

Gavin McNicol
Earth and Environmental Sciences
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EDUCATION

PhD	University of California at Berkeley , Berkeley, CA, USA Ecosystem Science Advisor: Prof. Whendee L. Silver <i>Quantification and Controls of Wetland Greenhouse Gas Emissions</i>	2016
BSc	University of Stirling , Stirling, UK Environmental Science (Graduated with First Class Honors)	2010

PROFESSIONAL APPOINTMENTS

Joint Appointment	Argonne National Laboratory, Lemont, IL	2021 – present
Assistant Professor	University of Illinois at Chicago, Chicago, IL	2021 – present
Postdoctoral Fellow	Stanford University, Stanford, CA	2018 – 2020
Postdoctoral Fellow	University of Alaska Southeast, Juneau, AK	2017 – 2018
Postdoctoral Fellow	University of Hawaii Mānoa, Honolulu, HI	2016 – 2017
Graduate Scholar	Lawrence Livermore National Laboratory, Livermore, CA	2013 – 2016

FELLOWSHIPS

UC President's Sustainability Student Fellowship (\$7,500)	2015 - 2016
Berkeley University Fellowship (\$52,000)	2010 - 2012

RESEARCH GRANTS

NASA Carbon Monitoring System (\$87,000)	2021 - 2024
NSF Doctoral Dissertation Improvement Grant (\$16,000)	2014 - 2016
Pre-doctoral Delta Science Grant (\$100,000)	2012 - 2014

AWARDS

UIC Faculty Open Education Resources Incentive Program (\$2,000)	2021
Lewis & Ann Resh Endowed Graduate Support in Freshwater Ecology	2015 - 2016
Carolyn Meek Memorial Scholarship in Soil Science	2014 - 2015
University Medal, Royal Scottish Geographical Society	2010

RESEARCH SKILLS

Disciplinary Methods

Natural abundance and tracer stable isotope analysis, radiocarbon isotope analysis

Eddy-covariance flux measurement, ecology field methods, soil biogeochemical methods

Technical Skills

Artificial Intelligence for prediction and attribution in Earth sciences, geospatial analysis and mapping

R, Google Earth Engine, ArcGIS, Unmanned aerial systems for 3D modeling, Github

PUBLICATIONS

- Kasak K. Espenberg M. Anthony T. L. Tringe S. G. Valach A. C. Hemes K. S. Silver W. L. Mander Ü. Kill K. **McNicol G.** Szutu D. Verfaillie J. Baldocchi D. D. (2021) Restoring wetlands on intensive agricultural lands modifies nitrogen cycling microbial communities and reduces N₂O production potential. *J. Environ. Manage.* 299, 113562.
- Irvin J. Zhou S. **McNicol G.** et al. (2021) Gap-filling eddy covariance methane fluxes: Comparison of machine learning model predictions and uncertainties at FLUXNET-CH₄ wetlands. *Agricultural & Forest Meteorology*, 308-309, 108528.
- Yang W. H. Hall S. J. **McNicol G.** (2021) Chapter 20 – Global gases, in: Gentry, T.J. Fuhrmann, J.J. Zuberer, D.A. (Eds), *Principles and Applications of Soil Microbiology (Third Edition)*. Elsevier, 557-579
- Delwiche K. B. Knox S. H. Malhotra A. Fluet-Chouinard E. **McNicol G.** et al. (2021) FLUXNET-CH₄: A global, multi-ecosystem dataset and analysis of methane seasonality from freshwater wetlands. *Earth Syst. Sci. Data*, 13, 3607-3689.
- Knox S. H. Bansal S. **McNicol G.** Schafer K. Sturtevant C. Ueyama M. Valach A. C. et al. (2021) Identifying dominant environmental predictors of freshwater wetland methane fluxes across diurnal to seasonal time scales. *Glob. Chang. Biol.*, 27: 3582-3604.
- Chang K.-Y. Riley W. J. Knox S. H. Jackson R. B. **McNicol G.** Poulter B. et al. (2021) Substantial hysteresis in emergent temperature sensitivity of global wetland CH₄ emissions. *Nature Communications*, 12: 2266.
- Bidlack A. L. Bisbing S. M. Buma B. J. Diefenderfer H. L. Fellman J. B. Floyd W. C. Giesbrecht I. Lally A. Lertzman K. P. Perakis S. S. Butman D. E. Fleming S. W. Hood E. W. Hunt B. P. V. Kiffney P. M. **McNicol G.** Menounos B. Tank S. E. (2021) Climate-mediated changes to linked terrestrial and marine ecosystems across the Northeast Pacific coastal temperate rainforest margin. *Bioscience*, 71: 581-595.
- McNicol G.** Yu Z. Berry Z. C. Emery N. Soper F. M. Yang W. H. (2021) Tracing plant-environment interactions from organismal to planetary scales using stable isotopes: a mini review. *Emerg. Top. Life Sci.*, 5: 310-316.
- Lawrence C. R. Beem-Miller J. Hoyt A. M. Monroe G. Sierra C. A. Stoner S. Heckman K. Blankinship J. C. Crow S. E. **McNicol G.** et al. (2020) An open-source database for the synthesis of soil radiocarbon data: ISRaD version 1.0. *Earth Syst. Sci. Data*, 12: 61–76
- McNicol G.** Jeliazovski J. François J. J. Kramer S. & Ryals R. (2020) Climate change mitigation in sanitation via offsite composting of human waste. *Nature Climate Change*, 10: 545-549.
- McNicol G.** Knox S. Guilderson T. Baldocchi D. D. & Silver W. L. (2020) Where old meets new: An ecosystem study of methanogenesis in a reflooded agricultural peatland. *Glob, Chang, Biol.*, 26:772-785
- Knox S. H. Jackson R. B. Poulter B. **McNicol G.** Fluet-Chouinard E. Zhang Z. Hugelius G. Bousquet, P. Canadell J. G. Papale D. et al. (2019) FLUXNET-CH₄ synthesis activity: Objectives, observations, and future directions. *Bull. Amer. Meteor. Soc.*, 100: 2607-2632

