

Alexander H. Krichels, Ph.D.

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Professional Appointments

2026 – present	Assistant Professor University of Georgia Odum School of Ecology
2023 – 2026	Research Ecologist United States Department of Agriculture (USDA), Forest Service Rocky Mountain Research Station (RMRS) Maintaining Resilient Dryland Ecosystems Program
2019 – 2023	Postdoctoral Scholar University of California, Riverside (UCR) Department of Environmental Science Advisors: Peter M. Homyak & Darrel Jenerette

Education

2019, Ph.D.	University of Illinois at Urbana Champaign (UIUC) Program in Ecology, Evolution, and Conservation Biology (PEEC) Advisor: Wendy H. Yang
2013, B.A.	Oberlin College Biology & Environmental Studies double major

Research Funding and Traineeships

2025 – 2028	Effects of fire on soil organic matter and aboveground biomass in forests in the southwestern United States, \$424,998 . Source: USDA Rocky Mountain Research Station, non-competitive. Role: PI
2024	Controls over soil N accumulation in desert grasslands and piñon-juniper woodlands, \$5,000 . Source: University of New Mexico Faculty Research Grant, competitive. Role: PI
2023 – 2026	Science to support high priority data needs at stream restoration sites in priority landscapes throughout the USFS Southwestern Region, \$343,500 . Source: Bipartisan Infrastructure Law, Forest Service Ecosystem Restoration Research, competitive (30% funding rate). Role: Co-PI
2023 – 2025	Santa Fe National Forest soil carbon monitoring project, \$22,722 . Source: USDA Southwest Climate Hub, non-competitive. Role: PI
2017 & 2018	PEEC Summer Research Award, competitive, \$2,000
2017	National Science Foundation Integrated Training with Genomics Research Grant, competitive, \$5,000
2016 & 2018	Lebus Fund Award, competitive, \$2,000

2015 Francis M. Clark Research Support Grant, competitive, **\$1,000**
 2014 – 2016 National Science Foundation, Integrative Graduate Education and
 Research Traineeship, Vertically Integrated Training with Genomics,
 competitive, **\$60,000** (stipend)

Publications (* denotes undergraduate mentees)

2026	Krichels AH, *Vulcan A, Driscoll KP. Varying effects of stream restoration on riparian soil carbon persistence and methane emissions in the southern Rocky Mountains, USA. <i>Restoration Ecology</i>
2026	Stephens EC, Barriga MFP, Greene AC, Krichels AH, Kargul M, Larios L, Glassman SI, Homyak PM. Wildfire alters nitrogen cycling to increase soil emissions of nitric oxide (NO) and the heterogeneity of nitrous oxide (N ₂ O) in California chaparral. <i>Geoderma</i> .
2026	Sun S, Cotrufo MF, Viscarra Rossel RA, <i>et al.</i> Global hotspots of particulate organic carbon losses under climate change. <i>Nature Communications</i> .
2026	Irby JC, Krichels AH , Spasojevic MJ, Jenerette GD, Hanan EJ, Homyak PM. Precipitation legacy effects on gross N mineralization and nitrification rates in a pinyon-juniper dryland under altered precipitation. <i>Biogeochemistry</i> .
2026	Krichels AH , Reid C, Zhilik BB, Kemner J, York RA, Glassman SI, Homyak PM. Fall prescribed burns deplete surface soil C pools more than spring burns in a young mixed-conifer forest. <i>Forest Ecology and Management</i> . 600, 123298.
2025	Krichels AH , Stephens EZ, Reid C, Barriga MFP, Ordoñez ME, McLaren JR, Kargul M, Larios L, Glassman SI, Homyak PM (2025). Wildfire-induced losses of particulate organic carbon persist for over 4 years in a chaparral ecosystem. <i>Global Change Biology</i> . 31, e70404.
2025	Zhu G, Shi H, He G, Wang B, Shan J, Liu T, Wang S, Liu C, Hou L, Jiang L, Yu L, Zhang N, Zhang S, Su X, Di H, Krichels AH , Trimmer M, Peng Y, Löffler F, Tian H, Zhu Y, Zhang J, Chunhui Z. Nitrous oxide sources, mechanisms and mitigation. <i>Nature Reviews Earth & Environment</i> . 2662-138X.
2025	*Zhao S, Krichels AH , Stephens EZ, Calma AD, Aronson EL, Jenerette GD, Spasojevic MJ, Schimel JP, Hanan EJ, Homyak PM. Nitrogen availability and changes in precipitation alter microbially mediated NO and N ₂ O emissions from a Pinyon-Juniper dryland. <i>Global Change Biology</i> , 31, e70159.
2025	Krichels AH , Sanford RA, Chee-Sanford JC, Connor L, Van Allen R, Kent AD, Yang WH. Distinct N cycling microbial communities contribute to microtopographic variation in soil N ₂ O emissions. <i>Soil Biology and Biochemistry</i> , 202, 109683.
2024	Krichels AH , Greene AC, Stephens EZ, Zhao S, Schimel JP, Aronson EL, Hanan EJ, Homyak PM. Nitrifier controls on soil NO and N ₂ O emissions in three chaparral ecosystems under contrasting atmospheric N inputs. <i>Soil Biology and Biochemistry</i> , 196, 109482.

