

Alison R. Marklein

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EDUCATION

Ph.D., University of California, Davis (*Ecology, Advisor: B. Z. Houlton*), 2014

Dissertation: Nitrogen and Phosphorus Cycling in Terrestrial Ecosystems: Using Models and Meta-analysis to Understand Patterns and Processes

B.A., Cornell University (*Computational Biology*), 2008

RESEARCH APPOINTMENTS

Associate Project Scientist, UCOP Dairy Greenhouse Gas Study (January 2019 – present)

University of California, Riverside; University of California, Berkeley

Advisors: F. Hopkins, W. Silver

Postdoc, UC Drought and Carbon Management Consortium (January 2017 – December 2018)

University of California, Berkeley; Lawrence Berkeley National Lab

Advisors: W. J. Riley, E. L. Brodie

Postdoc, UC Global Food Initiative (January 2016 – December 2016)

University of California, Davis; Lawrence Berkeley National Lab

Advisors: P. S. Nico, K. S. Steenwerth

Postdoc, Terrestrial Biogeochemistry (September 2014 – November 2015)

College of Forestry and Conservation, University of Montana

Advisor: C. C. Cleveland

Postdoc, Global Ecology and Biogeochemistry (January 2014 – July 2014)

Department of Land, Air, and Water Resources, University of California, Davis

Advisor: B. Z. Houlton

GRANTS AND FELLOWSHIPS

National Science Foundation Award 1556643, Collaborative Research: Bioavailability of soil phosphorus in tropical forest soils: Is slowly cycling phosphorus accessible to plants and soil biota? Dr. Cory Cleveland (PI), Dr. Noah Fierer (Co-PI), **Dr. Alison Marklein (Co-PI)** (\$399,759.00, August 2016 – July 2019)

UC Davis Graduate Researcher Award, Engineering & Computer Science (\$8106, 2011)

Peter J. Shields and Henry A. Jastro Research Fellowship (\$3000, 2010)

University of California – Davis Block Grant Fellowship (\$5400, 2009)

Peter J. Shields and Henry A. Jastro Research Fellowship (\$1275, 2009)

PUBLICATIONS

A.R. Marklein, W.J. Riley. Modeling the effects of cover crop and organic fertilizer on yield and soil carbon in a California tomato-corn rotation. In prep for *Field Crops*.

A.R. Marklein, P.S. Nico, K. Steenwerth, E. Elias. “Projected temperature increases may require shifts in the growing season of cool-season crops and the growing locations of warm-season crops.” In revisions for *Science of the Total Environment*, July 2020.

R.R. Thiruvengkatachari, V. Carranza, F. Ahangar, **A.R. Marklein**, F. Hopkins. “Uncertainty in using dispersion models to estimate methane emissions from manure lagoons in dairies.” Submitted to *Agricultural and Forest Meteorology*, November 2019.

M. Schaefer, N. Bogie, D. Rath, **A.R. Marklein**, A. Garniwan, T. Haensel, Y. Lin, C. Avila, P. Nico, K. Scow, E. Brodie, W.J. Riley, M. Fogel, A. Berhe, T. Ghezzehei, S. Parikh, M. Keiluweit, S. Ying. “Effect of cover crop on carbon distribution in size and density separated soil aggregates.” In revisions to *Soil Systems*, November 2019.

S.J. Cheng, N.G. Smith, W.W. Wieder, **A.R. Marklein**. “Modeling global change ecology in a 410+ ppm CO₂ world.” In revisions for *Eos*, October 2017.

E. Elias, **A.R. Marklein**, J.T. Abatzoglou, J. Bialesandro, J. Brown, C. Steele, A. Rango, K. Steenwerth. “Vulnerability of field crops to midcentury temperature changes and yield effects in the Southwestern United States.” *Climatic Change* 2017.

Marklein, A.R., J.B. Cookingham, S.K. Enders, D.J.X. Gonzalez, T.L. van Huysen, J.E. Izquierdo, D.R. Light, D. Liptzin, K.E. Miller, S.L. Morford, R.A. Norton, B.Z. Houlton. “Global forest nutrient supply tracks leaf litter decomposition.” *Global Ecology and Biogeography* 25 (3) 2016.

Houlton, B.Z, **A.R Marklein**, E. Bai. “Improving nitrogen in climate change forecasts.” *Nature Climate Change* 5 (5) 2015.