- Ryals R. **McNicol G.** Porder S. & Kramer S. (2019) Greenhouse gas fluxes from waste management pathways in Haiti. *J. Clean. Prod.*, 226: 106–113.
- McNicol G.** Bulmer C. D'Amore D. Sanborn P. Saunders S. Giesbrecht I. Gonzalez Arriola S. Bidlack A. Butman D. & Buma B. (2019) Large, climate-sensitive soil carbon stocks mapped with pedology-informed machine learning in the North Pacific coastal temperate rainforest. *Env. Res. Letters*, 14: 014004.
- Finstad K. M. Pfeiffer M. **McNicol G.** Tuite M. Williford K. & Amundson R. (2018) A late Quaternary paleoenvironmental record in sand dunes of the northern Atacama Desert, Chile. *Quat. Res.*, 90: 127-138.
- Yang W. H. **McNicol G.** Teh Y. A. Estera K. Wood T. E. & Silver W. L. (2017) Evaluating the classical versus an emerging conceptual model of peatland methane dynamics. *Global Biogeochem. Cycles*, 31: 1435-1453.
- McNicol G.** Sturtevant C. Knox S. Dronova I. Baldocchi D. D. & Silver W. L. (2017) Effects of seasonality, transport pathway, and spatial structure on greenhouse gas fluxes in a restored wetland. *Glob. Chang. Biol.*, 23: 2768-2782.
- Finstad K. M. Pfeiffer M. **McNicol G.** Barnes J. Demergasso C. Chong G. & Amundsen R. (2016) Rates and geochemical processes of soil and salt crust formation in Salars of the Atacama Desert, Chile. *Geoderma*, 284: 57-72.
- Hall. S. J. **McNicol G.** Nataka T. & Silver W. L. (2015) Large fluxes and rapid turnover of mineral-associated carbon across three humid tropical soil: Insights from paired ¹⁴C analysis. *Biogeosciences*, 12: 2471-2487.
- McNicol G.** & Silver W. L. (2015) Non-linear response of carbon dioxide and methane emissions to oxygen availability in a drained Histosol. *Biogeochemistry*, 123: 299-306.
- McNicol G.** & Silver W. L. (2014) Separate effects of flooding and anaerobiosis on soil greenhouse gas emissions and redox sensitive biogeochemistry. *J. Geophys. Res. Biogeosci.*, 119: 557–566.

PRESENTATIONS

Invited Speaker

Tower-based measurements. Improving our Understanding of Methane Emissions from Tropical Wetlands (**Kieran Bhatia & Aoife Toomey**), *June 18, 2021*.

Wetland climate interactions under current and future global change. Improving our Understanding of Methane Emissions from Tropical Wetlands (**Kieran Bhatia & Aoife Toomey**), *June 19, 2021*.

Ecosystem carbon stocks and lateral carbon fluxes in the coastal temperate rainforest. Illinois Soil Classifiers Association (**Alicia Metzger**) Chicago, IL, *Mar 20, 2021*.

