Samuel C. Hoover

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Skills

- Languages & tools: Python, C, Bash, MATLAB, LaTeX, PyTorch, scikit-learn, Git, AWS, SQL, Docker, HTML
- Speaks: English (native), French (intermediate), Spanish (basic)

Experience

Muthu Polymer Group (Graduate Research Assistant) *UMass Amherst, Amherst, MA* Jan 2021 - Present

- Created >260k row dataset and novel repesentation to learn the conformations of macromolecules with $R^2 > 0.95$
- Optimized group free energy minimization script to achieve 10x execution time speedup by implementing C backend
- Administered Linux high-performance GPU computing cluster with Slurm and group's static HTML webpage

Triton Systems, Inc. (Sensing & Separations Technologies Intern) *Chelmsford, MA* Jun 2023 - Sep 2023

- Led design of induction heating coil to selectively desorb VOCs for sensitive (< 1 ppm) molecular sensing device
- Developed application to perform multivariate optimization so team could easily tweak design without learning COMSOL
- Provided deliverables and met with DHS sponsors on monthly basis for Phase II SBIR project

Bai Research Group (Graduate Research Assistant) *UMass Amherst, Amherst, MA* Jan 2019 - Dec 2020

- Utilized convolutional neural networks for high-throughput virtual screening of nanoporous materials
- Wrote custom PyTorch modules to handle multple cases like volumetric (3D), multimodal, and tabular data
- Developed deep learning pipeline to automate experiment tracking, logging, and analysis to ensure reproducibility

SI Group (Global Manufacturing Technology Intern) *Schenectady, NY* May 2017 - Aug 2017

Projects

Automating Teaching Assistant Duties

- Programmatically anonymize, aggregate, and distribute via email peer feedback
- Reduced time spent on duties from 30 minutes per week to seconds with minimal overhead

Modeling Spinodal Decomposition

- Solves the Cahn-Hilliard equation using the Forward Euler method and generates animations

Publications & Ongoing Work

- **Hoover, S. C.**, Li, S.-F. & Muthukumar, M. Learning the sequence effects on the microphase separation transition of charged heteropolymers. **In preparation**.
- **Hoover, S. C.**, Margossian, K. O. & Muthukumar, M. Theory and quantitative assessment of pH-responsive polyzwitterion-polyelectrolyte complexation. *Soft Matter* (2024) doi: 10.1039/D4SM00575A.
- Liu, Y., Perez, G., Cheng, Z., Sun, A., **Hoover, S. C.**, Fan, W., Maji, S., Bai, P. ZeoNet: 3D convolutional neural networks for predicting adsorption in nanoporous zeolites. *J. Mater. Chem. A* **11**, 17570-17580. (2023) doi: 10.1039/D3TA01911J.

Education

University of Massachusetts Amherst *Amherst, MA* Sep 2018 - Present

Ph.D. in Chemical Engineering (awarded PPG Fellowship and Teaching Assistant Award)

Thesis: "Study of Charged Macromolecule Phase Behavior using Conventional and Modern Modeling Methods"

Clarkson University *Potsdam, NY* Aug 2014 - May 2018

B.S. in Chemical Engineering (with distinction); Minors in Mathematics and Cross-Cultural & International Perspectives