Peter M. Homyak, Ph.D.

Assistant Professor Director, Facility for Isotope Ratio Mass Spectrometry Department of Environmental Sciences University of California, Riverside Riverside, CA 92521 Office: 951-827-2358 Email: phomyak@ucr.edu Website: www.petehomyak.weebly.com

APPOINTMENTS

Assistant Professor

2018 - present University of California, Riverside

Ecosystem and Soil Microbial Processes

Ford Foundation Postdoctoral Research Fellow

2017 – 2018 University of California, Santa Barbara

- Topic: Ecosystem Organic N Cycling: Soil-plant Feedbacks
- Sponsoring Scientists: Joshua P. Schimel and Oliver A. Chadwick

Postdoctoral Research Scientist

2016 – 2017 University of California, Santa Barbara.

- Topic: Ecosystem Organic N Cycling: Soil-plant Feedbacks
- Sponsoring Scientist: Joshua P. Schimel

2015 – 2016 University of California, Irvine.

- Synthesized drought effects on soil N cycling. Compiled global database to assess degrees of ecosystem N saturation
- Sponsoring Scientists: Steve Allison, Travis Huxman, Mike Goulden, and Kathleen Treseder

National Science Foundation Postdoctoral Research Fellow

2012 – 2015 University of California, Santa Barbara.

- Furthered understanding of trace gas emission and dryland ecosystem N cycling.
- Sponsoring Scientist: Joshua P. Schimel.

EDUCATION

Ph.D. Soil and Water Science

2007 - 2012 University of California, Riverside

- Dissertation: "Nitrogen and Phosphorus Biogeochemistry of Watersheds Along the Western Slope of the Sierra Nevada"
- Major Professor: James O. Sickman

M.S. Forest and Natural Resources Management, Ecosystem biogeochemistry

2004 - 2006 SUNY College of Environmental Science and Forestry, Syracuse, NY.

- Thesis: "Nitrogen Immobilization by Wood-chip Application: Protecting Water Quality in a Northern Hardwood Forest"
- Major Professor: Ruth D. Yanai

B.S. Environmental Studies, Ecosystem biogeochemistry

- 2001 2004 Binghamton University, Binghamton, NY.
- Chemistry minor
- Undergraduate Research: "Biogeochemical cycling of N and P"

RESEARCH FUNDING

US Department of Agriculture. 2023. Co-PI. Real-time mapping of hydroxylamine and other trace gases in soil

US Department of Energy. 2022. Co-PI. Predicting post-fire N cycling through traits and cross-kingdom interactions

University of California Office of the President—Advancing Faculty Diversity Grants. 2022. Co-PI. Increasing faculty retention in the College of Natural and Agricultural Sciences through mentorship

US Department of Agriculture. 2022. Co-PI. A trait-based approach for understanding the role of fire-adapted microbes on soil carbon sequestration and greenhouse gas emissions

University of California-Hispanic Serving Institutions Doctoral Diversity Initiative (UC-HSI DDI). 2022. Co-PI. Latinxs and the Environment: Paving Pathways to the Professoriate

California Department of Forestry and Fire Protection. 2022. Co-PI. Proposal led by my PhD student Elizah Stephens. Effects of wildfire on soil emissions of NOx and N_2O

California Department of Forestry and Fire Protection. 2021. Co-PI. Influence of prescribed burn season on tree survival, soil microbial resilience, and carbon cycling in mixed conifer forests

UC Regents Faculty Development Award. 2021. PI. Linking wildfire-impacted soils with regional air quality and Earth's climate

UC Regents Faculty Fellowship. 2020. PI. Nitrogen pollution in drylands: Processes controlling emission of air pollutants and greenhouse gases from soils

NSF-DEB. 2019. PI. How can we assess nitrogen saturation in xeric ecosystems? Accounting for water, time, and nitrogen availability

Ford Foundation Postdoctoral Fellowship. 2017. PI. Ecosystem organic N cycling: Plant uptake, diffusion, and availability of soil amino acids

NSF Postdoctoral fellowship. 2012. PI. Biotic and abiotic mechanisms of gaseous N production in semiarid environments

AWARDS AND RECOGNITION

Nature Research Awards for Driving Global Impact 2020 (finalist). https://www.nature.com/collections/ccjnyjxvmp/shortlist

S.A. Wilde Early Career Achievement Award from the Forest Range and Wildland Soil Division of the Soil Science Society of America 2017

Gene E. Likens Outstanding Publication Award. Biogeosciences section of the

Ecological Society of America 2016

Elizabeth Sulzman Outstanding Publication Award. Biogeosciences section of the Ecological Society of America 2015 (honorable mention)

NSF GK-12 Teaching Fellowship, SUNY-ESF 2004 - 2006

PUBLICATIONS (TECHNICAL JOURNAL ARTICLES; TJA)

Denotes *postdoc, ‡graduate, and †undergraduate student mentee from my research group.

