

Emily E. Mixon

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RESEARCH INTERESTS

Coupling of geochemical and geochronologic methods to investigate feedbacks between solid-Earth and climate processes; Radiogenic isotopes (U-Pb, Lu-Hf, Sm-Nd, K-Ar), Stable O isotopes; REE; Analytical methods for mass spectrometry.

EDUCATION

PhD Geological Sciences The University of Wisconsin-Madison Advisor: Dr. Annie Bauer Dissertation: <i>An Integrative in situ Geochemical Lens on Continental Growth from the Archean to the Proterozoic</i>	Expected 2024
B.S. Geological Sciences The University of Texas at Austin, Jackson School of Geosciences	2018
B.S Environmental Sciences (Geography Concentration) B.A. Plan II Honors The University of Texas at Austin, College of Liberal Arts	2015

APPOINTMENTS

NSF GRFP Fellow & UW-Madison Isotope Lab Research Assistant. September 2020-August 2024
Advisor: Dr. Annie Bauer

- Conduct independent and collaborative research using clean-lab protocols, MC-ICP-MS, LA-ICP-MS, SIMS, TIMS, Raman Spectroscopy, and SEM. Assist with maintenance of ICP-MS instrumentation and upkeep of clean lab facilities, including mentoring and training of lab users in sample preparation and ion exchange chromatography.
- Co-author successful grant applications involving the application of TE/REE, U-Pb, Hf, Nd, and O isotopes to questions about continental crust growth and recycling through Earth history.
- Collaborate across institutions and lab groups to design analytical campaigns and publish scientific findings.

NSF GRFP Fellow & WiscAr Lab Research Assistant September 2018-September 2020
Advisor: Dr. Brad Singer

- Developed a workflow for a newly installed noble gas mass spectrometer (Isotopx NGX-600).
- Generated ^{40}Ar and ^3He chronologies, geological maps, and geochemical records of Quaternary volcanism in the Chilean Southern Volcanic Zone (SVZ) to quantify eruptive styles and volumes in relation to LGM ice extent.

UT-Austin Geosciences Catalyst Undergraduate Research Program May 2017-May 2018
Advisors: Dr. Whitney Behr and Alissa Kotowski

- Performed mineral separation for Rb-Sr geochronology on a blueschist mineral assemblage from Syros, Greece.

ACI Group, LLC; Austin, TX July 2015-May 2018
Environmental Scientist

- Collaborated with a team to plan, execute, and write reports for critical environmental features + hazardous materials.
- Gained karst feature survey experience including cave mapping and speleothem sampling.

Texas Commission on Environmental Quality; Austin, TX May 2015-July 2015
Mickey Leland Environmental Science Intern (Superfund Division)

- Constructed a database for Hexavalent Chromium contaminated sites in the Midland/Odessa region.

Robert S. Strauss Center for International Security and Law; Austin, TX October 2014-March 2015
GIS Technician

- Curated spatial data for a U.S. Department of Defense project assessing climate vulnerability in South Asia.

UT-Austin Digital Landscapes Lab Group Undergraduate Researcher August 2014-May 2015
Advisors: Dr. Thoralf Meyer and Dr. Kelley Crews

- Wrote and presented an independent thesis investigating vegetative response to fire in the Miombo woodland of southern Africa using MODIS satellite data.

