

# Jessica Ernakovich

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Natural Resource Ecology Laboratory  
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## **Education**

Anticipated graduation: 5/2014 Ph.D. candidate, Graduate Degree Program in Ecology, Colorado State University, Fort Collins, CO  
Major Advisor: Matthew Wallenstein; Co-advisor: Ken Reardon; Committee: Rich Conant and Mary Stromberger

7/2009 Alaska soil geography field course (Soils affected by permafrost, NRM 689), University of Alaska Fairbanks, AK

2002 B.S. Chemistry, California Polytechnic State University, San Luis Obispo, CA

## **Research and Professional Experience**

*National Science Foundation (NSF) Research Fellow*, Colorado State University, 2009 & 2012- current

Microbial ecology, organic matter chemistry, and biogeochemical analysis of permafrost soil. *Tools include:* Fourier-transformed mid-infrared (MidIR) spectroscopy on SOM and DOM; measurements of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O flux from soils; multivariate and traditional statistics; continued use of skills acquired as DOE research fellow.

*Designer and instructor*, Skills for Undergraduate Participation in Ecological Research (SUPER) Program, Colorado State University, 2012-2013

Created program to teach undergraduates ecological research methodology; taught program 2012-13 and 2013-current.

*Communication Fellow*, Global Sustainability Leadership, School of Global and Environmental Sustainability, Colorado State University 2012

Participated in a yearlong program to teach scientists how to communicate with the public through traditional media outlets and social media; currently use Twitter and NREL's blog (EcoPress) for outreach/communication.

*Department of Energy (DOE) Research Fellow*, Colorado State University, 2010-2011

Microbial ecology and soil organic matter chemistry of arctic permafrost and active layer soil. *Tools include:* protein extraction and mass spectroscopy; DNA extraction, PCR, gel electrophoresis and 454 pyrosequencing; Community level physiological profiling using Ecolog (Biolog, Inc) plates; microbial biomass and DOC extraction and analysis; soil N extraction and analysis, total soil C and N analysis.

*Graduate Research Assistant*, Colorado State University, 2007-2009

Seasonality of microbial ecology in arctic soils. *Tools include:* isotope ratio mass spectroscopy of gas and solids; CO<sub>2</sub> flux from soils; protein extraction from soils, 1D and 2D gel electrophoresis, protein quantification.

*Undergraduate research mentor*, Colorado State University, 2007-2013

I have mentored 16 undergraduate students, three of which were for their senior or honors thesis.

*Post-baccalaureate Intern*, Promega Biosciences, San Luis Obispo, CA, 2002

Synthesis of custom nucleosides. *Tools include*: same as JBL Scientific intern position

*Undergraduate researcher (including senior thesis)*, California Polytechnic State University, San Luis Obispo, CA, 1999-2002

Investigation of an alternative method of glycosidic bond synthesis (between DNA sugar and base). *Tools include*: 1D and 2D NMR; standard organic synthesis reactions and purification techniques; molecular modeling; thin layer chromatography

*Intern*, JBL Scientific, San Luis Obispo, CA, 2001

Synthesis of custom nucleosides. *Tools include*: standard organic synthesis reactions; 1D and 2D NMR; HPLC; GC.

## **Grants and Awards**

*Travel Grant*, Colorado State University Natural Resource Ecology Laboratory & US Permafrost Association (for AGU 2012) (\$1,000)

*Grant*, NSF Dissertation Improvement Grant (DDIG), "Dissertation Research: Is organic matter chemistry or temperature a stronger driver of microbial community structure in permafrost soil?" 2012-2014 (\$15,000)

*Fellowship*, NSF Graduate Research Fellowship Program (GRFP), "Vulnerability of thawed permafrost to decomposition under *in situ* Arctic conditions," 2009-2014 (\$124,000)

*Travel Grant*, US Permafrost Association, Permafrost Young Researchers Network, & Colorado State University Graduate Degree Program in Ecology (for attendance of 10<sup>th</sup> International Conference on Permafrost, Salekhard, Russia 2012) (\$5,000)

*Fellowship*, DOE Global Change Education Program (GCEP), "Vulnerability of thawed permafrost to decomposition under *in situ* Arctic conditions," 2009-2012 (\$84,000; declined \$28,000)

*Grant*, "Development of an undergraduate mentoring plan at NREL," Natural Resource Ecology Laboratory Program Development, 2011 and 2012 (renewal) (\$10,000 total)

*Scholarship*, Francis Clark Soil Biology Scholarship, Colorado State University, 2008 (\$2,500)

*Fellowship*, President's Award for Research and Scholarly Excellence, Colorado State University, 2007-2008 (\$10,000)

*Outstanding Graduate Student*, Natural Resource Ecology Laboratory, CSU, 2008

*Cum Laude Graduate*, California Polytechnic State University, 2002

*Undergraduate Award*, American Chemical Society Analytical Chemistry, 2000

*Analytical Chemist Award*, California Polytechnic State University Chemistry Department, 2000

*Member*, Golden Key International Honour Society, 1999

*Scholarship*, William B. Turner Scholarship, California Polytechnic State University, 1997

## **Peer-reviewed Publications**

**Ernakovich, J.G.**, M.D. Wallenstein, and F.J. Calderón. The chemical properties of Alaskan permafrost and seasonally thawed soils. In prep (anticipated submission 10/2013), *Soil Science Society of America Journal*.