Published

37. Ren, J., Hanan, E. J., *Greene, A., Tague, C., *Krichels, A. H., Burke, W. D., Schimel, J. P., & Homyak, P. M. (2024). Simulating the Role of Biogeochemical Hotspots in Driving Nitrogen Export From Dryland Watersheds. Water Resources Research, 60(3). https://doi.org/10.1029/2023wr036008

36. Avila, C. C. E., Schaefer, M. V., Duro, A. M., Haensel, T. P., Garniwan, A., Lin, Y., Darrel Jenerette, G., Nico, P. S., Dubinsky, E., Keiluweit, M., Brodie, E. L., Lin, Y.-H., **Homyak, P. M.**, & Ying, S. C. (2023). Carbon dynamics as a function of soil moisture following repeated wet-dry cycles in irrigated soils. **Geoderma**, 439, 116681. https://doi.org/10.1016/j.geoderma.2023.116681

35. Wang, X., Li, S., Zhu, B., **Homyak, P. M.**, Chen, G., Yao, X., Wu, D., Yang, Z., Lyu, M., & Yang, Y. (2023). Long-term nitrogen deposition inhibits soil priming effects by enhancing phosphorus limitation in a subtropical forest. **Global Change Biology**, 29, 4081–4093.

34. Lyu, M., **Homyak, P. M.**, Xie, J., Peñuelas, J., Ryan, M. G., Xiong, X., Sardans, J., Lin, W., Wang, M., Chen, G., & Yang, Y. (2023). Litter quality controls tradeoffs in soil carbon decomposition and replenishment in a subtropical forest. **Journal of Ecology**

33. ‡Stephens, E.Z. and Homyak, P.M. Post-fire soil emissions of nitric oxide (NO) and nitrous oxide (N2O) across global ecosystems: A review. (2023). Biogeochemistry. https://doi.org/10.1007/s10533-023-01072-5

32. Andrews, H. M., *Krichels, A. H., **Homyak, P. M.**, Piper, S., Aronson, E. L., Botthoff, J., ‡Greene, A. C., & Jenerette, G. D. (2023). Wettinginduced soil CO₂ emission pulses are driven by interactions among soil temperature, carbon, and nitrogen limitation in the Colorado Desert. **Global Change Biology**, 29, 3205–3220.

31. *Krichels, A. H., Jenerette, G. D., Shulman, H., Piper, S., *Greene, A. C., Andrews, H. M., Botthoff, J., Sickman, J. O., Aronson, E. L., & Homyak, P. M. (2023). Bacterial denitrification drives elevated N 2 O emissions in arid southern California drylands. Science Advances, 9(49). https://doi.org/10.1126/sciadv.adj1989

30. Yu, L., **Homyak, P.M.**, Li, L., & Gu, H. (2023). Succession of bacterial community structure in response to a one-time application of biochar in barley rhizosphere and bulk soils. **Elementa: Science of the Anthropocene**, 11(1)

29. *Krichels, AH, **Homyak, PM**, Aronson, EL, Sickman, JO, Botthoff, J, *Greene, AC, Andrews, HM, Shulman, H, Piper, S, Jenerette, GD. 2023. Soil NH3 emissions across an aridity, soil pH, and N deposition gradient in southern California. **Elementa: Science of the Anthropocene** 11(1): 00123

28. ‡Püspök, J. F., †Zhao, S., †Calma, A. D., Vourlitis, G. L., Allison, S. D., Aronson, E. L., Schimel, J. P., Hanan, E. J., & Homyak, P. M. (2023). Effects of experimental nitrogen deposition on soil organic carbon storage in Southern California drylands. Global Change Biology, 29, 1660–1679.

27. Pulido-Chavez, M. F., Randolph, J. W. J., Zalman, C., Larios, L., **Homyak, P. M.**, & Glassman, S. I. (2023). Rapid bacterial and fungal successional dynamics in first year after chaparral wildfire. **Molecular Ecology**, 32, 1685–1707

26. Osborne, B. B., Bestelmeyer, B. T., Currier, C. M., Homyak, P. M., Throop, H. L., Young, K., & Reed, S. C. 2022. The consequences of climate change for dryland biogeochemistry. New Phytologist. 236: 15-20

25. Andrews, H. M., **Homyak, P. M.**, Oikawa, P. Y., Wang, J., & Jenerette, G. D. 2022. Water-conscious management strategies reduce per-yield irrigation and soil emissions of CO2, N2O, and NO in high-temperature forage cropping systems. **Agriculture, Ecosystems & Environment**, 332, 107944

24. Spasojevic, M. J., **Homyak, P. M.**, Jenerette, G. D., Goulden, M. L., McFaul, S., Madsen-McQueen, T., Schauer, L., & Solis, M. 2022. Altered precipitation has asymmetric impacts on annual plant communities in warm and cool growing seasons. **Elementa: Science of the Anthropocene**, 10 (1): 00014

