Samuel C. Hoover

Contact Information

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Education

Ph.D., Chemical Engineering, UMass Amherst, Amherst, MA, USA **August 2024**

Dissertation Advisor: Prof. Murugappan Muthukumar

Dissertation Title: *Study of charged macromolecule phase behavior using conventional and modern modeling methods*

B.S., Chemical Engineering, Clarkson University, Potsdam, NY, USA **May 2018**

Degree conferred with distinction.

Minors: Mathematics and International & Cross-Cultural Perspectives

Employment

Research Assistant, UMass Amherst, Amherst, MA, USA **January 2021–Present**

Teaching Assistant, UMass Amherst, Amherst, MA, USA **Fall 2021–2023**

DTMD Intern, Triton Systems, Inc., Chelmsford, MA, USA **June–September 2023**

Research Assistant, UMass Amherst, Amherst, MA, USA **January 2019–December 2020**

Research Assistant, Clarkson University, Potsdam, NY, USA **September 2017–May 2018**

STEM Educator, Clarkson University, Potsdam, NY, USA **September 2017–May 2017**

Tutor, Clarkson University, Potsdam, NY, USA **Fall 2017, Spring 2018**

Teaching Assistant, Clarkson University, Potsdam, NY, USA **Spring 2016, Fall 2017**

Global Manufacturing Tech. Intern, SI Group, Schenectady, NY, USA **May–August 2017**

Senior Teaching Assistant, Clarkson University, Potsdam, NY, USA **Spring 2017**

Research Interests

Computational studies (machine learning, simulation, theory) of synthetic and biological polymeric systems. One major theme is to elucidate the physical mechanisms underpinning protein aggregations and self-assemblies that give rise to neurodegeneration. Another theme is to use complex coacervates as models for biomolecular condensates to further understand the spatiotemporal organization within the cell.

Honors and Awards

PPG Fellowship, PPG Industries, Inc. **2024**

Teaching Assistant Award, University of Massachusetts Amherst **Fall 2022**

Clarkson Scholarship, Clarkson University **Fall 2014–Spring 2018**

Dean's List, Clarkson University **Fall 2014–Fall 2017**

Teaching Experience

Teaching Assistant, University of Massachusetts Amherst

- CHEM-ENG 401, Senior laboratory — **Falls 2022–2023**
- CHEM-ENG 338, Separation processes — **Spring 2022**
- CHEM-ENG 446, Process control — **Fall 2021**

Tutor, Clarkson University

- STAT 383, Probability and statistics — **Spring 2018**
- CH 370, Transfer process fundamentals — **Fall 2017**

Teaching Assistant, Clarkson University

- CH 370, Transfer process fundamentals — **Fall 2017**
- ES 100, Intro to engineering use of computers — **Spring 2016**

Senior Teaching Assistant, Clarkson University

- ES 100, Intro to engineering use of computers — **Spring 2017**

Professional Membership, Activities, Outreach, and Service

University of Massachusetts Graduate Student Senate

- Senator — **September 2019–May 2021**

Order of the Engineer

- Member — **2018–Present**

Omega Chi Epsilon

- Delta Chapter President — **2017–2018**
- Member — **2016–Present**

American Institute of Chemical Engineers

- Clarkson University ChemE Car Senior Advisor — **2017–2018**
- Clarkson University ChemE Car President — **2016–2017**
- Clarkson University ChemE Car Treasurer — **2015–2016**
- Member — **2014–Present**

Outreach

- AIChE Eckhardt Northeast Student Regional Conference volunteer — **March 30, 2019**
  Hosted ChemE Jeopardy Competition
- Extended Day STEM Peer Educator — **September 2017–May 2018**
  After school activities to teach STEM to local middle school students on a weekly basis

Skills

Proficient in Python, Bash, MATLAB. Experience in C. Proficient at *nix and HPC. Markup languages: LaTeX, HTML, CSS, Markdown.

Methods—Polymer physics, biophysics, molecular dynamics, machine learning, statistical modeling, data engineering, explainable machine learning, deep learning, and computational biology.

Software—Most contributions can be found at https://github.com/samuelhoover. Proficient in machine learning and numerical toolkits like PyTorch, scikit-learn, NumPy, SciPy, pandas, PostgreSQL, XGBoost, and SHAP. Experience with coarse-grained and atomistic molecular dynamics

packages like GROMACS, LAMMPS, PyMOL, Avogadro, Schrödinger, and VMD. Experience with development tools like Git, Docker, and AWS. Experience developing machine learning and deep learning pipelines for physical science research. Experience with finite element analysis with COMSOL. Proficient with visualization tools like Matplotlib, seaborn, and Inkscape.

Publications in Progress

3. **Hoover, S. C.**, Li, S. -F., Muthukumar, M. (2024) *Learning the sequence effect on the microphase separation transition of charged heteropolymers.*

Refereed Publications

2. **Hoover, S. C.**, Margossian, K. O., Muthukumar, M. (2024) *Theory and quantitative assessment of pH-responsive polyzwitterion-polyelectrolyte complexation*, Soft Matter **20**, 7199-7213.
1. Liu, Y., Perez, G., Cheng, Z., Sun, A., **Hoover, S. C.**, Fan, W., Maji, S., Bai, P. (2023) *ZeoNet: 3D convolutional neural networks for predicting adsorption in nanoporous zeolites*, J. Mater. Chem. A **11**, 17570-17580.

Presentations and Conferences

7.	UMass Amherst Chemical Engineering G.R.A.S.S. talk	October 2023
6.	Center for UMass / Industry Research on Polymers poster session	October 2023
5.	Center for UMass / Industry Research on Polymers poster session	May 2023
4.	UMass Amherst Chemical Engineering Graduate Open House poster session	March 2023
3.	Nanopore Sequencing: From Genomes to Proteomes poster session	May 2022
2.	Center for UMass / Industry Research on Polymers poster session	May 2022
1.	NHGRI Advanced Genomic Technology Development virtual meeting	May 2021

References

Available upon request.