Clues to climate mitigation priorities from global greenhouse gas budgets. American Institute of Chemical Engineers 13th Midwest Regional Conference (**Dennis O'Brien**) Chicago, IL, *Mar 17, 2021*

What's in a wetland's breath? Quantification and controls of wetland greenhouse gas emissions. Earth and Environmental Sciences Seminar, Lawrence Berkeley National Laboratory (**Eoin Brodie**), Berkeley, CA, *Jun 29, 2016*

Beyond the methanogenic black box: Greenhouse gas (CO₂, CH₄, N₂O) evidence for wetlands as dynamics redox environments. Lawrence Berkeley National Laboratory Climate Brownbag (**William Riley**), Berkeley, CA. *Aug 31, 2015*

Anaerobiosis with and without flooding: The effects of water content on greenhouse gas emissions from a peatland soil. Climate Science Group Meeting (**Margaret Torn**), Lawrence Berkeley National Laboratory, Berkeley, CA. *Mar 26, 2012*

Oral

23. Illinois Soil Classifiers Association, Chicago, IL. Mar 20, 2021.
22. American Institute of Chemical Engineers 13th Midwest Conference, Chicago, IL. Mar 17, 2021
21. Permafrost Carbon Meeting, San Francisco, CA. Dec 8, 2019.
20. AmeriFlux Annual Meeting, Boulder, CO. Sep 17, 2019.
19. Global Carbon Project Townhall, Washington D.C., MD.
18. AmeriFlux AGU Townhall, Washington D.C., MD. Dec 10, 2018
17. AmeriFlux Annual Meeting, Bloomington, IN. Oct 24, 2018.
16. AmeriFlux Decadal Synthesis Workshop, Berkeley, CA. Aug 23, 2018.
15. International Arctic Research Center Research Salon, Fairbanks AK. July 18, 2018.
14. US International Association of Landscape Ecology Annual Meeting, Chicago, IL. April 10, 2018.
13. Alaska Coastal Rainforest Center Seminar, University of Alaska Southeast, Juneau, AK. Oct 6, 2017.
12. SOIL Research Seminar, Limonad, Haiti. Mar 3, 2017.
11. SOIL Research Seminar, Limonad, Haiti. Aug 19, 2016.
10. Environmental Science, Policy, & Management Graduating Seminar, UC Berkeley, CA. May 2, 2016.
9. Lawrence Livermore National Laboratory Biogeochemistry Seminar, Livermore, CA. Feb 1, 2016.
8. Lawrence Livermore National Laboratory Biogeochemistry Seminar, Livermore, CA. Jul 30, 2015.
7. 8th Biennial Bay-Delta Science Conference, Sacramento, CA. Oct 30, 2014.
6. Ecological Society of America 99th Annual Meeting, Sacramento, CA. Aug 15, 2014.
5. Joint Aquatic Science Meeting, Portland, Or. May 20, 2014.
4. Lawrence Livermore National Laboratory Biogeochemistry Seminar, Livermore, CA. Jan 23, 2014.
3. Ecological Society of America 98th Annual Meeting, Minneapolis, Minnesota. Aug 6, 2013.
2. American Geophysical Union Fall Meeting, San Francisco, CA. Dec 4, 2012.
1. Climate Group Meeting, Lawrence Berkeley National Laboratory, Berkeley, CA. Mar 26, 2012.

Poster

17. American Geophysical Union Fall Meeting, San Francisco, CA. Dec 9, 2020.
16. Water, Sanitation, and Hygiene Symposium, Boulder, CO. Mar 4, 2020.
15. Stanford Global Health Research Convening, Stanford, CA. Jan 29, 2020.
14. American Geophysical Union Fall Meeting, San Francisco, CA. Dec 9, 2019.
13. AmeriFlux Annual Meeting, Boulder, CO. Sep 19, 2019.
12. American Geophysical Union Fall Meeting, Washington, DC. Dec 10, 2018.
11. American Geophysical Union Fall Meeting, San Francisco, CA. Dec 15, 2015.
10. American Geophysical Union Fall Meeting, San Francisco, CA. Dec 18, 2014.
9. The Sixth International Workshop on Soil and Sedimentary Organic Matter Stabilization and Destabilization, Kiawah Island, SC. Oct 7, 2014.
8. Postdoc Symposium, Lawrence Livermore National Laboratory, Livermore, CA, Jul 9, 2014.
7. Berkeley Atmospheric Sciences Colloquium, Berkeley, CA. Feb 7, 2014.
6. American Geophysical Union Fall Meeting, San Francisco, CA. Dec 7, 2013.
5. 11th Biennial State of the San Francisco Estuary Conference, Oakland, CA. Oct 29, 2013.

4. Berkeley Atmospheric Sciences Colloquium, Berkeley, CA. Feb 8, 2013.
3. Long Term Ecological Research All Scientists Meeting. Estes Park, Colorado. Sep 10, 2012.
2. Ecological Society of America 97th Annual Meeting, Portland, Oregon. Aug 9, 2012.
1. American Geophysical Union Fall Meeting, San Francisco, CA. Dec 2011.