23. *Krichels, Alexander H., ‡Greene, Aral C., Jenerette, G. Darrel, Spasojevic, Marko J., Glassman, Sydney I., and **Homyak, P.M.** 2023. Precipitation Legacies Amplify Ecosystem Nitrogen Losses from Nitric Oxide Emissions in a Pinyon–Juniper Dryland. **Ecology** 104(2): e3930

22. *Krichels A.H., **P.M. Homyak**, E.L. Aronson, J.O. Sickman, H. Shulman, S. Piper, H. Andrews, G.D. Jenerette. 2022. Rapid nitrate reduction produces pulsed NO and N2O emissions following wetting of dryland soils. **Biogeochemistry**, 158: 233–250

21. Slessarev E.W., ‡A.C. Greene, **P.M. Homyak**, S.C. Ying, and J.P. Schimel. "High resolution measurements reveal abiotic and biotic mechanisms of elevated nitric oxide emission after wetting dry soil. 2021. **Soil Biology & Biochemistry**, 160: 108316

20. Bingham NL, Slessarev EW, **Homyak PM** and Chadwick OA (2021) Rock-Sourced Nitrogen in Semi-Arid, Shale-Derived California Soils. **Front. For. Glob. Change** 4:672522.

19. Homyak, P.M., Slessarev, E.W., Hagerty, S., Greene, A.C., Marchus, K., Dowdy, K., Iverson, S. and Schimel, J.P. (2021), Amino acids dominate diffusive nitrogen fluxes across soil depths in acidic tussock tundra. New Phytologist, 231: 2162-2173.

18. ^AEberwein, J.R., ^A**P.M. Homyak**, ^AC.J. Carey, E.L. Aronson, D.J. Jenerette. 2020. Large nitrogen oxide emission pulses from desert soils and

associated microbiomes. **Biogeochemistry Letters** 149:239-250 ^Acontributed equally to this work

17. Slessarev E.W., Y. Lin, B.Y. Jimenez, **P.M. Homyak**, O.A. Chadwick, C.M. D'Antonio, and J.P. Schimel. 2020. Cellular and extracellular C contributions to respiration after wetting dry soil. **Biogeochemistry** 147:307-324

16. Lu Y., **P.M. Homyak**, X. Kang, P.C. Brookes, Y. Ye, Y. Lin, A. Muhammad, J. Xu. 2020. Changes in abundance and composition of nitrifying communities in barley (*Hordeum vulgare* L.) rhizosphere and bulk soils over the growth period following combined biochar and urea amendment. **Biology and Fertility of Soils** 56:169-183

15. Lyu M., X. Li, J. Xie, **P.M. Homyak**, L. Ukonmaanaho, Z. Yang, X. Liu, C. Ruan, Y. Yang. 2019. Root-microbial interaction accelerates soil nitrogen depletion but not soil carbon after increasing litter inputs to a coniferous forest. **Plant and Soil** 444:153-164

14. Sickman J.O., A. E. James, M.E. Fenn, A. Bytnerowicz, D.M. Lucero, and **P.M. Homyak**. 2019. A test of the Integrated Total Nitrogen Input (ITNI) method for quantifying N deposition rates in a semi-arid region. **Science of the Total Environment** 646:1253-1264

13. Homyak P.M., J.C. Blankinship, E.W. Slessarev, S.M. Schaeffer, S. Manzoni, and J.P. Schimel. 2018. Effects of altered dry-season length and plant inputs on soluble soil carbon. **Ecology** 99:2348-2362

12. Hall S.J., L. Reyes, W. Huang, and **P.M. Homyak**. 2018. Wet spots as hotspots: Moisture responses of nitric and nitrous oxide emissions from poorly drained agricultural soils. **Journal of Geophysical Research-Biogeosciences** 123:3589-3602

11. Schaeffer S.M., **P.M. Homyak**, C.M. Boot, D. Roux-Michollet, and J.P. Schimel. 2017. Soil carbon and nitrogen dynamics throughout the summer drought in a California annual grassland. **Soil Biology & Biochemistry** 115: 54-62

10. Leitner S., **P.M. Homyak**, J.C. Blankinship, J. Eberwein, D.J. Jenerette, S. Zechmeister-Boltenstern, and J.P. Schimel. 2017. Linking NO and N_2O emission pulses with the mobilization of mineral and organic N upon rewetting dry soils. **Soil Biology & Biochemistry** 115: 461-466

9. Homyak P.M., S.D. Allison, T.E. Huxman, M.L. Goulden, and K.K. Treseder. 2017. Effects of drought manipulation on soil nitrogen cycling: A meta-analysis. Journal of Geophysical Research-Biogeosciences 122: 3260-3272

8. Homyak P.M.*, J.C. Blankinship, K. Marchus, D.M. Lucero, J.O. Sickman, and J.P. Schimel. 2016. Aridity and plant uptake interact to make dryland soils hotspots for nitric oxide (NO) emissions. Proceedings of the National Academy of Sciences of the United States of America 113: E2608-E2616

*Received the Gene E. Likens Award of the Ecological Society of America Biogeosciences section