Huang, W., B.Z. Houlton, **A.R. Marklein**, J. Liu, G. Zhou. “Plant stoichiometric responses to elevated CO₂ vary with nitrogen and phosphorus inputs.” *Scientific Reports*, 5 2015. (*Biology Faculty of 1000 selection*)

Cleveland, C., B.Z. Houlton, W.K. Smith, **A.R. Marklein**, S.C. Reed, W. Parton, S. Del Grosso, S.W. Running. “Patterns of new production point to sustained CO₂ uptake capacity in tropical forests.” *Proceedings of the National Academy of Sciences* 110 (31) 2013.

Marklein, A.R., B.Z. Houlton. “Nitrogen inputs accelerate phosphorus cycling rates across a wide variety of terrestrial ecosystems.” *New Phytologist* 193 (3) 2012. (*Biology Faculty of 1000 selection*)

Cleveland, C., A. Townsend, S. Alvarez-Clare, M. Bustamante, G. Chuyongs, P. Grierson, K. Harms, B. Houlton, **A.R. Marklein**, W. Parton, S. Porder, S. Reed, C. Sierra, W. Silver, P. Taylor, E. Tanner, W. Wieder. “Relationships among net primary productivity, nutrients, and climate in tropical rain forest: a pan-tropical analysis.” *Ecology Letters* 14 (9) 2011.

Pimentel, D. **A.R. Marklein**, M. Toth, M. Karpoff, G. Paul, R. McCormack, J. Kyriazis and T. Krueger. “Why we should not be using biofuels” in *Food versus Fuel: An Informed Introduction to Biofuels*, F. Rosillo-Calle and F. Johnson, Eds. Zed Books, 2010, pp 29-57. (*not peer-reviewed*)

Pimentel, D., **A.R. Marklein**, M. Toth, M. Karpoff, G. Paul, R. McCormack, J. Kyriazis, T. Krueger. “Environmental and Economic Costs of Biofuels” in *Human Ecology*, D. Bates and J. Tucker, Eds. Springer, 2010, pp 349-360. (*not peer-reviewed*)

Pimentel, D., **A.R. Marklein**, M. Toth, M. Karpoff, G. Paul, R. McCormack, J. Kyriazis, T. Krueger. “Food Versus Biofuels: Environmental and Economic Costs.” *Human Ecology* 37 (1) 2009.

Pimentel, D., **A.R. Marklein**, M. Toth, M. Karpoff, G. Paul, R. McCormack, J. Kyriazis, T. Krueger. “Biofuel Impacts on World Food Supply: Use of Fossil Fuel, Land and Water Resources.” *Energies* 1 (2) 2008.

Rhesus Macaque Genome Sequencing and Analysis Consortium: Gibbs, R., [...] **A.R. Marklein et al.** “Evolutionary and biomedical insights from the Rhesus Macaque Genome.” *Science* 316 (5822) 2007.

AWARDS

Powerhouse Science Center’s Science Communication Fellow (2016)

U.C. Davis Community Service Award (2012)

TEACHING EXPERIENCE AND COURSE DEVELOPMENT

Teaching Assistant and Course Design, Ecosystem Biogeochemistry (ECL 217) graduate class with ~20 students per quarter (March – June 2011; March – June 2013)

Department of Land, Air and Water Resources, University of California, Davis

Developed and led meta-analysis and modeling workshop sessions; led 2 discussion sections per week; held 2 office hours per week; graded 2 exams and managed grades

Teaching Assistant, Global Environmental Interactions (ERS 120), undergraduate class with ~120 students per quarter (January – March 2010; January – March 2012)

Department of Environmental Resource Science, University of California, Davis

Led 3 discussion sections per week and 2 lectures per quarter; graded problem sets, writing assignments and exams; held 3 office hours per week; managed grades

Teaching Assistant, Freshman Seminar: Seed Biology and Health (January – May 2007)

Department of Biology, Cornell University

Trained freshmen science majors in research principles and critical thinking

GUEST LECTURES

Guest Lecturer, Introduction to Climate Change (February 2018; February 2019; February 2020)

Introduction to Music Technology, Dr. Taurin Barrera

Department of Applied Composition and Technology, San Francisco Conservatory of Music

Guest Lecturer, Nitrogen Cycle (February 2019)

