

**Peter M. Homyak, Ph.D.**

Post-doctoral Research Fellow

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**ACADEMIC BACKGROUND**

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***NSF Post-doctoral Research Fellow***

2012 – present University of California, Santa Barbara

- Topic: Biotic and Abiotic Control of Soil Gaseous N Emissions in Semiarid Ecosystems
- Sponsoring Scientist: Dr. Joshua P. Schimel

***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: Dr. James O. Sickman
- GPA: 3.9

***M.S. Forest and Natural Resources Management***, Ecosystem Science

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: Dr. Ruth D. Yanai
- GPA: 3.8

***B.S. Environmental Studies***, Ecosystems

2001 - 2004 Binghamton University, Binghamton, NY.

- Chemistry minor
- Graduated Cum Laude
- Undergraduate Research: “Nutrients from the landscape”
- GPA: 3.6

**RESEARCH FUNDING, SCHOLARSHIPS, AND RECOGNITION**

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NSF Hydrologic Sciences. *In review*. Nitrogen saturation in xeric ecosystems: Hydrologic disconnections and temporal asynchrony in N uptake and availability. PI: Homyak P.M.; co-PI: Schimel J.P and Sickman J.O.; Collaborators: Fenn M.E., Bytnerowicz A., and Melack J.M. [\$698,736]

NSF Postdoctoral fellowship in Biology. Biotic and abiotic mechanisms of gaseous N production in semiarid environments. UC-Santa Barbara 2012 [\$189,000]

Stolzy-Letey Environmental Science Scholarship, UC-Riverside 2011 [\$750]

Kearny Foundation of Soil Science, UC-Riverside 2011 [\$3,000]. Successful application to fund an undergraduate student during summer 2011.

Graduate Research Mentorship Fellowship, UC-Riverside 2009 [\$8,000]

Albert Marsh Environmental Sciences Scholarship, UC-Riverside 2008, 2011 [\$1,000]

Chancellor's Distinguished Fellowship, UC-Riverside 2007-2008 [\$25,000]

NSF GK12 Fellowship, SUNY-ESF 2004 – 2006

Sigma-Xi Scientific Research Society Grant 2004 [\$800]

Binghamton University Foundation Research Grant 2003, 2004 [\$200]

Phi Theta Kappa Honor Society Scholarship 2001 – 2003

## PUBLICATIONS

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1. Homyak, P.M., J.P. Schimel, and J.O. Sickman. *In preparation*. Measuring the  $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$  of soil nitric oxide emissions: Evaluating mechanisms of gaseous N production following the wetting of dry soil. To be submitted to Rapid communications in Mass Spectrometry
2. Homyak, P.M., J.P. Schimel, and J.O. Sickman. *In preparation*. Contribution of abiotic processes to soil NO emissions along an altitudinal gradient in the Sierra Nevada (California). To be submitted to Biogeochemistry
3. Homyak, P.M., K.T. Vasquez, J.O. Sickman, D.R. Parker, and J.P. Schimel. *In review*. The elusiveness of nitrite in soils: drawbacks of the conventional 2 M KCl extraction technique. *Geoderma*
4. Homyak, P.M., J.O. Sickman, A.E. Miller, J.M. Melack, and J.P. Schimel. 2014. Assessing N saturation in a seasonally dry chaparral watershed: limitations of traditional indicators of N saturation. *Ecosystems* 17: 1286-1305
5. 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
6. 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
7. 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
8. 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

**Ongoing research projects:**

- Mechanisms controlling NO production under periods of stress to soil microbes. Use of stable isotopes to identify sources of N supply and laboratory incubations to identify contribution of abiotic processes
- Influence of C and water availability on nitric oxide emissions from semi-arid ecosystems. Full factorial field design with manipulation of microbial access to C and soil moisture content
- Comparison of two analytical techniques for measuring NO<sub>x</sub> emissions from soils

**PROFESSIONAL EXPERIENCE**

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***Consultant***

2006 – 2007 Upper Susquehanna Coalition, Owego, NY.

Nutrient cycling in forested ecosystems of the Upper Susquehanna watershed. Conduct investigations on stream nutrient loading and collaborate with modeling efforts on N export from forested ecosystems

***National Science Foundation GK12 Graduate Fellow***

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

- Develop and integrate inquiry based lesson plans into the course curriculum of a college-level environmental science course. Incorporate research and scientific literacy into the high-school learning experience

***Research Specialist***

Summer 2004 Binghamton University, Binghamton, NY.

- Analysis of samples, data entry, 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
- Conducted surveys on 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**

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Watershed biogeochemistry/Ecosystem nutrient cycling/Global change

Application of stable isotope techniques in watershed science

Linking biogeochemical cycles across the terrestrial-aquatic interface

## TEACHING EXPERIENCE

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### *Courses taught:*

- Instructor of Record (lecture and laboratory), Introduction to Soil Science. UCR, 2014. Student evaluation on teaching effectiveness: 5/5; department average 4.8; campus average 4.4
- Co-Instructor, Introduction to Environmental Science. SUNY-ESF freshman-level course taught to high-school seniors for college credit (2004 and 2005 high-school academic calendar)
- Teaching Assistant, Introduction to Environmental Science, UCR, Fall 2011. Led discussion sessions in a class of approximately 200 students. Graded homework assignments and prepared students for exams. Student evaluation on teaching effectiveness: 6.3/7; department average 6; campus average 6.1
- Teaching Assistant, Hydrology, UCR, Winter 2010. Prepared laboratory equipment and lead fieldtrips to local streams and mountains to measure streamflow and snowpack. Student evaluation on teaching effectiveness: 6.8/7; department average 6.8; campus average 5.9
- Teaching Assistant, Water Resources, UCR, Fall 2008. Led discussions in a class of 80 students. Graded homework and prepared students for exams. Student evaluation on teaching effectiveness: 6.8/7; department average 5.6; campus average 6.1

### *Guest Lecturer:*

- Introduction to Environmental Science, Topic: The Geospheres. (UCR 2011)
- Hydrology, Topic: Water in the unsaturated zone (UCR 2010)
- Hydrology, Topic: Snow hydrology (UCR 2009)

### *Outreach Presentations:*

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

### *Undergraduate Research Student Mentees:*

Jennifer Quach, Ahmed Haggag, Thomas Martin, Krystal Vasquez, Edward Dominguez, Matthew Kamiyama

## PROFESSIONAL MEMBERSHIPS

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AGU, ESA, SSSA

## FOREIGN LANGUAGES

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Spanish (native language)

## PRESENTATIONS AT PROFESSIONAL MEETINGS

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(Selected presentations since 2005)

- 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 N<sub>2</sub>O 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**

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### **Presider**

- 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

### **Reviewer**

- Soil Biology and Biochemistry; Biogeochemistry; Journal of Environmental Quality, Journal of Agricultural and Forest Meteorology

### **Synergistic interactions**

- Biogeosciences Section Judge. AGU annual fall meeting, 2012-2013
- 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