7. Homyak P.M., M.T. Kamiyama[†], J.O. Sickman, and J.P. Schimel. 2017.

Acidity and organic matter stimulate abiotic nitric oxide production in drying soils. **Global Change Biology** 23: 1735-1747

6. Homyak P.M., K.T. Vasquez[†], J.O. Sickman, D.R. Parker, and J.P. Schimel. 2015. Improving nitrite analysis in soils: Drawbacks of the conventional 2 M KCl extraction. Soil Science Society of America Journal 79: 1237-1242

Press Release: Standard Extraction Method Underestimates Nitrite in Soils. CSA News Magazine. August 2015, 60 (8): 14

5. Homyak P.M., J.O. Sickman, and J.M. Melack. 2014. Pools, transformations, and sources of P in high-elevation soils: Implications for nutrient transfer to Sierra Nevada lakes. Geoderma 217-218: 65-73

4. Homyak P.M. and J.O. Sickman. 2014. Influence of soil moisture on the seasonality of nitric oxide emissions from chaparral soils, Sierra Nevada, California, USA. Journal of Arid Environments 103: 46-52

3. Homyak P.M., J.O. Sickman, and J.M. Melack. 2014. Phosphorus in sediments of high-elevation lakes in the Sierra Nevada (California): Implications for internal phosphorus loading. Aquatic Sciences 76: 511-525

2. Homyak P.M.*, J.O. Sickman, A.E. Miller, J.M. Melack, T. Meixner, and J.P. Schimel. 2014. Assessing nitrogen-saturation in a seasonally dry chaparral watershed: Limitations of traditional indicators of N-saturation. **Ecosystems** 17: 1286-1305

*Received the Elizabeth Sulzman Award (honorable mention) of the Ecological Society of America Biogeosciences section

1. Homyak P.M., R.D. Yanai, D.A. Burns, R.H. Germain, R.D. Briggs. 2008. Nitrogen immobilization by wood-chip application: protecting water quality in a northern hardwood forest. Forest Ecology and Management. 255: 2589-2601

PROFESSIONAL EXPERIENCE

Consultant

2006 – 2007 Upper Susquehanna Coalition, Owego, NY.

Nutrient cycling in forested ecosystems of the Upper Susquehanna watershed. Investigated stream nutrient loading and N export from forested watersheds

National Science Foundation GK12 Graduate Teaching Fellow

2004 – 2006 SUNY College of Environmental Science and Forestry, Syracuse, NY.

• Developed and integrated inquiry based lesson plans into the course curriculum of a college-level environmental science course. Incorporated research and scientific literacy into the high-school learning experience

Research Specialist

Summer 2004 Binghamton University, Binghamton, NY.

• Sample and data analysis, development of experimental designs, and fieldwork

Intern

Summer 2002 Broome County Soil and Water Conservation District, Binghamton, NY

 Stream and ditch assessment of the Castle Creek Watershed, Broome County, NY Surveyed erosion, stream banks, and riparian buffer zones

Tutor

2000 - 2001 Broome Community College, Binghamton, NY.

• Worked with the Learning Assistance Center helping students in the subjects of algebra, chemistry, and statistics

RESEARCH INTERESTS

Microbial and abiotic controls on soil trace gas emissions and elemental cycling/Ecosystem biogeochemistry/Global change

Stable isotope biogeochemistry/Linking biogeochemical cycles across the terrestrialaquatic-atmospheric interfaces

TEACHING AND MENTORING

Courses taught at UCR:

- ENSC 002: Introduction to Environmental Science; Winter 2019-2023
- ENSC 232: Biogeochemistry; Spring 2019, 2020, 2023
- ENSC 100: Introduction to Soil Science; Summer 2013
- ENSC 217: Isotopes in Ecology and Environmental Sciences; Spring 2020, 2022
- NASC 093: Freshman Seminar in Natural and Agricultural Sciences; Fall 2018, 2019

Other courses:

• Co-Instructor, Introduction to Environmental Science. SUNY-ESF course taught to high-school seniors for college credit (2004 and 2005 academic calendar)

Mentor, Postdoctoral Scholars

Dr. Alex Krichels, 2020-2023; current position: Research Ecologist USDA Rocky Mountain Research Station

Dr. Ken Czapla, 2023-present

Major advisor, PhD students

Elizah Stephens; 2019-present; Honorable mention NSF-GRFP

Aral Greene; 2020-present; Honorable mention NSF-GRFP

Jamie Irby; 2022-present

Major advisor, MS students

Johann Püspök; 2020-2022

Major advisor, undergraduate students

Kobe Luu, Heather Haro, Nikki Shelton, Karen Argumedo, Jacob Velasquez, Demiana Dannoun, Felix Osuna-Lopez, Danni Ortiz, Tony Calma, Yareli Olazabal, Ellen Nguyen, Yanira Herrera

Major advisor, Research Assistants (Jr. Specialists)