PEER-REVIEWED PUBLICATIONS

5. **Mixon, E.E.**, Bauer, A.M., Blum, T.B., Valley, J.W., Rizo, H., O’Neil, J., Kitajima, K. (*in review at Proceedings of the National Academy of Sciences (PNAS) 03/2024*). Earliest Evolved Terranes Record Arc-Like Zircon Geochemistry at 3.9 Ga.
4. **Mixon, E.E.**, Bauer, A.M., O’Neil, J., Rizo, H. Blum, T.B., Valley, J. (2023). Mechanisms for generating elevated zircon $\delta^{18}\text{O}$ in Archean crust: Insights from the Saglek-Hebron Complex, Canada. *Earth and Planetary Science Letters*. Vol. 624. <https://doi.org/10.1016/j.epsl.2023.118443>
3. Klug, J.D., Ramirez, A., Singer, B.S., Jicha, B.R., **Mixon, E.E.**, Martinez, P. (2022) Intercalibration of the Servicio Nacional de Geología y Minería (SERNAGEOMIN), Chile and WiscAr $^{40}\text{Ar}/^{39}\text{Ar}$ laboratories for Quaternary dating. *Quaternary Geochronology*, Vol. 72. <https://doi.org/10.1016/j.quageo.2022.101354>
2. **Mixon, E.E.**, Jicha, B.R., Tootell, D., Singer, B.S. (2022). Optimizing $^{40}\text{Ar}/^{39}\text{Ar}$ analyses using an Isotopx NGX-600 mass spectrometer, *Chemical Geology*, Vol. 593. <https://doi.org/10.1016/j.chemgeo.2022.120753>
1. **Mixon, E.E.**, Singer, B.S., Jicha, B.R., Ramirez, A. (2021). Calbuco, a monotonous andesitic high-flux volcano in the Southern Andes, Chile, *Journal of Volcanology and Geothermal Research*, Vol. 416. <https://doi.org/10.1016/j.jvolgeores.2021.107279>

AWARDS + FUNDING**The University of Wisconsin-Madison**

University of Wisconsin-Madison Department of Geoscience Distinguished Graduate Student Award (\$2,000)	2024
University of Wisconsin-Madison Geoscience Outstanding Paper Award (<i>Mixon et al.</i> , 2023; \$500)	2024
University of Wisconsin-Madison Department of Geoscience Charles Van Hise Dissertator Fellowship (\$24,000)	2023
University of Wisconsin-Madison Geoscience Outstanding Paper Award (<i>Mixon et al.</i> , 2022; \$500)	2023
University of Wisconsin-Madison SRGC Graduate Student Research Conference Grant (\$1,500)	2022
University of Wisconsin-Madison Department of Geoscience Summer Analytical Funding (\$2,500)	2022
University of Wisconsin-Madison Graduate Student Service Scholarship (\$1,000)	2022
University of Wisconsin-Madison James D. and Stella M. Robertson Research Assistantship (\$24,000)	2022
University of Wisconsin-Madison Geoscience Outstanding Paper Award (<i>Mixon et al.</i> , 2021; \$500)	2022
American Geophysical Union Lawrence A. Taylor Research Fund in Petrology & Geochemistry (\$4,000)	2021
Stanley A. Tyler Excellence in Teaching Award (GEOSCI 100, \$500)	2021
Geological Society of America Graduate Research Fellowship (\$2,500)	2021
University of Wisconsin-Madison Department of Geoscience Summer Analytical Funding (\$2,000)	2019
Geological Society of America Graduate Research Fellowship (\$2,500)	2019
American Geosciences Institute Harriett Evelyn Wallace Scholarship (\$5,000)	2019

National Science Foundation (NSF) Funding Experience

EAR-2136782 “A macro- to nano-scale interrogation of 4 Gyr of tectonism, metamorphism, and alteration in the Acasta Gneiss Complex” (\$465,263; student co-author, sole student investigator on project; PI: T. Blum)	2022
EAR-2121570 “Ice forcing of arc magma plumbing systems” (\$1,872,867; student contributor; PI: B. Singer)	2021
DGE-1747503 National Science Foundation Graduate Research Fellowship Program (\$138,000; PI: E. Mixon)	2018

The University of Texas at Austin

Jackson School of Geosciences Endowed Field Camp Scholarship (\$5,500)	2018
Jackson School of Geosciences John Bunker Sands Memorial Endowed Scholarship (\$2,000)	2017
Plan II Honors Model Senior Thesis + Distinguished Graduate	2015
Fulbright US-UK Wales Summer Institute Fellowship	2012

INVITED TALKS

Smithsonian National Museum of Natural History Mineral Sciences Department	01/24/2024
University of Hawai‘i at Mānoa School of Ocean and Earth Science and Technology	11/29/2023
Gordon Early Career Research Seminar on Timing, Tempo, and Drivers of Lithospheric Evolution	08/13/2023

