Brandon Bocklund

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Research Experience

- **Phases Research Lab, Pennsylvania State University** — **University Park, PA**
  NASA Space Technology Research Fellow (Advisor: Zi-Kui Liu) — *2016 – Present*
  - 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
- **NASA Jet Propulsion Lab** — **La Cañada Flintridge, CA**
  Graduate Research Intern (Mentors: Richard Otis, Peter Dillon) — *05/2017 – 08/2017*
  - Used computational thermodynamics to develop bulk metallic glass alloy composition specifications
  - Developed a model for oxygen tolerance in bulk metallic glasses
- **Solid State Ionics Laboratory, Michigan State University** — **East Lansing, MI**
  Undergraduate Research Assistant (Advisor: Jason D. Nicholas) — *2015 – 2016*
  - 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
- **Composite Materials & Structures Center, Michigan State University** — **East Lansing, MI**
  Undergraduate Research Assistant (Advisor: Lawrence T. Drzal) — *2014 – 2015*
  - 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

Teaching Experience

- **Department of Materials Science and Engineering, Pennsylvania State University** — **University Park, PA**
  Teaching Assistant — *2017*
  - MatSE 404/BME 444: Surfaces and the Biological Response to Materials
    - Developed and graded problems for homework and exams
  - MatSE 462: General Properties Laboratory in Materials
    - Independently taught and graded assignments for two lab sections of 10 students
    - Instructed students on using techniques for characterizing mechanical, electrical and optical properties
- **College of Engineering, Michigan State University** — **East Lansing, MI**
  Undergraduate Lab Mentor — *2015 – 2016*
  - Mentored 3 classes, interacting with over 250 students
  - Responsible for grading assignments and quizzes, promoting learning, and proctoring exams
    - EGR 100: Introduction to Engineering Design
    - EGR 102: Introduction to Engineering Modeling
    - EGR 291: Spatial Visualization

Education

- **Pennsylvania State University** — **University Park, PA**
  Ph.D. Materials Science and Engineering; Graduate Minor, Computational Materials — *2016 – Present*
  - 3.86 GPA
  - NASA Space Technology Research Fellow (2018 – Present)
  - Honorable Mention, National Science Foundation Graduate Research Fellowship Program (2018)
  - NSF Research Trainee in the CoMET Program (dftcomet.psu.edu) (2016 – 2018)
  - Helen R. and Van H. Leichliter Graduate Fellowship recipient (2016)
- **Michigan State University** — **East Lansing, MI**
  B.S. Materials Science and Engineering — *2012 – 2016*
  - 3.56 GPA
  - Dean's List, 5 semesters
  - MSU College of Engineering Endowed Opportunity Fund scholarship recipient (2015 – 2016)

Publications

- Bobbio, L.D., **Bocklund, B.**, Otis, R, Borgonia, J.P., Dillon, R.P., Shapiro, A.A., McEnerney, B., Liu, Z.-K., Beese, A.M. 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
- Mathew, K., Montoya, J.H., Faghaninia, A., Dwarakanath, S., Aykol, M., Tang, H., Chu, I., Smidt, T., **Bocklund, B.**, Horton, M., Dagdelen, J., Wood, B., Liu, Z.-K., Neaton, J., Ong, S.P., Persson, K., Jain, A. 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
- Smith, N. D., Marker, C., **Bocklund, B.**, Orabona, N., Lichtenstein, T., Gesualdi, J., Nigl, T., Liu, Z.-K., Kim, H. Thermodynamic Assessment of the Strontium-Antimony Binary System via Electromotive Force Measurements Supported by First-Principles Calculations and CALPHAD Modeling. *Submitted.*
- Bobbio, L.D., **Bocklund, B.**, Otis, R., Borgonia, J.P., Dillon, R.P., Shapiro, A.A., McEnerney, Bryan, Liu, Z.-K., Beese, A.M. Experimental analysis and thermodynamic calculations of an additively manufactured functionally graded material of V to Invar 36. *Accepted.*
- Marker, C., Higgins, O., Smith, N., **Bocklund, B.**, Kim, H., Liu, Z.-K. Thermodynamic modeling of the Ba-Sb system from first-principles calculations. *In preparation.*
- **Bocklund, B.**, Otis, R. A., Egorov, A., Roslyakova, I., Liu, Z.-K. ESPEI for efficient database development, modification and uncertainty quantification: application to the Cu-Mg system. *In preparation.*

Technical Skills

Software Developed: pycalphad (pycalphad.org), ESPEI (espei.org), atomate (hackingmaterials.github.io/atomate)
Computational Tools and Software: Python, MATLAB, VASP, Thermo-Calc, MongoDB