J. Kerry Miller | Chemist

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Research Experience

08/2023-
Colorado State University | Fort Collins, CO
Graduate teaching assistant, graduate research assistant
PhD in progress – joint student in materials and environmental analytical chemistry under the mentorship of Dr. Thomas Borch. Taught general chemistry lab in fall of 2023 and spring 2025.
Previous project: For Colorado house bill 23-1069, the use of biochar-reinforced cement was investigated to add chemical and mechanical resistance to traditional cement used to plug oil wells.
Current projects: 1) Investigate photodegradation of agricultural plastics and the release of plastic additives into soil. **2)** Investigate the photo-transformation and degradation pathways of plastic additives in soil. **3)** Characterize plastic additive extracts from environmental samples using high resolution mass spectrometry (HRMS) and non-targeted analysis (NTA). **4)** Elucidate a metabolic pathway and any transformation products from the biotic metabolism of 6PPDq by combining HRMS, NTA, RNAseq, and differential expression analysis.

01/2022-06/2023
University of Massachusetts Medical School | Worcester, MA
Research Associate and lab contact
Designed and carried out experiments for independent research and to assist senior researchers; presented data at lab meetings and departmental events; grant writing; maintained mice colony and performed in vivo experiments; cultured mammalian cells for in vitro assays; managed lab orders and general lab organization
Independent project summary: AI-10-49 is a promising small-molecule inhibitor for the treatment of inv(16) acute myeloid leukemia, however its hydrophobic nature makes it difficult to administer in vivo with high bioavailability and targeting. Encapsulating the drug in an antibody-targeted polymeric nanogel should allow for simple, effective, and highly targeted delivery of the drug to leukemic cells in a live mouse model.

05/2021 - 08/2021
Center of Sustainable Nanotechnology (Univ. Wisconsin Madison) | Tacoma, WA
Undergraduate research (virtual REU)
Independent project summary: Metal nanoparticles are commonly used in medical contrast dyes, particularly gold, however these metals are generally expensive and somewhat toxic. We propose a bismuth nanoparticle as a gold replacement as bismuth is inexpensive and biologically inert.

Other Select Employment History

Choral Scholar (08/2023-)
First United Methodist Church | Fort Collins, CO
Media Technician (09/2020-12/2021)
Grace Baptist Church | Tacoma, WA

Emergency Room Scribe (01/2020-09/2020)
Scribe America | South Sound region, WA
Hospital Attendant (06/2018-08/2018)
Frontier Veterinary Hospital | Hillsboro, OR

Select Academic Experience

Polymer chemistry
Solid state chemistry
Soil Chemistry
Organic chemistry I and II
Inorganic chemistry
Physical biochemistry
Metabolic biochemistry*
Analytical chemistry
Physical chemistry I*
Cell biology
Genetics

*Includes capstone project

Laboratory Skills

Nanoparticle assembly and p
Dynamic light scattering
Zeta potential
Thermogravimetric Analysis
Non-targeted analysis
GC-MS
LC-QTOF-MS
ICP-MS
Gel Permeation Chromatography (GPC)
Ion Chromatography
UV Spectroscopy
IR Spectroscopy
NMR Spectroscopy
Microwave extraction
Flow Cytometry
Scanning Electron Microscopy
Fluorescent Microscopy
BET Analysis
Mammalian Cell Culturing
PCR and Genotypic Analysis
Dissection and *In Vivo* experimentation
Differential expression analysis and RNAseq

Education

Colorado State University (CSU)
PhD in progress, GPA 3.7
Anticipated graduation – 2028

University of Puget Sound (UPS)
Biochemistry (BS), Double major in music (BA). GPA 3.3
Graduated 2021

Publications

Brooke Ballenger, **Kerry Miller**, Thomas Borch, Jason C. Quinna. "A Sustainable Seal: Integrating Biochar in the Decommissioning of Oil & Gas Wells for Improved Sustainability" *Resources, Conservation & Recycling*, 2025 **(Submitted)**

Holly Roth, Brooke Silagy, **Kerry Miller**, Ashley Woolman, Amanda West Fordham, Al Myracle Martin, Jason Quinn, and Thomas Borch. "Study Biochar In Plugging Of Oil And Gas Wells" *Report prepared in accordance with CO HB 23-1069*, 2024

Mohd Hafiz Ahmad et. al. "Runx1-R188Q germ line mutation induces inflammation and predisposition to hematologic malignancies in mice." *Blood Advances* 7 (23), 2023: 7304–7318. **(Acknowledgements)**

Awards and Honors

2024-2025 | Vice President, Chemistry Graduate Student Organization

2023, 2024 | Foley Music Scholarship
First United Methodist Church
For a chorus member demonstrating outstanding commitment and leadership

2022 | UMass Cancer Center Pilot Project Grant
University of Massachusetts Medical School
For a cancer-related pilot project encouraging interdisciplinary collaboration

2021 | Jack & Gertrude Sprenger Scholarship
University of Puget Sound
For academic success in the field of chemistry

Other Activities

- Classically trained soprano soloist, conductor, and composer
- Member of the *Laudamus Choral Ensemble*
- Former musical director of *Underground Sound A Cappella*
- Former college varsity swimmer, high school swim captain, and swim instructor

Volunteer Experience

2024 | Habitat for Humanity
Medford, OR

2023 | Ara Manzanillo
Manzanillo, Costa Rica

2014 | RE-member
Pine Ridge Reservation, SD

2013 | Cedar Hills United Church of Christ work trip
Lummi Reservation, WA

References

Dr. Thomas Borch
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970-689-0918

Dr. Lucio Castilla
Principal Investigator | UMass Chan Medical School
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Dr. Nathan Payant
Choral Conductor | FUMC
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Dr. Amanda Mifflin
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