials Studio, SolidWorks, Packmol  
Miscellaneous: Microsoft Excel, Linux, LaTeX, Optimization, Scientific Computing, German (A2)

## HONORS & AWARDS

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Gilbert Robinson Research Award – Clemson University  
South Carolina High School State Geography Champion  
Employee of the Month, *Sonic Drive-In*

Apr 2023  
Feb 2019  
Aug 2018

## **PUBLICATIONS**

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Grant, B., Wanless, T., Crooks, J., Beck, L., Bandera, Y., & Foulger, S. H. (2023). Nonconformal electrochemical memristor through vapor phase polymerization of pyrrole. *ACS Applied Electronic Materials*, 5(7), 3993–4001. <https://doi.org/10.1021/acsaelm.3c00708>

Submitted to 2D Materials

Shuck, C. *et al.* (2025). MXenes 2025: A Roadmap on Synthesis, Processing, and Applications. 92–98.

Submitted to ACS Nano

Armstrong, I., Slocik, J., Beck, L., Nepal, D., Zhu, C., Varshney, V., & Heinz, H. (2025). Validated Reactive Force Field Quantifies Mxene Interfacial Properties, Mechanics, and Thermal Transport. <https://doi.org/10.26434/chemrxiv-2025-212s7>

Submitted to arXiv

Karabin, M., Armstrong, I., Beck, L., Apanel, P., Eisenbach, M., Mitzi, D., Terletska, H., & Heinz, H. (2025). Enhancing Dimensionality Prediction in Hybrid Metal Halides via Feature Engineering and Class-Imbalance Mitigation. <https://doi.org/https://doi.org/10.48550/arXiv.2512.05367>