

Jacob W. Krueel

US Citizenship

jacobk9929@gmail.com | +1 5166612812

Austin, TX, USA

EDUCATION

The University of Texas at Austin

Master of Science in Geosciences - Concentration in Hydrology and Water Resources

Cumulative GPA - 4.00/4.00

Austin, TX, USA

Aug 2024 - Current

State University of New York at Binghamton

Bachelor of Science in Chemistry, Minor in Environmental Studies

Cumulative GPA - 3.87/4.00

Binghamton, NY, USA

Aug 2019 - May 2023

RESEARCH EXPERIENCE

Graduate Research Assistant

Thompson Lab - Soil Hydrology/Fire Dynamics

- NASA FireSense Project
- Measure soil hydraulic and chemical properties pre- and post-fire
- Collect UAS-based multispectral TIR data and conduct gas emissions analyses
- Assess impacts of fires on vegetation and soils

Austin, TX, USA

Aug 2024 - Current

Undergraduate Research Assistant

Guo Lab - Analytical/Environmental Chemistry

- Designed and synthesized SERS substrates with gold nanoparticles and nanocellulose
- Assessed substrate capability to adsorb micropollutants in aqueous and agricultural environments
- Tested Raman signal of micropollutants on substrates using portable Raman

Binghamton, NY, USA

Aug 2021 - May 2023

NSF REU Research Assistant at the University of Texas at Austin

Griffin/Jha Lab - Integrative Biology

- Tested soil from fire-managed restoration land for key physical and chemical properties – bulk density, porosity, water repellency, water content, pH, electrical conductivity
- Drew comparisons between winter-burn soils and summer-burn soils

Austin, TX, USA

May 2022 - Aug 2022

First-Year Research Immersion Program

Karam Lab - Inorganic Materials/Clean Energy

- Synthesized CsPbBr₃ perovskites using room-temperature supersaturated recrystallization
- Measured PLQY of samples with fluorimetry and UV-visible spectrophotometry
- Performed DFT bandgap and band structure calculations using Quantum ESPRESSO

Binghamton, NY, USA

Aug 2019 - Dec 2020

PUBLICATIONS

Terry, L. R.; Jain, M.; **Krueel, J. W.**; Das, A.; Sharma, P.; Hsiao, B. S.; Guo, H. A dual- functional nanocellulose-based plasmonic membrane for both detection and removal of synthetic dyes. **In preparation.**

Terry, L. R.; **Krueel, J. W.**; Jain, M.; Lara, A.; Sharma, P.; Hsiao, B. S.; Guo, H. Detection of pesticides in sprayed droplets by using biowaste-derived nanocellulose-based SERS nanosubstrate. *Cellulose*. **2024.**

Terry, L. R.; Sanders, S.; Potoff, R. H.; **Krueel, J. W.**; Jain, M.; Guo, H. Applications of surface-enhanced Raman spectroscopy in environmental detection. *Anal. Sci. Adv.* **2022**, 3 (3-4), 113–145.

WORK AND TEACHING EXPERIENCE

Biogeoscience Research Technician

Cornell University - Houlton Lab

Ithaca, NY, USA
Aug 2023 - May 2024

- Sampled water from mineral-amended cropland and greenhouse soils
- Measured the total inorganic carbon of samples using a Shimadzu TOC-L instrument
- Understood the effect of mineral soil amendments on soil chemistry, soil structure, water chemistry, crop health, field-scale carbon and nutrient cycling, and overall agronomy

Undergraduate Teaching Assistant

ENVI 101 - Humans and Ecological Environment

Binghamton, NY, USA
Aug 2022 - Dec 2022

- Led trips into the Binghamton University Nature Preserve to teach students about ecosystem structure, ecological interactions, and habitat management
- Facilitated lecture discussion by addressing student questions and working in small groups
- Held weekly office hours to assist students with course-related questions

Inventory Receiver and Stocker

Riverhead Building Supply

Mineola, NY, USA
July 2017 - Jan 2021

- Received product into AS/400 inventory and stocked shelves
- Guided customers by answering questions and translating for Spanish speakers