Aral Greene; 2019-2020

Sharon Zhao; 2021-2022

Chloe Reid; 2022-Present

Student Sponsorship and Service

First Name	Last Name	Degree	Dept	Committee	Roles	Date
Gayatri	Mishra	PhD	EPS	Qualifying Exam	Member	07/2023 - Present
Jean Claude	Iradukunda	PhD	ENSC	PhD Dissertation	Member	01/2023 - Present
Jean Claude	Iradukunda	PhD	ENSC	Oral Exam	Member	08/2022 - 09/2022
Ariana	Firebaugh Ornelas	PhD	EEOB	Oral Exam	Member	07/2022 - 04/2023
Alyssa	Valdez	PhD	ENSC	Qualifying Exam	Member	07/2022 - Present
Jacob	Kemner	PhD	ENSC	PhD Dissertation	Major Profess or	06/2022 - Present
Elizah	Stephens	PhD	ENSC	Oral Exam	Major Profess or	06/2022 - 06/2022
Gretchen	Heimlich	PhD	Plant Pathology	Oral Exam	Member	06/2022 - 06/2022
Jamie	Irby	PhD	ENSC	PhD Dissertation	Major Profess or	06/2022 - Present
Elizah	Stephens	PhD	ENSC	Qualifying Exam	Major Profess or	04/2022 - 06/2022

Fabiola	Pulido-Chavez	PhD	Microbiology and Plant Pathology	PhD Dissertation	Member	09/2021 - Present
Michael	Rodriguez	PhD	ENSC	Oral Exam	Member	05/2021 - 11/2021
Tesa	Madsen-McQueen	PhD	EEOB	Oral Exam	Member	04/2021 - 11/2021
Holly	Andrews	PhD	EEOB	PhD Dissertation	Member	03/2021 - 06/2021
Valerie	Carranza	PhD	ENSC	PhD Dissertation	Member	02/2021
Miranda	Aiken	PhD	ETOX	PhD Dissertation	Member	12/2020 - 06/2022
Michael	Rodriguez	PhD	ENSC	Qualifying Exam	Member	10/2020 - 12/2020
Miranda	Aiken	PhD	ETOX	Oral Exam	Member	10/2020 - 12/2020
Aral	Greene	PhD	Environment al Sciences	PhD Dissertation	Major Profess or	09/2020 - Present
Andrea	Keeler	PhD	EEOB	Oral Exam	Member	08/2020 - 01/2021
Fabiola	Pulido-Chavez	PhD	Microbiology and Plant Pathology	Qualifying Exam	Member	08/2020 - 08/2020
Valerie	Carranza	PhD	ENSC	Qualifying Exam	Member	06/2020 - 09/2020
Jared	Anderson-Huxley	PhD	EEOB	Oral Exam	Member	02/2020 - 06/2020
Johann	Püspök	MS	Environment al Sciences	Masters Thesis	Major Profess or	01/2020 - 03/2022

Elizah	Stephens	PhD	Environment al Sciences	PhD Dissertation	Major Profess or	09/2019 - Present
Tania	Kurbessoian	PhD	Microbiology	Qualifying Exam	Member	08/2019 - 08/2020
Claudia	Avila	PhD	Environment al Sciences	PhD Dissertation	Member	06/2019 - 06/2021
Hannah	Shulman	PhD	Microbiology	PhD Dissertation	Member	04/2019 - 07/2022
Claudia	Avila	PhD	Environment al Sciences	Qualifying Exam	Member	01/2019 - 07/2019
Hannah	Shulman	PhD	Microbiology	Qualifying Exam	Member	11/2018 - 04/2019
Stephanie	Piper	PhD	Botany & Plant Science	Qualifying Exam	Member	09/2018 - 06/2020
Douglas	Wolf	PhD	Environment al Sciences/Eto x	PhD Dissertation	Member	09/2018 - 06/2019
Valerie	Carranza	PhD	Environment al Sciences	Advisory Committee	Member	06/2018 - 12/2022

PROFESSIONAL MEMBERSHIPS

American Geophysical Union, European Geophysical Union, Ecological Society of America, Soil Science Society of America, American Association of the Advancement of Science

WORKGROUPS

USDA Multistate Project: The National Atmospheric Deposition Program (NADP) note: provides ~ \$13,000/year of funding to candidate's research group)

FOREIGN LANGUAGES

Spanish (native language)

