

Research Experience

- **Phases Research Lab, Pennsylvania State University**
NASA Space Technology Research Fellow (Advisor: Zi-Kui Liu)

 - Developer of pycalphad and ESPEI, open research and education software for computational thermodynamics
 - Developer of atomate, a computational tool for high-throughput, first-principles DFT calculations with VASP
 - Mentor undergraduate students in the Women In Science and Engineering Research (WISER) program

University Park, PA
2016 – Present
 - **NASA Jet Propulsion Lab**
Graduate Research Intern (Mentors: Richard Otis, Peter Dillon)

 - Used computational thermodynamics to develop bulk metallic glass alloy composition specifications
 - Developed a model for oxygen tolerance in bulk metallic glasses

La Cañada Flintridge, CA
05/2017 – 08/2017
 - **Solid State Ionics Laboratory, Michigan State University**
Undergraduate Research Assistant (Advisor: Jason D. Nicholas)

 - Fabricated and improved the performance of solid oxide fuel cells
 - Characterized fuel cells with EIS, XRD, and SEM
 - Developed Rp Plotter, a GUI-based Python application for data analysis and visualization
 - Participated in a 10 week professional development course

East Lansing, MI
2015 – 2016
 - **Composite Materials & Structures Center, Michigan State University**
Undergraduate Research Assistant (Advisor: Lawrence T. Drzal)

 - Designed a graphene nanoplatlet-based capacitive deionization cell
 - Characterized graphene nanoplatelet papers using scanning electron microscopy
 - Used Solidworks to create a 3D printed model for the deionization cell apparatus
 - Participated in a 10 week professional development course

East Lansing, MI
2014 – 2015
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Teaching Experience

- **Department of Materials Science and Engineering, Pennsylvania State University**
Teaching Assistant

 - MatSE 404/BME 444: Surfaces and the Biological Response to Materials
 - o Developed and graded problems for homework and exams
 - MatSE 462: General Properties Laboratory in Materials
 - o Independently taught and graded assignments for two lab sections of 10 students
 - o Instructed students on using techniques for characterizing mechanical, electrical and optical properties

University Park, PA
2017
 - **College of Engineering, Michigan State University**
Undergraduate Lab Mentor

 - Mentored 3 classes, interacting with over 250 students
 - Responsible for grading assignments and quizzes, promoting learning, and proctoring exams
 - o EGR 100: Introduction to Engineering Design
 - o EGR 102: Introduction to Engineering Modeling
 - o EGR 291: Spatial Visualization

East Lansing, MI
2015 – 2016
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Education

- **Pennsylvania State University**
Ph.D., Materials Science and Engineering; Graduate Minor, Computational Materials

 - 3.73 GPA
 - NASA Space Technology Research Fellow (2018 – Present)
 - NSF Research Trainee in the CoMET Program (dftcomet.psu.edu) (2016 – 2018)

University Park, PA
2016 – Present
 - **Michigan State University**
B.S. Materials Science and Engineering

 - 3.56 GPA
 - Dean's List, 5 semesters

East Lansing, MI
2012 – 2016
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Awards and Honors

- pycalphad: Runner Up, NASA Software of the Year (SoY) award 2019
 - Honorable Mention, National Science Foundation Graduate Research Fellowship Program 2018
 - Outstanding Contribution in Reviewing - *CALPHAD* 2017
 - Helen R. and Van H. Leichliter Graduate Fellowship recipient 2016
 - MSU College of Engineering Endowed Opportunity Fund scholarship recipient 2015
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Publications

- L.D. Bobbio, **B. Bocklund**, A. Reichardt, R.A. Otis, J.P. Borgonia, R.P. Dillon, A.A. Shapiro, B.W. McEnerney, P. Hosemann, Z.-K. Liu, A.M. Beese, Analysis of formation and growth of the σ phase in additively manufactured functionally graded materials, **Submitted**. (2018).
 - **B. Bocklund**, R.A. Otis, A. Egorov, A. Obaied, I. Roslyakova, Z.-K. Liu, ESPEI for efficient thermodynamic database development, modification, and uncertainty quantification: application to Cu-Mg. **MRS Communications** *In press*. (2019) [arxiv:1902.01269](https://arxiv.org/abs/1902.01269).
 - N.H. Paulson, **B. Bocklund**, R.A. Otis, Z.-K. Liu, S. Marius, Quantified Uncertainty in Thermodynamic Modeling for Materials Design. **Acta Materialia** *In press*. (2019) [doi:10.1016/j.actamat.2019.05.017](https://doi.org/10.1016/j.actamat.2019.05.017).
 - Y. Wang, Y.-J. Hu, **B. Bocklund**, S.-L. Shang, B.-C. Zhou, Z.-K. Liu, L.-Q. Chen, First-principles thermodynamic theory of Seebeck coefficients, **Physical Review B** 98 (2018) 224101. [doi:10.1103/PhysRevB.98.224101](https://doi.org/10.1103/PhysRevB.98.224101).
 - L.D. Bobbio, **B. Bocklund**, R.A. Otis, J.P. Borgonia, R.P. Dillon, A.A. Shapiro, B. McEnerney, Z.-K. Liu, A.M. Beese, Characterization of a functionally graded material of Ti-6Al-4V to 304L stainless steel with an intermediate V section. **Journal of Alloys and Compounds** 742, 1031-1036 (2018). [doi: 10.1016/j.jallcom.2018.01.156](https://doi.org/10.1016/j.jallcom.2018.01.156)
 - L.D. Bobbio, **B. Bocklund**, R.A. Otis, J.P. Borgonia, R.P. Dillon, A.A. Shapiro, B. McEnerney, Z.-K. Liu, A.M. Beese, Experimental analysis and thermodynamic calculations of an additively manufactured functionally graded material of V to Invar 36, **Journal of Materials Research** 33 (2018) 1642–1649. [doi:10.1557/jmr.2018.92](https://doi.org/10.1557/jmr.2018.92).
 - K. Mathew, J.H. Montoya, A. Faghaninia, S. Dwarakanath, M. Aykol, H. Tang, I. Chu, T. Smidt, **B. Bocklund**, M. Horton, J. Dagdelen, B. Wood, Z.-K. Liu, J. Neaton, S.P. Ong, K. Persson, A. Jain, Atomate: A high-level interface to generate, execute, and analyze computational materials science workflows. **Computational Materials Science** 139, 140–152 (2017). [doi: 10.1016/j.commatsci.2017.07.030](https://doi.org/10.1016/j.commatsci.2017.07.030)
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Technical Skills

Software Developed: pycalphad (pycalphad.org), ESPEI (espei.org), atomate (atomate.org)

Computational Tools and Software: Python, MATLAB, VASP, Thermo-Calc, MongoDB