WILLIAM BRACKETT

willbrackett@utexas.edu

Currently pursuing PhD in chemical engineering in the Milliron and Truskett labs at the University of Texas at Austin. Undergraduate research experience studying dynamics of ionic soft materials. Ambition to understand molecular and nano scale interactions and their correlations to useful macroscopic properties. Studying structural and dynamic properties of optically active colloidal nanocrystal assemblies.

EDUCATION

Ph.D. Student in Chemical Engineering **Aug 2023 – Present**
University of Texas, Austin

Bachelor of Science in Chemical Engineering **Aug 2019 – May 2023**
University of Tennessee, Knoxville
Summa Cum Laude

RESEARCH EXPERIENCE

University of Texas at Austin, Austin, TX **Aug 2024 – Present**
Position: Graduate Research Assistant
Supervisors: Dr. Delia Milliron, Dr. Thomas Truskett

- Investigating interactions of colloidal metal oxide nanocrystals for nanomaterial assembly
- Studying material properties and assembly of novel metal oxide nanocrystal gels

University of Tennessee, Knoxville, TN **Aug 2022 – May 2022**
Position: Part-time Undergraduate Research Assistant
Supervisor: Dr Catalin Gainaru, Dr. Alexei Sokolov, Dr. Ivan Popov

- Characterized ionic copolymers for applications to solid state lithium-ion batteries
- Constructed laboratory hardware and operational software for custom Raman spectroscopy experiments

Oak Ridge National Laboratory, Oak Ridge, TN **Jun 2022 – Aug 2022**
Position: Full-time Summer Undergraduate Researcher
Supervisor: Dr. Catalin Gainaru, Dr. Alexei Sokolov

- Characterized ion dynamics in single lithium ion conducting polymer electrolytes.
- Analyzed decoupling between dielectric and mechanical dynamics in ion electrolyte containing polymer.

University of Tennessee, Knoxville, TN **May 2021 – May 2022**
Position: Part-time Undergraduate Research Assistant
Supervisor: Dr. Joshua Sangoro

- Studied the microstructure and dynamics of deep eutectic solvents to understand property relationship to complex transiently bonded networks

- Troubleshot a network analyzer and employed microwave spectroscopy as a complimentary method to broadband dielectric spectroscopy

INDUSTRY EXPERIENCE

SkyNano Technologies, Knoxville, TN **Jun 2023 – July 2023**
Position: Full-time R&D intern
Supervisor: Dr. Anna Douglas, Dr. David Wood

- Designed and executed protocol regarding high temperature electrochemistry experiments for process diagnostics
- Addressed hazardous solid particulate handling by designing fully enclosed and automated system
- Led efforts to integrate CO_2 derived carbon nanotubes into 3D printing filaments

TEACHING EXPERIENCE

University of Texas at Austin, Austin, TX **May 2024**
Graduate Teaching Assistant, Chemical engineering

- Served as a teaching assistant for an accelerated fundamentals of chemical engineering laboratory with a focus on scientific communication

University of Tennessee, Knoxville, TN **Jan 2022 – May 2022**
Undergraduate Teaching Assistant, Chemical and Biomolecular Engineering

- Served as a grader and TA for Fluid Flow and Heat Transfer

PUBLICATIONS

S Spittle, I Alfurayj, BB Hansen, K Glynn, **W Brackett**, R Pandian, C Burda, J Sangoro, "Enhanced Dynamics and Charge Transport at the Eutectic Point: A New Paradigm for the Use of Deep Eutectic Solvent Systems," *JACS Au* **2023**, 3 (11), 3024–3030. https://doi.org/10.1021/jacsau.3c00420**.**

CK Ofosu, TA Wilcoxson, TL Lee, **W Brackett**, TM Truskett, DJ Milliron, "Assessing Depletion Attraction Between Colloidal Nanocrystals," ***in progress***.

PRESENTATIONS

W Brackett, A Rahman, A Sokolov, C Gainaru, "In-situ synthesized copolymer lithium-ion conducting electrolytes for solid state batteries," *Oak Ridge National Laboratory Summer Undergraduate Laboratory Internship presentation,* August 2022

W Brackett, S Spittle, BB Hansen, J Sangoro, "The effect of composition on dynamics and properties of deep eutectic solvents," *UTK EURēCA poster competition,* April 2022

W Brackett, S Spittle BB Hansen, J Sangoro, "The effect of composition on dynamics and properties of deep eutectic solvents," *UTK Chemical Engineering poster competition,* April 2022

W Brackett., S Spittle, BB Hansen J Sangoro, "The effect of composition on dynamics and properties of deep eutectic solvents*," Spring American Physical Society Conference,* March 2022

SERVICE

Graduate school application workshop panelist and application reviewer	**2024**
Graduate recruitment volunteer	**2024**
NSF PREM lab tour guide	**2024**
First year student mentor	**2024**

HONORS AND AWARDS

Dr. Thomas F. Edgar Endowed Graduate Fellowship in Chemical Engineering, Univ of Texas at Austin dept of Chemical Engineering	**2023**
Cook Grand Challenge Honors Scholar, Univ of Tennessee	**2023**
2nd Place Poster Presentation, Univ of Tennessee, Knoxville dept of Chemical Engineering	**2022**
Top Presentation Award, American Physical Society	**2022**
John Tummins Memorial Scholar, Univ of Tennessee	**2020-2021**
UT-Battelle Scholar, UT-Battelle and Oak Ridge National Laboratory	**2019-2023**
Distinguished Tennessean Award, Univ of Tennessee	**2019-2023**
UT Volunteer Scholar, Univ of Tennessee	**2019-2023**
Fredrick T Bonham Scholar, Univ of Tennessee	**2019-2023**
Herbert & Lillian Duggan Scholar, Univ of Tennessee	**2019-2020**

SKILLS

- Experience with material characterization techniques such as broadband dielectric spectroscopy, UV-vis spectroscopy, Raman spectroscopy, dynamic light scattering, differential scanning calorimetry, rheology and x-ray scattering.
- Constructed comprehensive python libraries to process 2D small angle x-ray scattering profiles, dynamic light scattering data, and continuous UV-vis data for structural and dynamical analysis of colloidal dispersions.
- Industrially implemented electrochemical characterization techniques including cyclic voltammetry, impedance spectroscopy, chronopotentiometry, chronoamperometry, and step voltammetry variations in high temperature systems.
- Handled hygroscopic materials, unbound nanoparticle mixtures, molten salts, cryogenics, compressed gasses, and strong acids.
- Proficient in data analysis using software including Python, MATLAB, and OriginPro.
- Designed lab-scale mechanical systems and user control software for various applications.
- Proficient in Aspen and HYSYS process engineering software.