INVITED TALKS

- Homyak, P.M. Effects of altered seasonal precipitation on soil N dynamics in a pinyon-juniper ecosystem. Ecological Society of America. August 2021
- Homyak, P.M. Drought effects on trace and greenhouse gas emissions from soils. Weber State University. April 2, 2021
- Homyak, P.M. Losing too much when there's too little: A case for widespread N limitation in dryland ecosystems. Iowa State University. November 19, 2020
- Homyak, P.M. The role of microscale processes and microbial metabolic handoffs on ecosystem N limitation. University of Michigan. March 16, 2019
- Homyak, P.M. How drought controls ecosystem N loss: From soil microscales to landscapes. University of California, Irvine. March 21, 2018
- Homyak, P.M. Microbial controls on soil N trace gas emissions. University of California, Riverside. March 1, 2018
- Homyak, P.M. Aridity and plant uptake interact to make dryland soils hotspots for nitric oxide emissions. Invited talk at the Soil Science Society of America annual meeting. October 22-25, 2017
- Homyak, P.M. Linking soil aridity with regional air quality: Drought-stress effects on microbial and abiotic nitric oxide production. University of California, Riverside. April 10, 2017
- Homyak, P.M. Coupling soils with the atmosphere: Landscape controls on nitric oxide emissions. California State University, San Bernardino. Feb 10, 2016
- Homyak, P.M. Linking ecosystem processes with atmospheric chemistry: Mechanisms regulating nitric oxide emissions. University of California, Irvine. Feb 8, 2016
- Homyak, P.M. The role of mathematics in biogeochemical research: Understanding elemental cycling in remote ecosystems of the Sierra Nevada. Talk to calculus students at Riverside City College. May 22, 2015
- Homyak, P.M. Sources of P supply to alpine ecosystems in the Sierra Nevada: Challenging long-held paradigms. IGERT UC Riverside. Riverside, CA. November 12, 2014
- Homyak, P.M. Plant and soil moisture controls on NO and CO2 emissions in a California annual grassland. Biogeosciences seminar UC Santa Barbara. March 11, 2014
- Homyak, P.M. Alteration of N and P biogeochemical cycles in the Sierra Nevada: Effects on dryland and alpine ecosystems. University of Redlands. January 28, 2014
- Homyak, P.M. Linking mathematics with ecological research in the Sierra Nevada: N and P biogeochemistry. Talk to students of underrepresented groups in the PUENTE program at Riverside Community College. Riverside, CA. 2011
- Homyak, P.M. Nitrogen dynamics in semiarid ecosystems of California: application of basic mathematics. Talk to calculus students at Riverside Community College. 2011

PRESENTATIONS AT PROFESSIONAL MEETINGS

(Selected presentations since 2005)

- Krichels, A.H., Reid, C., Stephens, E., Pulido-Chavez, F., Greene, A.C., Glassman, S.I., Homyak, P.M. Wildfire-induced losses of particulate and mineral associated organic carbon persist for over three years in a Chaparral ecosystem. Talk at the Ecological Society of America annual meeting. Portland, Oregon, August 2023
- Irby, J.C., Krichels, A.H., Spasojevic, M.J., Jenerette D.G., Homyak P.M. The Effects of Altered Precipitation on Gross Inorganic N Production in a Pinyon-Juniper Dryland. Poster at the Ecological Society of America annual meeting. Portland, Oregon, August 2023
- Homyak, P.M. Denitrification in dry soils: Unexpected N emissions under environmental extremes. Talk at the EGU General Assembly. Viena, Austria. April 2023
- Stephens, E., Greene, A., Krichels, A., and Homyak, P.M. Wildfires alter nitrifier communities and increase soil emissions of NOx but not N₂O in California chaparral. Talk at the EGU General Assembly. Vienna, Austria, 23–28 Apr 2023
- Homyak, P.M. Using isotopes to understand N-limitation in dry lands: Unexpected N loss pathways in systems with too little N. Talk at the 10th International Symposium on Isotopomers (ISI) and 12th Isotopes Conference. Zurich, Switzerland. June 2022
- Homyak, P.M. Nitrogen Saturation: Mechanisms controlling ecosystem N loss. Talk at the Ecological Society of America annual meeting. August 2020
- Homyak, P.M. Mechanisms controlling Ecosystem N limitation: The role of microscale processes and microbial metabolic handoffs. Talk at the American Geophysical Union fall meeting. San Francisco, CA. December 9-13, 2019
- Greene, A.C., S. Ying, E.L. Aronson, D. Jenerette, J.O. Sickman, P.M. Homyak. Nitrous oxide emissions in response to wetting dryland soils along a carbon gradient. Poster displayed at the American Geophysical Union fall meeting. San Francisco, CA. December 9-13, 2019
- Andrews H., P.M. Homyak, and D. Jenerette. Spatiotemporal heterogeneity in trace gas nitrogen pulses from desert soils. Poster displayed at the American Geophysical Union fall meeting. Washington, D.C. December 10-14, 2018
- Homyak, P.M., J.C. Blankinship, E.W. Slessarev, S.M. Schaeffer, S. Manzoni, and J.P. Schimel. Mechanisms governing soluble soil carbon in drying soils: Exoenzymes vs. physics. Talk at the Ecological Society of America annual meeting. New Orleans, LA. August 5-10, 2018
- Homyak, P.M., S.L. Iverson, E.W. Slessarev, K.A. Marchus, and J.P. Schimel. Organic N cycling in Arctic ecosystems: Quantifying root uptake kinetics and temporal variability of soil amino acids. Poster displayed at the American Geophysical Union fall meeting. New Orleans, LA. December 11-15, 2017
- Homyak, P.M., S.L. Iverson, E.W. Slessarev, K.A. Marchus, and J.P. Schimel. Temporal variability of soil amino acids in N-limited ecosystems. Talk at the Ecological Society of America annual meeting. Portland, OR. August 6-11, 2017
- Slessarev, E.W., Y. Ling, P.M. Homyak, and J.P. Schimel. Soil wettingrespiration integrates microbial and extracellular C sources across a lithologic gradient. Talk at the Ecological Society of America annual meeting. Portland, OR. August 6-11, 2017
- Homyak, P.M., M.T. Kamiyama, J.O. Sickman, and J.P. Schimel. Acidity and organic matter stimulate abiotic nitric oxide emissions in drying soils. Poster displayed at the American Geophysical Union fall meeting. San Francisco, CA. December 12-16, 2016
- Homyak, P.M., J.C. Blankinship, and J.P. Schimel. Mechanisms controlling CO₂

