

Curriculum Vita

Greg Michalski

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University Address: Department of Earth and Atmospheric Sciences, Purdue University 550 Stadium Mall, West Lafayette, IN USA 47907-2051 765-496-1210

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Education

1998 B.S. Environmental Chemistry, University of California, San Diego
2001 M.S. Chemistry, University of California, San Diego
2003 Ph.D., Chemistry, University of California, San Diego

Positions held

2005- Present Assistant Professor, Purdue University
2003-2005 Post Doctoral Research Chemist, University of California, San Diego
1998-2003 Research/Teaching assistant, University of California, San Diego
1998-1999 Teaching assistant, University of California, San Diego

Research Interests

Stable isotope geochemistry, Physical Chemistry of Isotope Fractionations, Paleoclimatology, Isotopes in Atmospheric Chemistry, Evolution of Planetary Atmospheres, Global Nitrogen, Sulfur and Carbon Cycling, Desert Paleosols as Paleoclimate Proxies.

Peer reviewed Papers, Chapters and Reports.

Michalski, G., Bhattacharya, SK., and Girch NO_x cycle and the tropospheric ozone isotope anomaly: An experimental investigation. *Atmos. Chem and Physics*. (In press)

Riha, K.M., G. Erika L. Gallo, E., Lohse, K.A., Brooks, P.D., and Meixner, T., High atmospheric nitrate and reduced nitrogen turnover in semi-arid urban catchments. *Ecosystems* (In press).

Hale, R., Turnbull, L., **Riha, K.M.**, Earl, Moratto, Grimm, N.B., Childers, Michalski, G., and Lohse, K.A. Sources and transport of nitrogen in arid urban watersheds. *Environ. Sci. and Tech.* (In press)

Wang, F., Michalski, G., Seo, J., and Ge, W Geochemical, isotopic, and mineralogical constraints on the role of atmospheric deposition in soil development in the hyper-arid Atacama Desert, Chile. *Geochim. Cosmochim. Acta*, (In press).

Liu, T., F. Wang, G. Michalski, X. H. Xia and S. D. Liu, Using N-15, O-17, and O-18 To Determine Nitrate Sources in the Yellow River, China, *Envir. Sci. Tech.*, 47(23), 13412-13421, 2013.