**Ernakovich, J.G.**, K.A. Hopping, A.B. Berdanier, R.T. Simpson, E.J. Kachergis, H. Steltzer and M.D. Wallenstein. Responses of arctic and alpine ecosystems to altered seasonality under climate warming. In review (invited), *Global Change Biology*.

Evans, S.E., P.E. Brewer, **J.G. Ernakovich**, J.M. Steinweg and J.C. von Fischer. Anoxic microsites in upland ecosystems: a review of evidence and implications for nutrient dynamics, trace gas flux, carbon storage, and biodiversity. In prep, (anticipated re-submission 11/2013), *Soil Biology and Biochemistry*.

## **Non Peer-reviewed Publications**

Wallenstein, M., S. Allison, **J. Ernakovich**, J. M. Steinweg, and R. Sinsabaugh. 2010. Controls on the temperature sensitivity of soil enzymes: A key driver of in-situ enzyme activity rates. pp. 245-258 in G. C. Shukla and A. Varma, editors. *Soil Enzymology*. Springer-Verlag.

## **Presentations**

*Oral Presentations (\* indicates invited)*

\***J.G. Ernakovich**, K.A. Hopping, A.B. Berdanier, R.T. Simpson, E.J. Kachergis, H. Steltzer and M.D. Wallenstein. 2012. Responses of arctic and alpine ecosystems to altered seasonality under climate change. American Geophysical Union Fall Meeting, San Francisco, CA.

\***J.G. Ernakovich** and M.D. Wallenstein. 2012. The relationship between taxonomic and functional diversity for permafrost and active layer Arctic microbial communities: implications for decomposition in response to warming. American Geophysical Union Fall Meeting, San Francisco, CA.

**J.G. Ernakovich**, F.J. Calderon and M.D. Wallenstein. 2012. Microbial community traits: evidence that permafrost and active layer microbial traits have different abiotic drivers. Tenth International Conference on Permafrost, Salekhard, Russia.

**J.G. Ernakovich**, F.J. Calderon and M.D. Wallenstein. 2011. Assessing the vulnerability of permafrost carbon stocks: the importance of considering soil organic carbon chemistry and microbial community traits. Ecological Society of America Annual Meeting, Austin, TX.

\***J.G. Ernakovich**, S. Berg, K.F. Reardon and M.D. Wallenstein. 2009. A comparison of active-layer and permafrost microbial community responses to freeze-thaw stress: can microbes adapt to changing climates? Ecological Society of America Annual Meeting, Albuquerque, NM.

J.M. Steinweg, **J.G. Ernakovich**, J. Prucha, R.T. Conant, M.D. Wallenstein. 2008. Soil microbial temperature acclimation through changes in enzyme activity. Ecological Society of America Annual Meeting, Milwaukee, WI.

*Poster Presentations* († indicates presentation given by undergraduate working with me)

†T. Paul, M.D. Wallenstein, C.M. Boot and **J.G. Ernakovich**. 2013. Microbial DNA extraction: the best lysis and extraction method. Celebrate Undergraduate Research and Creativity, Fort Collins, CO.

**J.G. Ernakovich**, M.D. Wallenstein and F.J. Calderon. 2012. The Chemical Properties of Alaskan Permafrost and Seasonally Thawed Soils. Long Term Ecological Research All Scientists Meeting, Estes Park, CO.

**J.G. Ernakovich** and M.D. Wallenstein. 2012. The effect of temperature and soil properties on microbial growth yield efficiency in a cold-adapted system. NSF RCN Enzymes in the Environment workshop, Fort Collins, CO.

**J.G. Ernakovich**, F.J. Calderon and M.D. Wallenstein. 2012. Are microbial community traits different in the permafrost than the active layer? Evaluating controls on microbial community functional diversity. Arctic LTER All Scientists Meeting, Woods Hole, MA.

†A. Challenger, E.A. Paul, M.D. Wallenstein and **J.G. Ernakovich**. 2011. The use of FTIR in determining the decomposability of permafrost soil organic matter. Front Range Student Ecology Symposium, Fort Collins, CO.