pulses upon rewetting dry soils: Effects of vegetation on soil C dynamics. Poster displayed at the American Geophysical Union fall meeting. San Francisco, CA. December 14-18, 2015

- Homyak, P.M., J.P. Schimel, and J.O. Sickman. The influence of dry-season processes on soil NO emissions: A δ¹⁵N-NO and δ¹⁸O-NO isotopic approach. Talk at the Ecological Society of America annual meeting. Baltimore, MA. August 9-14, 2015
- Homyak, P.M., J.P. Schimel, and J.O. Sickman. Using δ¹⁵N- and δ¹⁸O-NO to evaluate mechanisms of nitric oxide production following the wetting of dry soil. Poster displayed at the American Geophysical Union fall meeting. San Francisco, CA. December 15-19, 2014
- Homyak, P.M., J. Blankinship, J.O. Sickman, and J.P. Schimel. Dry season length and vegetation controls on soil nitric oxide emissions from a semiarid annual grassland. Talk at the Ecological Society of America annual meeting. San Jose, CA. August 11-15, 2014
- Homyak, P.M., J.P. Schimel, and J.O. Sickman. The elusiveness of measuring nitrite in soils: fast chemical reactions or inadequate extraction methods? Poster displayed at the American Geophysical Union fall meeting. San Francisco, CA. December 9-12, 2013
- Homyak, P.M., J.P. Schimel, and J.O. Sickman. Nitrogen dynamics in chaparral ecosystems: limitations to the use of traditional N saturation indicators. Talk at the Ecological Society of America meeting. Minneapolis, MN. August 3-7, 2013
- Homyak, P.M., J.O. Sickman, A.E. Miller, J.P. Schimel, J.M. Melack, and T. Meixner. Nitrogen dynamics in chaparral ecosystems: limitations to the use of traditional N saturation indicators. Talk at the American Geophysical Union fall meeting. San Francisco, CA. December 3-7, 2012
- Homyak, P.M., J.O. Sickman, J.M. Melack. High-elevation soils and lake sediments as sources of excess P to aquatic ecosystems of the Sierra Nevada, CA. Talk at the Ecological Society of America meeting. Portland, OR. August 5-10, 2012
- Homyak, P.M., J.O. Sickman, A.E. Miller, K. Skeen, and J.M. Melack. Gaseous and hydrologic nitrogen fluxes indicate seasonal N saturation in chaparral ecosystems. Poster displayed at the American Geophysical Union fall meeting. San Francisco, CA. December 5-9, 2011
- Homyak, P.M., J.O. Sickman, J.M. Melack. Soil P dynamics in the Sierra Nevada: Exploring the connection between soils and eutrophication of high-elevation lakes. Talk at the Soil Science Society of America annual meeting. San Antonio, TX. October 16-19, 2011
- Homyak, P.M., and J.O. Sickman. Pulses of NO and N₂O in Mediterranean ecosystems of the Sierra Nevada (California): importance of gaseous fluxes in annual N budgets. Talk at the Ecological Society of America meeting. Austin, TX. August 7-12, 2011
- Homyak, P.M., J.O. Sickman, J.M. Melack. Phosphorus forms and pools in high-elevation soils of the Sierra Nevada: Sensitivity to climate change. Talk at the American Geophysical Union fall meeting. San Francisco, CA. December 13-17, 2010
- Homyak, P.M. Atmospheric nitrogen retention in forests of the upper Susquehanna watershed, New York. Poster displayed at the Cornell Agricultural Ecosystems Program Poster Session. Ithaca, NY. November 29, 2006
- Homyak, P.M., R.D. Yanai, D.A. Burns, R.H. Germain, R.D. Briggs. Nitrogen immobilization by woodchip application: protecting water quality in a northern hardwood forest. Poster displayed at the American Water Resources Association National Conference. Seattle, WA. November 6-