- Lybrand, R. A., G. Michalski, R. C. Graham and D. R. Parker, The geochemical associations of nitrate and naturally formed perchlorate in the Mojave Desert, California, USA, *Geochim. Cosmochim. Acta*, 104(0), 136-147, 2013.
- Dejwakh, N. R., Meixner, T., Michalski, G., & McIntosh, J. (2012) Using ^{17}O to Investigate Nitrate Sources and Sinks in a Semi-Arid Groundwater System *Envir. Sci. Tech.* **46**, 745-751.
- Costa, A. W., Michalski, G., Schauer, A. J., Alexander, B., Steig, E. J., & Shepson, P. B. (2011) Analysis of atmospheric inputs of nitrate to a temperate forest ecosystem from $\Delta^{17}\text{O}$ isotope ratio measurements *Geophys. Res. Lett.* **38**.
- *Michalski, G., S. Earman, **C. Dahman**, R. L. Hershey and T. Mihevc, Multiple isotope forensics of nitrate in a wild horse poisoning incident, *Forensic Science International*, 198(1-3), 103-109, 2010.
- *Michalski, G. and S. K. Bhattacharya, The role of symmetry in the mass independent isotope effect in ozone., *Proceedings of the National Academy of Sciences*, 106 (14), 5593-5496, 2009.
- *Michalski, G., Purification procedure for $\delta^{15}\text{N}$, $\delta^{18}\text{O}$, $\Delta^{17}\text{O}$ analysis of nitrate., *International Journal of Environmental Analytical Chemistry*, 89(6), 2009.
- *Hernandez-Ramirez, G., S. M. Brouder, D. R. Smith, G. E. Van Scoyoc and G. Michalski, Nitrous Oxide Production in an Eastern Corn Belt Soil: Sources and Redox Range, *Soil Science Society of America Journal*, 73(4), 1182-1191, 2009.
- *Michalski, G., **M. Kasem**, J. A. Rech, S. Adieu, W. S. Showers, B. Genna and M. Thiemens, Uncertainties in the oxygen isotopic composition of barium sulfate induced by coprecipitation of nitrate, *Rapid Communications in Mass Spectrometry*, 22(19), 2971-2976, 2008.
- *Earman, S., R. L. Hershey, G. Michalski, **C. Dahman** and T. Mihevc, Results and Discussion of Chemical Data from Samples Collected February 2008 at the Cactus Flat Watering Hole, Nevada Test and Training Range , *Desert Research Institute, Nevada System of Higher Education*, 2008.
- *Ewing, S. A., W. Yang, D. J. DePaolo, G. Michalski, C. Kendall, B. W. Stewart, M. Thiemens and R. Amundson, Non-biological fractionation of stable Ca isotopes in soils of the Atacama Desert, Chile, *Geochimica Cosmochimica Acta*, 72, 1096-1110, 2008.
- *Amundson, R., S. A. Ewing, G. Michalski, M. Thiemens, C. Kendall, K. Nishiizumi, C. McKay and G. Chong, The climatic and biotic thresholds on soil elemental cycling along an and to hyperarid rainfall gradient, *Geochimica Cosmochimica Acta*, 71, 22, 2007.
- *Ewing, S. A., G. Michalski, M. Thiemens, R. C. Quinn, J. L. Macalady, S. Kohl, S. D. Wankel, C. Kendall, C. P. McKay and R. Amundson, Rainfall limit of the N cycle on Earth, *Global Biogeochemical Cycles*, 21(3), 2007.
- *Michalski, G. and M. Thiemens, *The Use of Multi-Isotope Ratio Measurements as a New and Unique Technique to Resolve NO_x Transformation, Transport and Nitrate Deposition in Lake Tahoe.*, California Air Resources Board, 2007.

- *Rech, J. A., B. S. Currie, G. Michalski and A. M. Cowan, Neogene climate change and uplift in the Atacama Desert, Chile, *Geology*, 34(9), 761-764, 2006.
- *Jost, R., G. Michalski and M. Thiemens, Comparison of rovibronic density of asymmetric versus symmetric NO₂ isotopologues at dissociation threshold: Broken symmetry effects, *Journal of Chemical Physics*, 123(5), 2005.
- *Michalski, G., J. G. Bockheim, C. Kendall and M. Thiemens, Isotopic composition of Antarctic Dry Valley nitrate: Implications for NO_y sources and cycling in Antarctica, *Geophysical Research Letters*, 32(13), 2005.
- *Michalski, G., J. K. Böhlke and M. H. Thiemens, Long Term Atmospheric Deposition as the Source of Nitrate and Other Salts in the Atacama Desert, Chile: New Evidence from Mass-Independent Oxygen Isotopic Compositions, *Cosmochimica Acta*, 68, 4023-4038, 2004a.
- *Michalski, G., R. Jost, D. Sugny, M. Joyeux and M. Thiemens, Dissociation energies of six NO₂ isotopologues by laser induced fluorescence and zero point energy of some triatomic molecules, *Journal of Chemical Physics*, 121(15), 7153-7161, 2004b.
- Chang, C. C. Y., S. R. Silva, C. Kendall, G. Michalski, S. Wankel and K. L. Casciotti, Preparation and analysis of nitrogen-bearing compounds in water for stable isotope ratio measurement, in *Handbook of Stable Isotope Analytical Techniques*, v 1, edited by P. A. DeGroot, pp. 305-347, Elsevier, Amsterdam, 2004c.
- *Michalski, G., T. Meixner, M. Fenn, L. Hernandez, A. Sirulnik, E. Allen and M. Thiemens, Tracing atmospheric nitrate deposition in a complex semiarid ecosystem using $\Delta^{17}\text{O}$, *Environmental Science and Technology*, 38(7), 2175-2181, 2004d.
- *Michalski, G., Z. Scott, M. Kabling and M. Thiemens, First Measurements and Modeling of $\Delta^{17}\text{O}$ in Atmospheric Nitrate, *Geophysical Research Letters*, 30(16), (1870), 2003.
- *Michalski, G., J. Savarino, J. K. Böhlke and M. Thiemens, Determination of the total oxygen isotopic composition of nitrate and the calibration of a $\Delta^{17}\text{O}$ nitrate reference material, *Analytical Chemistry*, 74(19), 4989-4993, 2002.
- *Bao, H., G. M. Michalski and M. H. Thiemens, Sulfate oxygen-17 anomalies in desert varnishes *Geochimica Cosmochimica Acta*, 65(13), 2029-2036, 2001.