CONFERENCE PRESENTATIONS + SESSIONS

- Mixon, E.E.**, Bauer, A.M., Blum, T.B., Valley, J.V., Kitajima, K. (2023) **Oral Presentation**: “Evaluating zircon trace element proxies for Archean tectonic provenance using suites of cogenetic zircon from the Acasta Gneiss Complex”. Gordon Research Seminar on Timing, Tempo, and Drivers of Lithospheric Evolution, Mount Snow, VT.
- Bauer, A. M., **Mixon, E.E.**, Tappa, M., & Reimink, J. R. (2023). **Oral Presentation**: “Reevaluation of the highly contested Nd isotope record of the 4.0-2.9 Ga Acasta Gneiss Complex, Canada”, Goldschmidt 2023, Lyon, FR.
- Mixon, E.E.**, Bauer, A.M., O’Neil, J., Rizo, H. Blum, T.B., Valley, J. (2022) **Poster**: “Early and Variable Contributions from Supracrustal Rocks to Archean Magmas from the Saglek-Hebron Complex (Labrador, Canada)”, Geological Society of America Fall Meeting, Denver, CO.
- Condit, C., Meyers, M., Warren, J., Holder, R.M., Cooperdock, E.H.G, Guevara, V., Rader, E., Bauer, A., **Mixon, E.E.** (2022) **Poster**: “PetroNet: A Petrology and High-Temperature Geochemistry Community Built Within An Antiracist and Inclusive Framework”, GSA Fall Meeting, Denver, CO.
- Villa, A., Molinek, R., Batchelor, C., Christenson, C., Chutcharavan, P.M., Diaz-Vallejo, E.J., Dodge, S., Dutton, A., Goodwin, L.B., Jones, A.G., Lovelace, D., Lusk, A.D., Marin-Spiotta, E., McDowell, T., **Mixon, E.E.**, Norsted, B.N., Reusche, M., Vo, T., Zahasky, C. (2021) **Poster**: “URGE at UW-Madison: The Experience of a Super-Pod”. American Geophysical Union Annual Meeting, New Orleans, LA.
- Mixon, E.E.**, Jicha, B.R., Li, Y., Ross, J., Singer, B.S., Tootell, D., Varden, C. (2020). **Oral Presentation**: “Optimizing $^{40}\text{Ar}/^{39}\text{Ar}$ analyses using an Isotopx NGX mass spectrometer”, American Geophysical Union Annual Meeting, Virtual.
- Mixon, E.E.**, Singer, B.S., Jicha, B.R., Ramirez, A. (2020) **Poster**: “Temporal Evolution and Elevated Post-Last Glacial Maximum Magma Flux at Calbuco Volcano (41.3 °S)”, Geological Society of America Fall Meeting, Virtual.
- Mixon, E.E.**, Singer, B.S., Marcott, S.A., Ferrier, K. (2019) **Session Convener**: “Feedbacks Between Volcanism, Topography, and Climate”, American Geophysical Union Annual Meeting Session, San Francisco, CA.
- Mixon, E.E.**, Singer, B.S., Jicha, B.R., Marcott, S.A., Moreno, H., Ramirez, A. (2019) **Poster**: “ $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology and Geochemical Evolution of Calbuco Volcano (41.3°S): An Investigation of Trans-Crustal Magma System Response to Glacial Loading from 0-200 ka”, American Geophysical Union Annual Meeting Session, San Francisco, CA.
- Villa, A. V., **Mixon, E.E.**, Bate, C. E., Callahan, E. H., Honig, S., Hupp, B. N., Parrish, E., Roberts, N., Krishnan, A., Castro, A.E. (2019). **Poster**: Invigorating the geoscience community: Graduate student-led efforts in creating inclusive, equal, and diverse science and community at the University of Wisconsin-Madison. American Geophysical Union Annual Meeting, San Francisco, CA.
- Mixon, E.E.**, Barshi, N., Bruck, B., Villa, A., Koustakis, G., Kumar, A., Fournelle, J. (2019) **Oral Presentation**: “Seeking Compositional Truth: EDS vs. WDS to Evaluate New Standard Materials”, Microanalysis Society Quantitative Microanalysis Topical Meeting, Minneapolis, MN.

INSTRUMENTATION + LABORATORY EXPERIENCE

General Operations: Experience in diagnosis and repair of malfunctioning equipment and instrumentation in an isotope geochemistry laboratory, including maintenance to ICP-MS torch, cone, and lens systems, various electronics, vacuum systems, rock processing instruments, fume hood maintenance, etc.