Ecosystem Ecology (ESPM 111), Dr. Charlie Koven

Department of Environmental Science, Policy and Management, University of California, Berkeley

Guest Lecturer, Climate Change and California (March 2018)

Art Lab: California Climate, Dr. Kim Anno

Interdisciplinary Studios, California College of the Arts

Guest Lecturer, “Ecological Stoichiometry” (May 2017)

Ecosystem Biogeochemistry (ECL 217), Dr. Rebecca Hernandez

Department of Land, Air and Water Resources, University of California, Davis

Guest Lecturer, “Applications of Algebra II in Ecological Research” (2014)

Algebra II, Berkeley High School

Developed lecture, discussion, and problem set using Algebra II to predict atmospheric CO₂

Guest Lecturer, “Modeling Nutrient Limitation in the Tropics” (May 2009)

Ecology of Tropical Latitudes, Dr. Arthur Shapiro

Department of Evolution and Ecology, University of California, Davis

INVITED ORAL PRESENTATIONS

Climate change mitigation and adaptation opportunities in California agriculture
UC Irvine Earth System Sciences Seminar Series (Irvine, CA; November 2019)

Modeling Management, Climate change and agriculture in California
Institute at Brown University for the Environment and Society (Providence, RI; November 2017)

Modeling deficit irrigation effects on yield and soil carbon
UC Merced Brownbag (Merced, CA; October 2017)

Modeling feedbacks between climate change and California agriculture
Lecture and Discussion with International Cochran Fellows (Davis, CA; September 2017)

Agriculture, Food Security, and Climate Change in California
Sacramento Science Distilled Presentation Series (Sacramento, CA; September 2017)

Modeling management opportunities for carbon sequestration in California agriculture
Center for Carbon Renewal (Oakland, CA; September 2017)

How to build strong collaborative projects between modelers and empiricists, Ignite Session, Ecological Society of America (Portland, OR; August 2017)

Future temperature impacts on California specialty crops
CA Dept. of Food and Agriculture Science Advisory Board (Berkeley, CA; July 2017)

Insights and opportunities from modeling tomato production systems
Russell Ranch Field Day (Davis, CA; June 2017)

Nitrogen isotopes improve predictions of N losses and climate change,
Lawrence Berkeley National Lab Land Modeling Group (Berkeley, CA; June 2014)

Global patterns of nitrogen/phosphorus mineralization in forests,
Stanford University, Carnegie Institute of Global Ecology (Palo Alto, CA; January 2013)

ORAL PRESENTATIONS

Modeling carbon storage and water use efficiency in a California agro-ecosystem, American Geophysical Union (San Francisco, CA; December 2019)

Modeling applications for irrigation management in the California Central Valley, American Geophysical Union (New Orleans, LA; December 2017)

Temperature effects on viable growing regions for California specialty crops, Ecological Society of America (Portland, OR; August 2017)

Interactions among plants, symbiotic N₂ fixing bacteria, and arbuscular mycorrhizal fungi: A model based analysis to predict NPP and nutrient uptake, Ecological Society of America (Baltimore, MD; August 2015)

Nitrogen/Phosphorus mineralization ratios across forests worldwide, American Geophysical Union (San Francisco, CA; December 2013)

Globally coherent patterns of litter nitrogen and phosphorus mineralization in temperate and tropical forests, International Nitrogen Initiative (Kampala, Uganda; November 2013)

Plant-microbe competition for nitrogen and phosphorus in tropical and temperate forests, Ecological Society of America (Minneapolis, MN; August 2013)

Nitrogen/Phosphorus mineralization ratios across forest ecosystems, Ecological Society of America (Portland, OR; August 2012)

Nitrogen inputs stimulate phosphorus-mineralizing enzymes, American Geophysical Union (San Francisco, CA; December 2010)

Nitrogen inputs stimulate phosphorus-mineralizing enzymes, International Nitrogen Initiative (New Delhi, India; December 2010)

Nitrogen inputs stimulate phosphorus-mineralizing enzymes, Ecological Society of America (Pittsburgh, PA; August 2010)

POSTER PRESENTATIONS

Nitrogen isotopes inform nitrogen by climate interactions, Ecological Society of America (Sacramento, CA; August 2014)

WORKING GROUPS

Farming in the 21st Century Working Group (CA Statewide; September 2017 – present)

Department of Energy Workshop: Strategies to Promote Integrated Experiment-Model Approaches to Terrestrial Ecosystem Study (Washington, DC; March 2012)

An Integrated Network for Terrestrial Ecosystem Research on Feedbacks to the Atmosphere and ClimatE (INTERFACE): Linking experimentalists, ecosystem modelers, and Earth system modelers. Working group: Using top-down approaches to constrain global N and P mineralization Rates (Fort Collins, CO; January 2012).