Book Chapter

Michalski, G., **Mase, D.** and Bhattacharya, S.K., Oxygen Isotopes in Atmospheric Nitrate. **Chapter** *Environmental Isotope Geochemistry Handbook*, Elsevier. (2010)

Current Funding

National Geographic Society Exploration Grant (8776-10). "The origin of the nitrate deposits in the Turfan-Hami basin, Xinjiang, China." 03/15/2010. **\$15,800**

NSF-EAR [0929981](#) (sole Investigator) *Development of New Instrumentation (Early Career): Laser Decomposition Isotope Interface (LADII)- Total Isotope Analysis of Nanomolar Amounts of Sulfate and Nitrate* Purdue University, 02/23/2009. **\$83,171**

NSF-EAR [0922114](#) (sole Investigator) *A new regional paleo-precipitation proxy: oxygen isotopes in desert nitrate* Purdue University 01/16/2009. **\$371,048**

NSF-DEB [0918708](#) (Principle Investigator) *Collaborative Research: Impacts of urbanization on nitrogen biogeochemistry in xeric ecosystems* Purdue University 01/08/2009. **\$289,031** (Purdue University) (\$856,000 total)

NSF-AGS [0856274](#) (sole Investigator) *Using Oxygen Isotopes to Constrain Ozone Sources and Sinks* Purdue University 09/29/2008. **\$299,748**

Purdue Research Foundation- Graduate fellowship support - **\$30,000**

Previous funding

Showalter Trust (PI) *Where Does Nitrate Come From and Where Does It Go? – A Novel Isotopic Analysis of Nitrate Loading in Groundwater and Surface Runoff in Indiana Watersheds.* \$75,000

Visiting Indian and Chinese Scholars grant. Purdue University International program \$10,000

Purdue Research Foundation- Exploration and origin of the nitrate mineral deposits in Turfan region of China.- \$8,000,

Purdue Research Foundation- International Travel Grant - International Symposium on Isotopomers, Tokyo Japan. \$ 1,000

C. Invited Lectures

University of Illinois at Chicago, Chicago, Ill. April 28 2010. *Understanding acid rain, climate, earth and planetary atmospheres and biologic turnover of nitrogen using multiple stable isotope approaches.*

University of Wisconsin, Madison, WI. April 23 2010. *Understanding acid rain, climate, earth and planetary atmospheres and biologic turnover of nitrogen using multiple stable isotope approaches.*

University of Illinois, Champaign-Urbana, Ill. April 16 2010. *Understanding acid rain, climate, earth and planetary atmospheres and biologic turnover of nitrogen using multiple stable isotope approaches.*

China University of Geosciences, Beijing, China March 17, 2010. *Using stable isotopes for understanding the role of atmospheric chemistry in soil formation in arid regions: Implications for paleoclimate and the surface of Mars*

Beijing Normal University, Beijing, China, March 18, 2010. *Multiple stable isotope approach to understanding the nitrogen cycle.*