MENTORING & SERVICE

Mentoring

- 2021 - **UIC Earth and Environmental Science Independent Study**
Mentored one undergraduate senior in Spring 2021 for a Chicago wetland restoration project
- 2019 **Stanford Earth Summer Undergraduate Research (SESUR)**
Mentored freshman computer science student on a spatial representativeness analysis
- 2019 – 2020 **Stanford AI for Climate Change Bootcamp**
Collaborated with 2 PhD and 4 undergraduate students from Prof. Andrew Ng’s computer science and machine learning group on a methane flux prediction project.
- 2017 **Alaska Native Science & Engineering Program (ANSEP), Juneau, AK**
Student mentor at weekly ANSEP meetings.
- 2016 **SOIL Climate and Compost Intern Program, Cap-Haïtien, Haiti**
Trained 6 Haitian agronomy interns and a laboratory assistant in field gas sampling, solid sample collection, and nutrient analyses via collaboration with SOIL.
- 2014 **Minority Serving Institutions (MSI) Internship Program, Livermore, CA**
Trained University of Puerto Rico student in laboratory techniques for cryogenic purification of trace gases and sample preparation for accelerator mass spectrometer radiocarbon analyses.
- **Mentored 2 high school, 7 undergraduates, 2 Masters’, and 3 PhD students**

Professional Development

- 2021 **Unlearning Racism in the Geosciences**
Participated in a 16-week course composed of bi-weekly readings and deliverables to develop UIC Department of Earth and Environmental Sciences’ resources for justice, equity, diversity, and inclusion.
- 2019 **Pedagogy MOOC: Advancing learning through evidence-based STEM teaching**
Completed an 8-week online course covering: peer instruction, problem-based learning, inquiry-based labs, the flipped classroom, and learning through diversity.
- 2018 - 2020 **Stanford Postdoc Teaching Training**
Attended pedagogy journal club meetings on topics including attendance, attrition, diversity and inclusion, ethical dilemmas in teaching, and active learning best practices.

STEM Outreach

- 2019 - 2020 **Speaker and Organizer of GenerationSci at Stanford University, CA**
Developed a 10-minute TED-style talk on Earth science, delivered to 200 high school students. Organizer for 2020 event and awarded \$3,000 of Stanford Diversity and Inclusion Funding.
- 2014 **Bay Area Scientist in Schools (BASIS) Instructor, Berkeley, CA**
Taught hands-on soil science lesson for local elementary school students
- **Scientific presenter for > 10 elementary, middle, and high school events or classes.**

Professional Service

- 2021 **UIC Impact and Research Week Student Presentation Judge**

Participated as a judge for six student oral presentations on their capstone research projects and provided written feedback to assist organizers in selecting student presenter awards.

- 2021 **Bridge-to-Faculty Post-doctoral Candidate Search**
Attended five candidate seminars and met with candidates in one-on-one and group settings and contributed to finalist discussions in two meetings alongside all departmental faculty.
- 2018 - 2020 **Organizer for USGS Powell Synthesis Center Workshop for Wetland Methane Fluxes**
Assisted with organization of two workshops (>30 participants) in May 2019 and February 2020. Led a working group on data-driven approaches to upscaling of wetland methane fluxes.
- 2019 - 2020 **FLUXNET Early Career Network Organizer**
Managed membership and email lists, initiated rebranding to “Early Career” from “Young Scientists” to increase inclusivity, organized conference brochures and social events.
- 2018 - 2020 **AmeriFlux Year of Methane Coordinator**
Facilitated and edited a featured site blog series, organized methane breakout sessions at 2018 and 2019 annual AmeriFlux conferences.
- 2018 - 2020 **American Geophysical Union Fall Meeting Student Presentation Judge**
Participated as a judge for three student oral presentations each year and left detailed feedback.
- 2018 **American Geophysical Union Fall Meeting Session Convener**
Organized the first Biogeosciences Section session on the biogeochemistry of sanitation.

Reviewer for: Atmosphere, Agricultural and Forest Meteorology, Biogeochemistry, Biogeosciences, Earth System Science Data, Ecology and Evolution, Ecosystems, Environment Development and Sustainability, Environmental Research, Environmental Research Letters, Environmental Modelling and Software, Environmental Science and Technology, Geoderma, Geosciences, Global Change Biology, Journal of Environmental Quality, Journal of Geophysical Research Biogeosciences, Land Degradation and Development, Limnology and Oceanography, Marine Ecology Progress Series, Nutrient Cycling in Agroecosystems, Plant and Soil, PLoS ONE, San Francisco Estuary and Watershed Science, Soil Biology and Biochemistry, Soil Research, Soil Use and Management

- **2019 Editors’ Citation for Excellence in Refereeing for *Journal of Geophysical Research Biogeosciences***

Professional Member: American Geophysical Union (2011-present), Society of Wetland Scientists North Central Chapter (2021)

Committee Member: Erich Ceisel (MS, 2021). Shuyu Chang (PhD, 2021). Alister Cunje (PhD, 2021). Cynthia Garcia (PhD, 2021)