

## 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](http://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

- A. Obaied, **B. Bocklund**, S. Zomorodpoosh, L. Zhang, R. Otis, Z.-K. Liu, I. Roslyakova, Thermodynamic re-assessment of pure chromium using modified segmented regression model, *CALPHAD Accepted* (2019).
  - 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  $\sigma$  phase in additively manufactured functionally graded materials, *Journal of Alloys and Compounds* 814 (2020) 151729. doi:10.1016/j.jallcom.2019.151729.
  - **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* 9(2) (2019) 618-627. doi:10.1557/mrc.2019.59.
  - N.H. Paulson, **B. Bocklund**, R.A. Otis, Z.-K. Liu, S. Marius, Quantified Uncertainty in Thermodynamic Modeling for Materials Design. *Acta Materialia* 174 (2019) 9-15. doi: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.
  - 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 (2018) 1031-1036. doi: 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.
  - 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
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## Technical Skills

**Software Developed:** pycalphad ([pycalphad.org](http://pycalphad.org)), ESPEI ([espei.org](http://espei.org)), atomate ([atomate.org](http://atomate.org))

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