- Carnegie Institute Geophysical Laboratory**, Washington D.C., MD. Feb. 2, 2010, *Using oxygen isotope anomalies in nitrate to understand chemistry, climate and nitrogen cycling.*
- University of Arizona**, Tucson AZ. Feb. 5, 2010. *Multiple isotopes in nitrate for understanding nitrogen cycling and its connection to water availability.*
- Wright State University**, Dayton, OH., 2009. *Isotopes in the Biogeochemical Cycling of Nitrogen: From Acid Rain to Climate Change to Gunpowder!*
- 4th International Symposium on Isotopomers**. Tokyo, Japan. 2008. *Multiple Isotope Forensics on Nitrate in the 2007 Poisoning of Wild Horses in southern Nevada*
- Czech Geological Survey**, Prague, Czech Republic, May 12, 2008. *Using oxygen isotope anomalies in nitrate to understand chemistry, climate and nitrogen cycling*
- Meeting of the Association of Isotope Geochemists**. Cape Town, South Africa. 2007. *Theory and Applications of ^{17}O anomalies in Biogeochemistry.*
- Bucknell University**, Lewisburg, PA., 2006. *Isotopes in the Biogeochemical Cycling of Nitrogen: From Acid Rain to Climate Change to Gunpowder!*
- Purdue University**, Department of Chemistry, West Lafayette, IN. 2006. *The Chemistry of "Anomalous" Isotope Effects: Their Use in Physical, Organic, and Biogeochemical Chemical Systems*
- 3rd International Symposium on Isotopomers**, La Jolla, Ca. 2006. *Using $\Delta^{17}\text{O}$ in Nitrate for Understanding Nitrogen Cycling on a Watershed Scale,*
- Biogeomon, Global Biogeochemistry Conference**. Santa Cruz, CA 2006. *Using $\Delta^{17}\text{O}$ in Nitrate for Understanding Nitrogen Cycling on a Watershed Scale*
- Lafayette College**, Easton, PA., 2006. *Isotopes in the Biogeochemical Cycling of Nitrogen: From Acid Rain to Climate Change to Gunpowder!*
- Purdue University**, Department of Agronomy, West Lafayette, IN. 2006. *Using multiple stable isotopes in understanding the biogeochemistry of the nitrogen cycle.*
- Ohio State University, Bryd Polar Center**, Columbus OH., May 12, 2006. *Oxygen and Nitrogen Isotopes in Nitrate: Understanding Past and Present Biogeochemical Cycling of Nitrogen.*
- Indiana Department of Environmental Management**. Indianapolis, IN. Nov. 11, 2006. *Using stable isotope to understand particulate nitrate formation.*
- Dickenson College**, Carlisle, PA., 2006. *Isotopes in the Biogeochemical Cycling of Nitrogen: From Acid Rain to Climate Change to Gunpowder!*
- American Geophysical Union**, San Francisco, CA. 2004. *Stable Isotope Constraints on N Deposition and Cycling in Lake Tahoe.*
- California Air Resources Board**, Sacramento CA, 2004. *Isotopic Analysis of NO_3^- in Lake Tahoe: Source Constraints on Nutrient Fluxes.*

Purdue University, Department of Earth and Atmospheric Sciences, West Lafayette, IN. 2004. *Using multiple stable isotopes in understanding the biogeochemistry of the nitrogen cycle.*

US Geological Survey, Reston VA., 2002. *Mass independent isotope effects in atmospheric nitrate.*

Joseph Fourier University, Grenoble, France, 2002. *From Molecules to Solar Systems: Understanding Mass Independent Fractionations.*

Princeton University, Princeton NJ., 2001. *Anomalous ^{17}O isotope compositions in atmospheric nitrate.*

Teaching Interests

Stable isotope biogeochemistry- lecture/lab
Atmospheric Chemistry- grad/undergraduate
Biogeochemistry- grad/undergraduate
Undergraduate research
Seminar in current issues in biogeochemistry

Honors

National Science Foundation Doctoral Enhancement Award, 2002

Research Advising and Mentoring

Graduate

David Mase - Earth and Atmospheric Sciences, MS. student
Krystin Riha - Ecological Sciences and Engineering -PhD student
Lindsey Edenburn - Chemistry - MS student
Fan Wang - Earth and Atmospheric Sciences, - PhD. student
Geoffery Girsch - Chemistry -PhD. student
Dan McMahon - Earth and Atmospheric Sciences, MS student

2010/2011 students

Michael King - Earth and Atmospheric Sciences MS student
Christine Fisher - PhD. Chemistry.