Clean-Lab: Sample digestion; Ion exchange chromatographic methods, including calibration and use of Bio-Rad cation exchange columns; Calibration and use of 2-Hydroxyisobutyric acid (α -HIBA) REE columns; Use of Sr-Spec Sr columns; Use and storage of HF and other reagents.

Mineral Separation: Rock saw; Jaw crusher; Disk mill; Frantz; Gold table; Gold panning; Heavy liquids (MEI).

Teaching + Mentoring: Experience training new lab users in clean-lab protocols and safety, mineral separation, and data acquisition. Collaboration with lab leaders to establish and implement lab-safety documentation and protocols.

Relevant Certifications: UW-Madison Chemical Safety Training ; UW-Madison Radioactive Safety Training; UW-Madison Responsible and Ethical Conduct of Research Training, UW-Madison Cybersecurity and Export Control; First-Aid; CPR.

Isotopx NGX-600 Noble Gas Mass Spectrometer (*method developer, maintenance experience*)

Nu Noblesse Noble Gas Mass Spectrometer (*user, maintenance experience*)

Nu Plasma II MC-ICP-MS and LA-ICP-MS (*user, maintenance experience*)

Agilent 8900 QQQ ICP-MS (*user, maintenance experience*)

VG Sector 354 TIMS (*user*)

Photon Machines femtosecond laser (*supervised user*)
Cameca IMS 1280 Secondary Ion Mass Spectrometer (*supervised user*)
Hitachi S3400N Scanning Electron Microscope (*supervised user*)
Horiba LabRAM HR Evo Raman Spectrometer (*supervised user*)

ACADEMIC FIELD EXPERIENCE

Grand Canyon Vishnu Basement Field Forum III (Arizona, USA) September 2021

- Collaborated on a 2-week multi-institutional field expedition on the Colorado River with a focus on middle crustal architecture, orogenic structure, and mass/heat transfer via metamorphism, plutonism and deformation.

Andean Southern Volcanic Zone (Villarrica, Osorno, and Calbuco Volcanoes, Chile) January 2019

- Planned and executed 5 weeks of volcanology field work. Lead student researcher in mapping terrain and geology by foot and helicopter, sampling for whole-rock geochemistry, cosmogenic ^3He and ^{10}Be surface exposure geochronology, $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology, and describing volcanic and glaciovolcanic features.

Geological Field Coursework (Iceland, TX, WI, NM, WY, MT) 2015-2024

- Graduate Student Field Experience: Collaborated with 20 peers and 3 faculty members to plan and execute a 10-day field excursion along the south coast of Iceland with a focus on volcanic, tectonic, and glacial features. (Iceland)
- Glacial and Pleistocene Geology: Participated on an overnight trip to characterize Last Glacial Maximum geomorphology and glacial features along Lake Michigan and in the Green Bay Lobe (WI).
- UT-Austin Geological Field Camp: Received the UT field camp outstanding student award for work in a 6-week long field course focused on geological processes, mapping, and structures across the Western US. Course included 40 nights of camping. Served as a driver over 6600 miles, including 4-WD (TX, NM, WY, MT).
- Karst Hydrogeology: Participated as a student in 4 weekend field trips focused on water quality sampling, near surface geophysics for aquifer characterization, and group report work. (TX)

TEACHING EXPERIENCE

UW-Madison Department of Geoscience Teaching Assistant Fall 2020, Spring 2021, Fall 2022

- GEOSCI 100 “Introduction to Geoscience”: Worked with a team to design and implement web-based discussions and lab modules for 120+ students during COVID-19.
- GEOSCI 109 “Geology of the National Parks”: Designed and implemented online content to supplement in-person instruction, re-designed formative and summative course assessments, provided office-hour instruction.

Professional Development Activities

- UW-Madison Gender and Sexuality Campus Center LGBTQ+ Safety Training (2hr)
- UW-Madison DELTA Active Teaching + Learning 4-week workshop (16hr)
- UW-Madison DELTA Research Mentorship Seminar (2hr/week)
- UW-Madison DELTA Designing and Facilitating Remote Discussion Sections (3hr)
- UW-Madison DELTA 5-Week TA Community (1hr/week)
- UW-Madison Social Justice Hub Facilitator Training in Generative Dialogue (3hr)
- UW-Madison Graduate Worker Equity Workshop (4hr)
- UW-Madison ‘Recognize, Respond, Refer’ Suicide Prevention Training (2hr)
- Center for the Integration of Research, Teaching, and Learning (CIRTL) Inclusive Learning Workshop (2hr)

