Brennon Shanks

Curriculum Vitae

Department of Chemical Engineering
University of Utah
513-256-4541
brennon.shanks@chemeng.utah.edu

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

Honda, Columbus, OH

Jan, 2019 – May, 2019 ***Process Engineering Intern***.
Proposed a heat exchanger network to improve thermal efficiency in body paint manufacturing process.

The Procter & Gamble Company, Cincinnati, OH

May, 2017 – Aug, 2017 ***Process Engineering Intern***.
Development of dye mixing model that recovers an estimated net loss of $\sim$ \$ 1.3 million / year.

May, 2016 – Aug, 2016 ***Strategic Innovation and Technology Intern***.
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 – May, 2018 ***Theoretical quantum chemistry of strongly correlated systems***.
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 – June, 2017 ***Apohemoglobin processing and reconstitution of cancer therapeutics***.
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: Bayesian optimized force fields 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.
Contributed Talk: Transferable force fields with structure-optimized potential refinement

Oct, 2021 ***US Total Scattering School***, Oak Ridge National Laboratory, TN.
Poster: Transferable force fields with structure-optimized potential refinement

Jan, 2021 ***Utah Biomedical Engineering Conference***, Salt Lake City, UT.
Contributed Talk: Characterizing self-assembly in biological liquids with 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 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 University of Utah.

2016 ***Undergraduate Research Scholar*** at the Department of Chemical, 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 Presentation** at the ***Graduate Engineering Symposium***, University of Utah.

Teaching Experience

University of Utah

Fall, 2023 **CHE 5000** | ***Introduction to Molecular Simulations***, *Lecturer*, bshanks.netlify.app.

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*.