Undergraduate research assistants

Daniel Curtis - Chemistry
Christa Dahman - Chemistry
Ben Nault - Chemistry
Patrick O'Keefe - Chemistry
Katie Guggenheim - Chemistry
Katie Jochime - Chemistry
Daniel McMahon - Chemistry
Fuhe Xu - Computer Engineering (SURF)
Ashley Wittrig - Chemistry
Sylvia Hong (Chem)
Ji-Hye Seo (Chem)

Vicky Sehwatha (Computer Science- SURF)
David Geng - Chemistry
Michelle Kasem - Chemistry
HelenWaldschmidt - Chemistry
Micjelle Kolanowski
Greg Kline - Chemsitry

Collaborators

Katherine Lohse - University of Arizona
Tom Meixner - University of Arizona
Paul Brooks - University of Arizona
Nancy Grimm - Arizona Sate University
Dave Parker - University of California, Riverside
Bill Showers - North Carolina State University
Wensheng Ge - China Geosciences University, Beijing
Jason Rech - Miami University, Ohio
Jennifer McIntosh - University of Arizona

Graduate and Postdoctoral Advisor

Professor Mark Thiemens, Dean of Physical Science, University of California, San Diego

Doctoral Dissertation: University of California, San Diego, Department of Chemistry and Biochemistry

Isotopic Studies of Nitrate and Nitrogen Dioxide: Atmospheric and Biosphere N Cycling.

Mentoring in Undergraduate Research Activities

SEEDS - American Chemical Society's - Summer research program for underprivileged high school students - 3 students, Summer 2009.

Purdue University Summer Undergraduate Research Fellowships (SURF) - 2009

Purdue Undergraduate Research experience- 15 students over 3 years

2000-2004 Summer Training Academy for Research in the Sciences (STARS). <http://ogsr.ucsd.edu/stars/>
One on one research mentoring with minority and female science undergraduates interested in attending graduate school. One to two students each summer.

2002-2004 California Alliance for Minority Participation in Science, Engineering and Mathematics Program (CAMP) One on one research mentoring with minority and female science undergraduates interested in attending graduate school. One student each summer.

2000-2004 Summer Training Academy for Research in the Sciences (STARS). <http://ogsr.ucsd.edu/stars/>
One on one research mentoring with minority and female science undergraduates interested in attending graduate school. One to two students each summer.

2000-2004 Undergraduate Research, single quarter research for chemistry undergrads. One on one mentoring and guidance in formal laboratory research 1-2 students per year.

2002-2004 California Alliance for Minority Participation in Science, Engineering and Mathematics Program (CAMP) One on one research mentoring with minority and female science undergraduates interested in attending graduate school. One student each summer.

Field Research Experience

Turpan-Hami Basin, northwestern China. Soil survey and sample collection of regional nitrate deposits. Collaboration with China Geosciences University, Beijing. 2010- present.

Atacama Desert, Chile. Soil and salt collection. Collaboration with Prof. Jason Rech, Miami University, Ohio. 2004, 2005, 2007, 2009

Death Valley and Mojave Desert. Soil, playa, and salt lake samples for anions. Biogeochemistry of desert soils. 2006-present

R/V Atlantis, Woods Hole and Scripps Institute of Oceanography, Methane hydrate research, Oregon coast, 1998.

R/V New Horizon, CalCOFI research leg, southern California Pacific bight; nutrient, chlorophyll and salinity sampling, aerosol collection. 1999

Mojave Desert/ Death Valley, California. Soil and rock varnish collections, collaboration with Prof. Huming Bao, Louisiana State University. 2000

McMurdo Dry Valleys, Victoria Land Antarctica. Soil survey. Collaboration with Prof. Dave Marchant, Boston University and Prof. Huming Bao, LSU. 2002

Lake Tahoe, California. Monthly water collection and analysis of isotopes in dissolved nutrients. Collaboration with the Tahoe Research Group, University of California, Davis., 2004