10, 2005

- Homyak, P.M., D.A. Burns, R.H. Germain, R.D. Briggs, R.D. Yanai. Nitrogen immobilization by woodchip application: protecting water quality in a northern hardwood forest. Talk at the Annual Conference on Watershed Protection and New York City Watershed Science and Technical Conference. Fishkill, NY. September 21-22, 2005
- Scanga, S., R. Barber, E. Cheshire, A. Dechen, P. Homyak, R. Jarrell, K.Miller, K. Shoemaker, D. Raynal, C. Spuches, R. Beal, D. DeSiato, and S.Tankersley. Bringing research into central New York classrooms: SUNY-ESF Science Corps. Poster displayed at the NSF Graduate Teaching Fellows in K-12 Education Annual Project Meeting. Arlington, VA. March 4-6, 2005

COMMUNITY AND ACADEMIC SERVICE

Associate Editor

- Elementa: Science of the Anthropocene. Jan 2020-Present
- Biogeochemistry. April 2024-Present

Reviewer (55 manuscript reviews since July 1, 2018)

 Geoderma, Environmental Science & Technology, JGR-atmospheres, Soil Biology & Biochemistry, Ecology, Global Change Biology, Biogeochemistry, Elementa, Ecosystems, Microbiology and molecular biology reviews, JGR-Biogeosciences, Nature Plants, STOTEN, Soil Science Society of America, Applied Soil Ecology, Rapid Communications in Mass Spectrometry, Plant and Soil, Science Advances, PNAS, Journal of Environmental Quality, Geophysical Research Letters, Biology and Fertility of Soils, Global Ecology and Biogeography.

Conference Organizing

- Yang W., Almaraz M., Homyak P.M. Exploring new frontiers of knowledge about soil nitrous oxide emissions. Ecological Society of America, 2023
- Harris, E., Homyak, P.M., Yu, L., Yang, W. Geoclimatic drivers of nitrous oxide and nitric oxide emissions: From microscopic variability to global influences. American Geophysical Union, 2021
- Krichels, A., Homyak P.M., Jenerette G.D., Hanan E. Linking physiological to landscape controls over dryland nitrogen cycling. Ecological Society of America, 2020
- Homyak, P.M. (convener), E. Slessarev, J.P. Schimel. Drought effects on soil biogeochemical cycling. Soil Science Society of America annual meeting, 2019
- Homyak, P.M. (convener), M. Maier, N. Brüggemann, and C. Wagner-Riddle. Understanding mechanisms governing ecosystem biogeochemical cycling in the solid, liquid, and gas phase: Physiology vs. physics and chemistry. American Geophysical Union fall meeting, 2016
- Biogeo Patterns Along Environmental Gradients. Ecological Society of America annual meeting, 2015. Session COS-134
- Biogeochemistry: New Paradigms in Biogeochemical Cycling II. Ecological Society of America annual meeting, 2013. Session COS-21
- Biogeochemistry: Aboveground-Belowground Interactions I. Ecological Society of America annual meeting, 2012. Session COS-74
- Changes in soil carbon due to climate and human activities. Soil Science Society of America annual meeting, 2011. Session 390

Synergistic interactions

- UCR Career Mentoring of Underrepresented STEM Students for the Professoriate (CUSP) Mentor, 2021-2022
- Woodlake High-school science outreach, 2021
- PUENTE Program Mentor. Riverside City College, 2016-2022
- Soil Ecology Section Mentor. ESA annual meeting, 2015
- Biogeosciences Section Judge. ESA annual meeting, 2014-2018
- Biogeosciences Section Judge. AGU annual fall meeting, 2012-2016
- Mentor to Women in Math and Sciences Organization. UCR, May 30, 2013
- Panelist. Obtaining Postdocs in the Sciences Workshop. UCR, January 22, 2013
- Represented UC-Riverside during Graduate Research Advocacy Day. Interacted with California legislature to advocate continued funding for graduate student research. Sacramento, CA May 11, 2011
- Activity leader-What is a watershed? Activity for middle school students. 2006
- Science fair judge, SUNY-ESF middle school science fair, 2005, 2006
- Science fair mentor, Riverside Middle School, Riverside, CA. 2012
- Science project mentor, La Colina Junior High School, Santa Barbara, CA. 2015
- Science project mentor, Laguna Beach High School, Laguna Beach, CA. 2016

University Service

- UCR Facility for Isotope Ratio Mass Spectrometry, Director
- ENSC Soil and Water Sciences, Field Director (2022-present)
- ENSC Diversity, Equity, and Inclusion Committee, **Chair and Member** (2020-present)
- ENSC Safety, Space, & Equipment Committee, Chair and Member (2019-2020)
- Faculty search committee, Chair (2023-2024)
- ENSC Graduate Education Committee, Member (2022-present)
- ENSC URGE Pods (unlearning racism in Geoscience), Member (2021)
- ENSC Social Committee, Member (2018-2019)
- Career Mentoring of Underrepresented STEM Students for the Professoriate (CUSP), Mentor (2021-2022)
- Center for Conservation Biology Executive Committee, Member (2020present)
- Environmental Science Research Laboratory sample processing protocol, Lead (2021)