- 2024 Ren J, Hanan EJ, Greene A, Tague C, **Krichels AH**, Burke WD, Schimel JP, Homyak PM. Stimulating the role of biogeochemical hotspots in driving nitrogen export from dryland watersheds. *Water Resources Research*, 60, e2023WR036008.
- 2024 Edwards JD, **Krichels AH**, Seyfried GS, Dalling J, Kent AD, Yang WH. Soil microbial community response to ectomycorrhizal dominance in diverse neotropical montane forests. *Mycorrhiza*, 34, 95-105.
- 2023 **Krichels AH**, Homyak PM, Aronson EL, Sickman J, Botthoff J, Greene AC, Shulman H, Piper S, Andrews H, Jenerette GD. Bacterial denitrification drives elevated N₂O emissions in arid southern California drylands. *Science Advances*, 9, eadj1989.
- 2023 **Krichels AH**, Homyak PM, Aronson EL, Sickman J, Botthoff J, Greene AC, Shulman H, Piper S, Andrews H, Jenerette GD. Soil NH₃ emissions across an aridity, soil pH, and N deposition gradient in southern California. *Elementa: Science of the Anthropocene*, 11, 00123.
- 2023 Andrews HM, **Krichels AH**, Homyak PM, Piper S, Aronson EL, Botthoff J, Greene AC, Jenerette GD. Wetting-induced soil CO₂ emission pulses are driven by interactions among soil temperature, carbon, and nitrogen limitation in the Colorado Desert. *Global Change Biology*, 29, 3205-2330.
- 2022 **Krichels AH**, Greene AC, Jenerette GD, Spasojevic MJ, Glassman SI, Homyak PM. Precipitation legacies amplify ecosystem nitrogen losses from nitric oxide emissions in a Pinyon-Juniper dryland. *Ecology*, 104, 1-9.
- 2022 **Krichels AH**, Homyak PM, Aronson EL, Sickman J, Botthoff J, Shulman H, Piper S, Andrews H, Jenerette GD. Rapid nitrate reduction contributes to pulsed NO and N₂O emissions following rewetting of dryland soils. *Biogeochemistry*, 158, 233-350.
- 2020 Chee-Sanford JC, Connor L, **Krichels AH**, Yang WH, Sanford RA. Hierarchical detection of diverse Clade II (atypical) *nosZ* genes using new primer sets for classical and multiplex PCR array applications. *Journal of Microbiological Methods*, 172, 105908.
- 2019 **Krichels AH**, Yang WH. Dynamic controls on soil nitrous oxide hot spots and hot moments across a microtopographic gradient. *Journal of Geophysical Research-Biogeosciences*, 124, 3618-3634.
- 2019 **Krichels AH**, *Sipic E, Yang WH. Iron redox reactions can drive microtopographic variation in upland soil carbon dioxide and nitrous oxide emissions. *Soil Systems*, 3, 60.
- 2019 **Krichels AH**, DeLucia EH, Sanford RA, Chee-Sanford, JC, Yang, WH. Historical soil drainage mediates the response of soil greenhouse gas emissions to intense precipitation events. *Biogeochemistry*, 143, 425-442.
- 2019 *Suriyavirun N, **Krichels AH**, Kent A, Yang WH. Microtopographic

differences in soil properties and microbial community composition at the field scale. *Soil Biology and Biochemistry*, 131, 71-80.