SHORT COURSES + WORKSHOPS

Quantitative Analysis, Visualization, and Modeling of Detrital Geochronology Data (GSA Fall meeting)	2022
National Outdoor Leadership (NOLS) 80hr Wilderness First Responder Certification (Austin, TX)	2021
Unlearning Racism in Geoscience (URGE) UW-Madison pod participant (Virtual)	2021
Stanford University Diversity in the Geosciences (DiG) Seminar (Virtual)	2021
Women in Science & Engineering Leadership Institute (WISELI) Breaking the Bias Habit workshop	2020
Geological Society of America Field Safety Leadership Workshop (GSA Fall meeting)	2020

Magma Chamber Simulator Workshop 2019 (AGU Fall Meeting)	2019
alphaMELTS Workshop 2019 (California Institute of Technology)	2019

SCIENCE COMMUNICATION + OUTREACH

<i>Science Communication Online Programme (SCOPE)</i> , Northwestern University	Winter 2023
<i>Founder</i> , GeoReadingForEquity Web Resource	June 2020-May 2024
<i>Founder</i> , UW-Madison Geo-Badgering Science Blog.	October 2018-May 2024
<i>Content Contributor</i> , Future Rock Doc Web Resource	December 2018-Present
<i>Science Pen-Pal</i> , Letters to a Pre-Scientist Pen Pal Program (LPS)	August 2019-Present
<i>Consultant + Volunteer</i> , UW-Madison “Life as We Don’t Know It” WID Kohler Project	Spring 2019-Spring 2020
<i>Volunteer</i> , UW -Madison Geology Museum (UWGM)	September 2021-May 2024

PROFESSIONAL SERVICE + COMMITMENT TO JEDI PRACTICES

Petrology Network (PetroNet) Planning Committee	March 2022-March 2024
<ul style="list-style-type: none"><i>Selected by peers to serve on PetroNet Planning Committee</i> Collaborate with fellow researchers to build an antiracist, inclusive, and supportive community that provides networking and mentoring opportunities for petrologists.	
Geological Society of America Geochronology Division Student Representative	September 2020-October 2022
<ul style="list-style-type: none"><i>Elected by peers to serve a 2-year term.</i> Worked with division members to facilitate a welcoming environment for undergraduate and graduate scientists. Piloted a meeting-mentorship program for the GSA Annual Meeting in 2022.	
Geosciences Education + Mentorship Support (GEMS)	September 2021-Present
<ul style="list-style-type: none"><i>Graduate school application mentor</i> for students pursuing post-bachelor’s opportunities in the Earth sciences.	
UW-Madison Faculty Diversity Initiative Committee Member (Geoscience)	September 2020-May 2022
<ul style="list-style-type: none"><i>Graduate Student Representative</i> on faculty hiring committee aimed at improving recruitment and retention of diverse faculty members through the UW-Madison Provost Office Target of Opportunity (TOP) program.	
UW-Madison Department of Geoscience Diversity & Inclusion (D&I) Committee.	September 2018-May 2024
<ul style="list-style-type: none"><i>Code of Conduct Sub-Committee Chair:</i> Led a group of faculty, staff, and students to research and draft a code of conduct and field safety best practice documents.Additional committee activities include re-framing physical spaces to be inclusive, hosting trainings, and contributing to the Departmental strategic plan.	
UW-Madison Geoscience Graduate Student Association (GGSA)	September 2018-May 2024
<ul style="list-style-type: none"><i>Founding member:</i> of the GeoPath initiative: aimed at establishing near peer mentoring connections.<i>Climate Survey Committee Founding Co-Chair:</i> Built, disseminated, and analyzed results from a first-of-its-kind workplace climate survey. Worked with faculty and grads to synthesize results and suggest data-driven solutions.<i>Faculty Liaison:</i> Attend faculty meetings and departmental townhalls to represent graduate student body.<i>Guest Student Lecturer</i> on topics including advising, work-life balance, and D&I for first-year grad student seminar.	

PROFESSIONAL ORGANIZATION MEMBERSHIPS

American Geophysical Union; Geological Society of America; Association of Women Geoscientists