# Eric S. Harper

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## Current Position

*NRC RAP (STFP) Postdoctoral Fellow,* Air Force Science and Technology Fellowship Program, Air Force Research Labs, Wright-Patterson Air Force Base

- Modeling and design of anisotropic dielectric metamaterials and photonic devices

## Areas of Specialization

Computational Materials Science:

- Simulation Techniques: Molecular Dynamics, Monte Carlo, Genetic Algorithms/Optimization, Rigorous Coupled Wave Analysis, Finite Element Analysis
- Machine Learning: Scikit-Image, Scikit-learn, Keras, Tensorflow
- Programming: Python, C++ (CUDA, MPI, OpenMP, Intel Thread Building Blocks), Julia, Haskell
- Remote Unix/Linux system usage and administration including Flux at UM, Blacklight at Pittsburgh, Stampede at UT-Austin, and Comet at SDSC

## Appointments Held

2018 - Present: *STFP Postdoctoral Fellow*, Air Force Research Labs, Dayton, OH
2017 - 2018: *Computational Scientist*, Azimuth Corporation at Air Force Research Labs, Dayton, OH
2011 - 2017: *Graduate Student Research Assistant*, Glotzer Group, University of Michigan
2010 - 2011: *Consultant*, Composite Technical Services, Dayton, OH
2008 - 2009: *Undergraduate Research Assistant*, Air Force Research Labs, Dayton, OH

## Education

2018: Ph.D. in Materials Science and Engineering, University of Michigan

- Thesis Topic: *The Nature of the Entropic Bond* (Defended Sept. 22, 2017)
  - Advisor: Sharon C. Glotzer (Materials Science and Engineering)
  - Co-Advisor: Greg van Anders (Physics)

2014: M.S. in Materials Science and Engineering, University of Michigan. GPA: 3.774/4.000
2011: Bachelor of Chemical Engineering, University of Dayton. GPA: 3.92/4.00

## Scientific Software Development

- Freud: lead developer (2012 - 2017), https://bitbucket.org/glotzer/freud
- S4: adapted for further use, https://github.com/harperic/S4

## Publications and Talks

### Journal Articles

[1] *Shape Allophiles Improve Entropic Assembly*, E. S. Harper, R. L. Marson, J. A. Anderson, G. van Anders, and S. C. Glotzer, Soft Matter, 2015, 11, 7250-56. DOI: 10.1039/c5sm01351h. *Cover: 7 October 2015*

[2] *Hierarchical self-assembly of hard cube derivatives*, E. S. Harper, B. Waters, and S. C. Glotzer, Soft Matter, 2019, DOI: 10.1039/c8sm02619j

[3] *Freud: a software suite for high-throughput simulation analysis*, E. S. Harper, M. P. Spellings, J. A. Anderson, and S. C. Glotzer, in preparation

[4] *Nature of the Entropic Bond in Particle Assemblies*, E. S. Harper, G. van Anders, and S. C. Glotzer, submitted to Nature, 2018
[5] *Entropic Engineering of Phase Transitions in Two Dimensions*, E. S. Harper, J. A. Anderson, G. van Anders, and S. C. Glotzer, in preparation for Physical Review Letters, 2018

### Poster Sessions

2017: Freud: A Software Suite for High-Throughput Simulation Analysis, MICDE Symposium, University of Michigan
2015: Entropic Bonding in Colloidal Systems, Engineering Graduate Symposium, University of Michigan
2014: Shape Allophiles Improve Entropic Assembly, Engineering Graduate Symposium, University of Michigan
2013: Self-assembly of complementary shape alloys, CyberInfrastructure Days, University of Michigan
2013: Self-assembly of complementary shape alloys, Engineering Graduate Symposium, University of Michigan

### Talks

2019: Machine Accelerated Nano Targeted Inhomogenous Structures, IEEE RAPID
2018: The Nature of the Entropic Bond in Particle Assemblies, APS March Meeting
2017: Freud: A Software Suite for High-Throughput Simulation Analysis, APS March Meeting
2016: Freud: A Software Suite for High-Throughput Simulation Analysis, AIChE Fall Meeting
2016: Entropic Bonding in Colloidal Systems, MSE Graduate Symposium, University of Michigan – Silver Award
2016: Shape Allophiles Improve Entropic Assembly, APS March Meeting
2015: Shape Allophiles Improve Entropic Assembly, MRS Fall Meeting

### Teaching

2015: GSI, Materials Science & Engineering Undergraduate Lab
2012: Teaching Assistant, VSCSE Parallel Programming
2011: Head Robotics Coordinator, Summer Honors Institute, University of Dayton
2010 – 2011: Teaching Associate, Chemical Engineering Department, University of Dayton

## Service to the Profession

2015 – 2016: Scientific Computing Student Club, founding member and President
2014 – 2016: Advisor, Tau Beta Pi, MI Γ Chapter
2009 – 2011: President, Tau Beta Pi, OH Θ Chapter

## Grants, Honors, and Awards

2018 – 2020: STFP Postdoctoral Fellowship Program (formerly NRC Research Associate Program)
2016 – 2017: MICDE Fellowship, University of Michigan
2012 – 2014: NSF Open Data IGERT Fellow, University of Michigan
2011 – 2012: William F. Hawkins Fellow, University of Michigan
2010 – 2011: Tau Beta Pi Geico Scholar

## Professional Organizations

2014: American Physical Society
2014: Materials Research Society
2009: Tau Beta Pi, the Engineering Honor Society
2008: American Chemical Society
2007: American Institute of Chemical Engineers