

Brennon Shanks

Curriculum Vitae

Department of Chemical Engineering
University of Utah
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Education

- 2019 – **Doctor of Philosophy in Chemical Engineering**, *University of Utah*, Salt Lake City, UT.
Neutron scattering analysis, statistical and quantum statistical mechanics, materials science, molecular simulation, thermodynamics, Bayesian statistics and machine learning
- 2019 – 2020 **Master of Science in Chemical Engineering**, *University of Utah*, Salt Lake City, UT.
- 2015 – 2019 **Bachelor of Engineering in Chemical and Biomolecular Engineering and Mathematics**, *Ohio State University*, Columbus, OH.
Protein complex synthesis and chemical processing, chemical informatics, computational quantum chemistry, electronic transitions in strongly correlated systems

Publications

Journal Articles

- 2022 **B. L. Shanks, J. J. Potoff, and M. P. Hoepfner**, *Transferable Force Fields from Experimental Scattering Data with Machine Learning Assisted Structure Refinement*, J. Phys. Chem. Lett, 13, 49, 11512–11520.

Industry

The Procter & Gamble Company, Cincinnati, OH

- May, 2017 – **Process Engineering Intern**.
Aug, 2017 Development of dye mixing model that recovers an estimated net loss of ~ \$ 1.3 million / year.
- May, 2016 – **Strategic Innovation and Technology Intern**.
Aug, 2016 Molecule development and strategic intellectual property filing.

Research

University of Utah, Salt Lake City UT

- Aug, 2019 – **Neutron scattering analysis with molecular simulation and machine learning**.
Application of statistical and quantum statistical mechanics to determine interatomic forces from microstructure of condensed matter.
- Advisor : **Dr. Michael Hoepfner**, Associate Professor, Department of Chemical Engineering, University of Utah ([Personal Web-page](#))

Ohio State University, Columbus OH

- Oct, 2017 – **Theoretical quantum chemistry of strongly correlated systems**.
May, 2018 Developed software designed to calculate properties of charged excited states in metals.
- Advisor : **Dr. Alexander Sokolov**, Assistant Professor, Department of Chemistry and Biochemistry ([Personal Web-page](#))

- Oct, 2015 – ***ApoHemoglobin processing and reconstitution of cancer therapeutics.***
June, 2017 Developed an improved method to separate heme from hemoglobin and initiated project aimed to determine the most likely drug candidates for apohemoglobin cancer therapeutic reconstitution as a treatment for leukemia.
Advisor : **Dr. Andre Palmer**, Professor, Department of Chemical and Biomolecular Engineering ([Personal Web-page](#))

Conference Presentations

- Mar, 2022 ***Recent Advances in Machine Learning Accelerated Molecular Dynamics***, CECAM (Centre Européen de Calcul Atomique et Moléculaire), Trieste, IT.
Poster: A Bayesian optimized structural force field for noble gases enabled by a radial distribution function surrogate model
Jan, 2022 ***Combining Multi-scale Simulation and Scattering for Structural Analysis of Complex Systems***, CECAM (Centre Européen de Calcul Atomique et Moléculaire), Lausanne, CH.
Talk: Transferable force field development with structure-optimized potential refinement
Oct, 2021 ***US Total Scattering School***, Oak Ridge National Laboratory, TN.
Poster: Transferable force field parameters with structure-optimized potential refinement
Jan, 2021 ***Utah Biomedical Engineering Conference***, Salt Lake City, UT.
Talk: Characterizing self-assembly in biological liquids with neutron scattering and machine learning
Jan, 2021 ***Combining Multi-scale Simulation and Scattering for Structural Analysis of Complex Systems***, CECAM (Centre Européen de Calcul Atomique et Moléculaire), Lausanne, CH.
Poster: Neutron scattering predicts emergent thermodynamic behavior in noble gas liquids

Fellowships & Awards

- 2023 – ***University Teaching Fellow*** at the Department of Chemical Engineering, University of Utah.
2022 – ***Research Fellow*** at the Energy Frontier Research Center for Multi-scale Fluid-Solid Interactions in Architected and Natural Materials (MUSE), University of Utah.
2019 – ***Graduate Research Fellow*** at the Department of Chemical Engineering, University of Utah.
2016 ***Undergraduate Research Scholar*** at the Department of Chemical and Biomolecular Engineering, Ohio State University.

Academic Achievements & Recognition

- June, 2023 ***Early Career Leadership Certificate*** at the Energy Frontier Research Center for Multi-scale Fluid-Solid Interactions in Architected and Natural Materials (MUSE), University of Utah.
Feb, 2021 ***1st Place Research Presentation*** at the ***Graduate Engineering Research Symposium***, University of Utah.

Teaching Experience

University of Utah

- Fall, 2023 **CHE 5000** | ***Introduction to Molecular Simulations***, Lecturer, [coursewebpage.com](#).
Fall, 2022 **CHE 6853** | ***Advanced Thermodynamics***, Guest Lecturer.
2021 – 2023 **CHE 7973** | ***Undergraduate Research Mentor***.
Fall, 2021 **CHE 7703** | ***Uncertainty Quantification, Validation, and Machine Learning***, GTA.
Fall, 2020 **CHE 6853** | ***Advanced Thermodynamics***, GTA.

Ohio State University

- Spring, 2019 **CBE 2523** | ***Separation Processes***, UTA.
Fall, 2018 **CBE 2420** | ***Transport Phenomena I***, UTA.