SKILLS AND TECHNIQUES

Technological

- ArcGIS Pro
- MATLAB
- Python
- R/RStudio
- VESTA
- Quantum ESPRESSO
- Microsoft Office

Field

- Drone piloting
- Mini disk infiltrometer
- KSAT
- Sap flow sensors
- Water flow probe
- Greenhouse flowmeters
- Groundwater well sampling/monitoring
- Soil auger/core sampling
- Lysimeter sampling
- Seismic geophones
- pH/EC meter
- Insect netting
- Quadrat sampling

Laboratory

- Shimadzu TOC-L
- Picarro gas analyzer
- Raman spectroscopy/SERS
- DLS nanoparticle analysis
- UV-Vis spectroscopy
- Fluorimetry
- FTIR spectroscopy
- Differential scanning calorimetry
- HPLC
- Gas chromatography (TCD/MS)
- Simple/fractional distillation
- Titration
- Acid/base extraction

ACTIVITIES AND ORGANIZATIONS

NSF Smart Energy Scholars

Jan 2020 - May 2023

- Engaged in weekly seminars involving cutting-edge research in smart energy related industries
- Professional development for internship, research, and job opportunities

Binghamton Citizens' Climate Lobby - Secretary

Aug 2021 - May 2023

- Attended weekly eBoard meetings and planned general body meetings regarding climate lobbying
- Participated in group workshops and lobby meetings with local representatives
- Managed attendance records and documented detailed minutes

POSTERS AND PRESENTATIONS

Kruel, J.; Jha, S.; Young, M.; Griffin, S. Impacts of Seasonal Fire Regimes on Physical and Chemical Properties of Soil. *Ecological Society of America Annual Meeting, Portland, OR. 2023*

Kruel, J.; Beck, J.; Kastrat, D. Influence Factors on the Critical Micelle Concentration Using Fluorescence Spectroscopy. *CHEM 455 Course Presentation. 2023*

Kruel, J. Tree-ring recorded variations of 10 heavy metal elements over the past 168 years in southeastern China. *CHEM 496 Poster Session. 2022*

Kruel, J.; Jain, M.; Terry, L. Detection of Aerosol Pesticide Droplets on Thin-Film SERS Substrates. *Binghamton ACS Local Section Undergraduate Poster Session. 2022*

Kruel, J.; Jha, S.; Young, M.; Griffin, S. Impacts of Seasonal Fire Regimes on Physical and Chemical Properties of Soil. *UT Austin NSF REU Poster Session. 2022*

Kruel, J. Impacts of Seasonal Fire Regimes on Physical and Chemical Properties of Soil. *Lady Bird Johnson Wildflower Center, Austin, TX. 2022*

Kruel, J.; Beck, J.; Morse, N. High-Performance Liquid Chromatography for Synthetic Food Dye Detection and Quantification in Commercial Beverages. *CHEM 422 Course Presentation. 2021*

Kruel, J.; Cotes, S.; Keith, A.; Santoro, K.; Wofse, J.; Karam, L. Improving Stability Of CsPbBr₃ Perovskite Quantum Dots Through Partial Replacement of Lead. *FRI Poster Session. 2020*

Kruel, J.; Aldous, A.; Ritsatos, A.; Santoro, K.; Stasko, S.; Torres, L.; Karam, L. Improving Optical Properties and Stability of CsPbX₃ Perovskite Quantum Dots via Hot Injection Method Using 1,2-Ethanedithiol Ligands. *FRI Poster Session. 2019*

HONORS, AWARDS, AND SUPPORT

- 2023 ESA Conference Support from UT Austin (\$1,500)
- NSF Smart Energy Scholarship (\$40,000)
- New York State STEM Scholarship (\$26,000)
- NSF SES Energy Innovation Competition Winner
- New York State Merit Scholarship (\$1,000)
- Binghamton University Dean's List (Fall 2019 - Spring 2023)
- Binghamton University Summa Cum Laude

LANGUAGES

English - Native

Spanish - Limited working proficiency