Invited Seminars

2026	Krichels AH. How do global change factors affect microbially-mediated nitrogen losses from terrestrial ecosystems? University of Georgia, Odum School of Ecology.
2025	Krichels AH & Driscoll KD. Evaluating the effects of beaver dam analogs and plug-and-pond stream restoration. USDA Forest Service. Region 3 Watershed, Soil, Air, and Ecology meeting.
2024	Krichels AH. Unexpected nitrogen emissions from dryland ecosystems. Sevilleta Long Term Ecological Research Station.
2023	Krichels AH. Controls over nitrogen emissions from dry soils. University of New Mexico, Biology seminar.
2022	Krichels AH. How does atmospheric N deposition affect N trace gas emissions from dryland ecosystems? University of California Riverside, Environmental Science seminar.
2021	Krichels AH. How will dryland nitrogen cycling respond to global change factors? University of California Merced, Enviro-Lunch seminar series.

Conference Presentations (oral unless stated otherwise; * denotes invited talk)

2025	Krichels AH, Vulcan A, Driscoll KP. Restoring Soil Carbon Cycling Processes in Degraded Riparian Wetlands. American Geophysical Union.
2024	Krichels AH, Vulcan A, Driscoll K. How does process-based stream restoration using beaver dam analogs affect soil carbon storage and greenhouse gas emissions in riparian wetlands in northern New Mexico? American Geophysical Union, poster.
2023	Krichels AH, Reid C, Stephens E, Glassman SI, Homyak PM. Wildfire-induced losses of particulate and mineral associated organic carbon persist for over three years in a Chaparral ecosystem. Ecological Society of America.
2022	*Krichels AH, Greene AC, Jenerette GD, Spasojevic MJ, Glassman SI, Homyak PM. Precipitation legacies amplify ecosystem nitrogen losses from nitric oxide emissions in a Pinyon-Juniper dryland. Ecological Society of America.
2021	Krichels AH, Homyak P, Shulman H, Piper S, Sickman J, Aronson EL, Jenerette GD. Contrasting controls over soil N ₂ O and NO emissions across an atmospheric N deposition gradient. American Geophysical Union.
2021	Krichels AH, Homyak P, Shulman H, Piper S, Sickman J, Aronson EL,

	Jenerette GD. Pulsed emissions of nitric and nitrous oxide from dryland soils have distinct responses to nitrogen addition. Ecological Society of America.
2020	Krichels AH , Greene AC, Glassman SI, Spasojevic M, Homyak PM, Jenerette GD. How do altered precipitation regimes affect soil N cycling and the mechanisms governing N loss? American Geophysical Union.
2019	Krichels AH , Suriyavirun N, Kent A, Sanford RA, Chee-Sanford JC, Yang WH. Soil drainage selects for distinct denitrifier communities that mediate nitrous oxide emissions, Ecological Society of America.
2018	*Krichels AH , DeLucia EH, Sanford RA, Chee-Sanford JC, Yang WH. Historical drainage legacy effects on denitrification in upland soils, Ecological Society of America.
2017	Krichels AH , Suriyavirun N, Kent AD, Sanford RA, Chee-Sanford JC, DeLucia EH, Yang WH. Historical soil redox regimes mediate soil greenhouse gas emissions, Goldschmidt Conference, poster.
2015	Krichels AH , Sanford RA, Chee-Sanford JC, DeLucia EH, Yang WH. Does drainage history mediate response of greenhouse gas emissions to precipitation in an agricultural field? Ecological Society of America, poster.
2012	Krichels AH . Contribution of lichens to ecosystem respiration in the arctic tundra, Toolik Field Station REU symposium.

Teaching Experience

2017	UIUC, Ecology 203, Teaching Assistant • Taught two lab sections focused on scientific writing. • Ranked as “Excellent” TA.
2016 – 2019	UIUC, Biology in Today’s World 100, Teaching Assistant • Developed the online course. • Taught online synchronous discussion sessions. • Maintained the course webpage.
2015 & 2017	UIUC, Ecosystem Ecology 452, Teaching Assistant • Graded student projects. • Coordinated guest speakers.