**J.G. Ernakovich**, A. Challenger, F.C. Calderon and M.D. Wallenstein, 2010. Vulnerability of permafrost soil carbon to climate warming: Evaluating controls on microbial community composition. International Society for Microbial Ecology Annual Meeting, Seattle, WA & Argonne Soil Metagenomics Conference, Chicago, IL.

**J.G. Ernakovich**, A. Challenger, F.C. Calderon and M.D. Wallenstein, 2010. Preventing protein-tannin interactions: implementing a directed approach to the optimization of protein extraction protocols from soils. Environmental Proteomics Workshop, Keystone, CO.

**J.G. Ernakovich**, S. Berg, K.F. Reardon and M.D. Wallenstein. 2009. A comparison of active-layer and permafrost microbial community responses to freeze-thaw stress: can microbes adapt to changing climates? Carbon Pools in Permafrost Regions, Stockholm, Sweden.

## **Field Experience**

*Field course*, Polar Urals field course on periglacial geology and permafrost, Yamalo-Nenets Autonomous District, Russia (7/2012)

*Winter and summer active layer soil sampling*, Toolik Lake, AK & Thule, Greenland (2007-2010)

*Field permafrost and active layer soil sampling*, Sagwon Hills, AK (8/2009)

Alaska soil geography field course (Soils affected by permafrost, NRM 689), University of Alaska Fairbanks, AK (7/2009)

*Soil sampling*, Prairie Heating and CO<sub>2</sub> Enrichment (PHACE) site, Cheyenne, WY (8/2007)

## **Service Activities**

*Proposal reviewer*, Research Corporation for Science Advancement, 2013, 2012

*Mentor* for 16 undergraduate student researchers, 2007-2013

*Working group organizer*, Linkages among specialized microbial communities across LTER landscapes: Developing the metacommunity concept. Long Term Ecological Research All Scientists Meeting 2012, Estes Park, CO.

*Session chair*, Permafrost Microbiology, Tenth International Conference on Permafrost, Salekhard, Russia 2012

*Manuscript reviewer*, Plant and Soil (1), Soil Biology and Biochemistry (3), Global Change Biology (2), Biogeosciences Discussions (1), ISME Journal (1), Biology and Fertility of Soils Journal (1), Biogeochemistry (2)  
*Science Fair judge*, Colorado State Science Fair, 2012, 2011  
*Organizing committee member*, Int'l. workshop on Environmental Proteomics, 2010  
*Committee chair* (2010), *President* (2009), *Secretary* (2008), Front Range Student Ecology Symposium, Colorado State University  
*Volunteer*, STEM-a-palooza, to get kids involved in science, technology, engineering, and math, 2009, 2008  
*Science fair judge*, Poudre School District Lab School 2008

### **Teaching Experience**

*Instructor*, Skills for Undergraduate Participation in Ecological Research (SUPER) Program, Colorado State University, 2013- current, 2012-2013  
*Guest lecturer*, Rangeland Ecology (RS 315), 2013; Ecosystem Ecology (ESS 311), 2013; Soil Microbiology (SOCR 455), 2012, 2013; Ecology (LIFE 320), 2011  
*Mentor* for 16 undergraduate student researchers, 2007-2013  
*Molecular laboratory Instructor*, Summer Soils Institute, Natural Resources Ecology Laboratory 2011, 2012  
*Teaching Assistant*, Ecology, Colorado State University, 2011  
*Co-instructor*, Alpine and arctic biogeography and biogeochemistry, Colorado State University 2008, 2009

### **Workshops**

*Participant*, Linking aquatic and soil organic matter across ecosystems through characterization of optical properties. Long Term Ecological Research Workshop, Boulder, CO, 2013.  
*Working group organizer and participant*, Linkages among specialized microbial communities across LTER landscapes: Developing the metacommunity concept. Long Term Ecological Research All Scientists Meeting, Estes Park, CO, 2012.  
*Participant*, Incorporating enzymes and microbial physiology into biogeochemical models, NSF RCN Enzymes in the Environment workshop, Fort Collins, CO, 2012.  
*Communication fellow*, Global Sustainability Leadership, School of Global and Environmental Sustainability, Colorado State University, 2012.  
*Organizing committee member and participant*, International workshop on Environmental Proteomics, Keystone, CO, 2010.  
*Participant*, Individual-based Ecology of Microbes, National Institute for Mathematical and Biological Synthesis (NimBios), Knoxville, TN, 2008.

### **Professional Memberships**

American Geophysical Union (AGU), Permafrost Carbon Research Coordination Network, Permafrost Young Researchers Network (PYRN), US Permafrost Association (USPA), Ecological Society of America (ESA), International Society of Microbial Ecology (ISME), Enzymes in the Environment Research Coordination Network, Environmental Proteomics Society, Earth Science Women's Network (ESWN).

## **References**

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