National Center for Ecological Analysis and Synthesis (NCEAS): Tropical Nutrient Limitation (Santa Barbara, CA; 2009 – 2011)

Ecological Society of America: Coupled Biogeochemical Cycles Symposium and Discussion (Invited participant, Albuquerque, NM; August 2009)

INDIVIDUAL MENTORING

Science advisor, Postdoc (2017 - present)

USDA California Climate Sub Hub and John Muir Institute for the Environment, UC Davis

Contributed to project development and hiring of postdoctoral scholar, will co-advise the successful candidate.

SEEDS Mentor, Ecological Society of America Fall Meeting (2014)

Mentored undergraduate student during ESA conference

EnvironMentor for minority high school student (2011 – 2012)

College of Agriculture and Environmental Science, University of California, Davis

Mentored high school student in environmental science and collaborate on research project. My student was a finalist and competed in national science fair in Washington, D.C.

OUTREACH

Leadership Team and Executive Board Member, 500 Women Scientists (2017 – 2020)

Organizing local chapters of organization committed to equity, justice, and inclusion in science; oversee activities related to strengthening our collective power.

Science Advisor, Climate Music Project (2017 – present)

Curate historical and projected climate data to structure data-driven musical compositions

Scientist, Meet a Scientist Day at Powerhouse Science Center (2016)

Developed and presented hands-on activity about my research at a science museum

Scientist, *Science is Elementary* (2015)

Conducted hands-on experiments in elementary schools

Mentor, Student Landowner Education & Watershed Stewardship (2011 – 2013)

Center for Land Based Learning, Winters, CA

Lead and mentor group of high school students during restoration project field trips

Outreach Educator, Watch it Don't Squash It (2010)

Society for Conservation Biology, University of California, Davis

Developed and led environmental activities for elementary classes

Assistant Coordinator and Web Developer, Education and Public Outreach (2007 – 2008)

Department of Radiophysics and Space Research, Cornell University

ACADEMIC SERVICE

Board Member, Science Ambassador Scholarship, Cards of Humanity (2015 - present)

Oral Session Organizer: From bacteria to the biosphere: Nitrogen isotope applications across systems and scales, Ecological Society of America (Sacramento, CA 2014)

Admissions Committee Reviewer, Graduate Group in Ecology, UC Davis (2011 - 2013)

Treasurer, Graduate Group in Ecology, UC Davis (2011 - 2013)

Ecology Symposium Organizer (2011, 2013), Co-chair (2012), UC Davis

Seminar Organizer: Ecological Stoichiometry (2012), Animals and Biogeochemistry (2011), Graduate Group in Ecology, UC Davis

Manuscript Reviewer for Acta Oecologia, Biology and Fertility of Soils, Case Studies in the Environment, Earth's Future, Ecological Modelling, Ecological Processes, Ecology, Forests, Geoderma, Geophysical Research Letters, Global Biogeochemical Cycles, Global Change Biology, Journal of Ecology, New Phytologist, Nutrient Cycling in Agroecosystems, Plant and Soil, Proceedings of the National Academy of Sciences, Public Library of Science ONE, Reviews of Geophysics, Science of the Total Environment, Scientific Reports, Soil Biology and Biochemistry, and Theoretical Ecology

PROFESSIONAL AFFILIATIONS

500 Women Scientists

American Geophysical Union (Biogeosciences section)

Earth Science Women's Network

Ecological Society of America (Biogeosciences section)

REFERENCES

Dr. Benjamin Houlton (Ph.D. advisor)
John Muir Institute for the Environment
University of California, Davis
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Dr. Peter S. Nico (Postdoc advisor)
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Email: psnico@lbl.gov

Dr. William J. Riley (Postdoc advisor)
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Dr. Kerri Steenwerth (Postdoc advisor)
United States Department of Agriculture
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Dr. Francesca Hopkins (Project Scientist
Advisor)
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