Mentoring

Rocky Mountain Research Station/University of New Mexico

2023 – present	Alina Vulcan, Hispanic Association of Colleges and Universities Intern • Trained in carbon density fractionation, soil trace gas emissions, and scientific writing.
2024	Erika Dunn, UNM Undergraduate mentee • Trained in field and lab techniques.

University of California, Riverside

2022 – present	Jamie Irby, UCR Masters Student Trained in stable isotope pool dilution to measure gross rates of microbial N transformations.
2022 – present	Chloe Reid, UCR Undergraduate Student - Trained in carbon density fractionation. - She co-authored manuscript submitted to <i>Global Change Biology</i>.
2021 – present	Sharon Zhao, National Science Foundation Research Experience for Post-Baccalaureate Students program She published our work in <i>Global Change Biology</i>.
2019 – present	Aral Greene, UCR Ph.D. candidate - Trained to measure isotopomers of nitrous oxide. - She co-authored three of my first-authored manuscripts.
2019 – present	Elizah Stephens, UCR Ph.D. - Trained in laboratory assay to measure the contribution of nitrifier communities to soil N trace gas emissions. - She co-authored one manuscript I have submitted for publication.

University of Illinois

2015 – 2017	Natcha Suriyavirun, UIUC Undergraduate mentee She published our work as a first author manuscript in <i>Soil Biology and Biochemistry</i>.
2017 – 2019	Emina Sipic, UIUC Undergraduate mentee She co-authored a manuscript I published in <i>Soil Systems</i>.

Awards

2024	USDA FS Certificate of Merit for helping rewrite 10-year charter for Maintaining Resilient Dryland Ecosystems Program
2023	UCR Outstanding Postdoctoral Scientist Award
2023	USDA FS Certificate of Merit for mentoring through the Hispanic Association of Colleges and Universities
2017	Ranked as “Excellent” TA for Ecology based on student evaluations

Professional Service

2023 – present	Forest Service Co-lead for the USDA Southern Plains Climate Hub
2023	Rechartering panel for Maintaining Resilient Dryland Ecosystems program
2023	Hiring committee for Research Soil Scientist, USDA FS

Organized conference sessions

2025	“Carbon and Nutrient Coupling in Terrestrial Agroecosystems” American Geophysical Union annual meeting
2024	“Soils in the Anthropocene: Carbon and Nutrient Coupling in Terrestrial Agroecosystems” American Geophysical Union annual meeting

2020 “Linking Physiological to Landscape Controls over Dryland Nitrogen Cycling”
Ecological Society of America annual meeting

Editorships

2024 – present Associate Editor, *Frontiers in Ecology and the Environment*

University Associations

2024 – present Adjunct Assistant Professor, University of New Mexico (UNM),
Department of Biology

Peer review

Nature Communications, Ecosystems, Global Change Biology, New Phytologist, Functional Ecology, Biogeochemistry, Geophysical Research Letters, Geoderma, Soil Biology and Biochemistry, Communications Earth & Environment, Journal of Environmental Quality, Frontiers in Forests and Global Change, Journal of Soils and Sediments, Biogeosciences, Agricultural and Forest Meteorology, Catena, Applied Soil Ecology, Scientific Reports

Community Outreach

2024	Presented work to Agri-Nature Center of Los Ranchos de Albuquerque.
2023	Volunteered at a “Dinner with a Scientist” event at Altura Prep elementary school in Albuquerque, NM.
2022	Presented research and organized activities for students at Woodlake High School in Woodlake, California—an institution primarily serving underrepresented students—with the goal of demystifying scientific research.
2020	Designed and implemented a science discovery day for indigenous students who live near our research sites in Riverside County, CA.
2014 – 2019	Organized multiple outreach events at the local farmers market, library, and public schools in Champaign, Illinois.

Professional Memberships

2025 – present	Society for Ecological Restoration
2019 – present	American Geophysical Union
2017 – 2018	Geochemical Society
2014 – present	Ecological Society of America