

# Sarah L. O'Brien

## Curriculum Vitae

Institute for Genomics and Systems Biology · Argonne National Laboratory  
9700 South Cass Avenue · Argonne · IL · 60439 · Phone: (630) 252-7854 · sobrien@anl.gov

---

### Research Interests

Microbial control of soil carbon cycling; linking soil microbial function to biogeochemical cycles; environmental constraints on microbial function; soil structure and soil organic matter dynamics; turnover and longevity of soil carbon pools

### Education

- 2011 Workshop on Molecular Evolution, Marine Biological Laboratory, Woods Hole, MA**  
**2010 Ph.D., University of Illinois at Chicago (UIC), Chicago, IL**  
Biological Sciences – Ecology and Evolution  
Co-Advisors: Julie D. Jastrow and Miquel A. Gonzalez-Meler  
Dissertation: Controls on soil carbon accrual in restored perennial grasslands.  
**2001 B.S. (cum laude), Bradley University, Peoria, IL**  
Major: Environmental Science, Biology Concentration  
Minor: English – Professional Writing

### Professional Experience

Argonne National Laboratory (ANL), Argonne, IL  
Postdoctoral Associate February 2010 – present  
Guest Graduate Appointment 2003 – January 2010  
Research Assistant 2001 – 2003

### Fellowships

- 2005-2009 Graduate Research Environmental Fellowship, U.S. Department of Energy  
(DOE) Global Change Education Program (Tuition, stipend, and research funds)  
2003-2004 University Fellowship, UIC (Tuition and stipend)

### Other Honors and Awards

- 2012 Director's Competitive Laboratory Directed Research and Development Award  
*Imaging "ecological engineers": a novel quantum dots approach to map microbes  
in complex soil structures with x-rays*; Principal investigator. \$210,000  
2010 Excellence in Research Award, UIC Department of Biological Sciences  
2009 Best Student Poster Presentation, Soil Ecology Section, Ecological Society of  
America 94<sup>th</sup> Annual Meeting  
Diess Award for Graduate Research, UIC Graduate College  
2008 Marvin L. Wesely Graduate Research Environmental Fellow, U.S. DOE Global  
Change Education Program  
2005 Excellence in Teaching Award for "Life Evolving", UIC Department of Biological  
Sciences  
2003 Second Place, Student Poster Competition, Soil Ecology Society Ninth Biennial  
International Conference

## **Publications**

1. **O'Brien SL**, Jastrow JD. Physical and chemical protection in hierarchical aggregates regulates soil carbon and nitrogen recovery in restored perennial grasslands. *Soil Biology and Biochemistry*. In review.
2. **O'Brien SL**, Glass EM, Brulc JM, Gilbert JA, Antonopoulos DA, Meyer F. 2011 Meeting Report: The 2<sup>nd</sup> Annual Argonne Soils Workshop, Argonne National Laboratory, Chicago USA, October 6-8, 2010. *Standards in Genomic Sciences*. DOI 10.4056/sigs.1874546
3. **O'Brien SL**, Jastrow JD, McFarlane KJ, Guilderson TP, Gonzalez-Meler MA. 2011 Stable mineral-associated soil organic matter pools revealed by combined physical and chemical fractionation. *Biogeochemistry*. DOI 10.1007/s10533-011-9673-0
4. **O'Brien SL**, Jastrow JD, Grimley D, Gonzalez-Meler MA. 2010. Moisture and vegetation controls on decadal-scale accrual of soil organic carbon and total nitrogen in restored grasslands. *Global Change Biology*, 16: 2573-2588.
5. Iversen CM, **O'Brien SL**. 2010. Spanning the continuum from living roots to soil organic matter. *Bulletin of the Ecological Society of America*, 91: 54-64.
6. **O'Brien SL**, Iversen CM. 2009. Missing links in the root-soil organic matter continuum. *New Phytologist*, 184: 513-516.

## **Presentations**

### **Selected Oral Presentations**

1. **O'Brien SL**, Owens SM, Caporaso JG, Hampton-Marcell J, Jastrow JD, Smith DS, Antonopoulos DA, Gilbert JA, Meyer F. Spatial structure of soil microbial communities from centimeter to ecosystem. Ecological Society of America 97<sup>th</sup> Annual Meeting, Portland, OR, 5–10 August 2012 and 4<sup>th</sup> Annual Argonne Soil Metagenomics Meeting, Bloomingdale IL 3–5 October 2012
2. **O'Brien SL**. Getting soil to do our dirty work: mechanisms controlling soil carbon sequestration in restored prairies. Biosciences Division, Argonne National Laboratory, 5 February, 2009
3. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Hierarchical controls on the accrual of physically protected soil carbon pools following tallgrass prairie restoration. Ecological Society of America 93<sup>rd</sup> Annual Meeting, Milwaukee, WI, 2-8 August, 2008
4. **O'Brien SL**. The role of soil aggregates in the recovery of soil C and N in a restored tallgrass prairie chronosequence. Department of Energy Global Change Education Program Orientation, Knoxville, TN, 8-15 June, 2008
5. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA, Grimley DA. Hydrologic and vegetative effects on the rate of soil carbon accumulation in restored Midwestern grasslands. American Geophysical Union Fall Meeting, San Francisco, CA, 10-14 December, 2007
6. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. The influence of topography and plant community on soil carbon recovery in restored grasslands. Soils and Restoration Ecology Meeting, DePaul University, Chicago, IL, 18-20 December 2006.
7. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Vegetative and edaphic controls on soil carbon accumulation in restored grasslands. Soil Ecology Society 10<sup>th</sup> Biannual International Conference, Argonne National Laboratory, Argonne, IL, 22-25 May 2005

### **Selected Poster Presentations**

1. Antonopoulos DA, **O'Brien SL**, Keegan KP, et al. North American soil metagenomes cluster by biome and edaphic factors. American Society for Microbiology, New Orleans, LA, 21–24 May 2011

2. Jastrow JD, Miller RM, **O'Brien SL**, Matamala R. Integrating the relationships among soil organic matter, aggregate structures, and the microbial community. 3rd North American Carbon Program (NACP) All Investigators Meeting, New Orleans, LA, 2-4 February 2011
3. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Stable mineral-associated soil organic matter pools revealed by combined physical and chemical fractionation. Organic Matter Stabilization and Ecosystem Functions, Presqu'île de Giens, France, 19-23 Sep 2010
4. **O'Brien SL**, Jastrow JD, Grimley DA, Gonzalez-Meler MA. Drainage and vegetation controls on landscape-scale soil carbon accumulation in restored prairies. Ecological Society of America 94<sup>th</sup> Annual Meeting, Albuquerque, NM, 2-7 August, 2009
5. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Hierarchical controls on the accrual of physically protected soil carbon pools following tallgrass prairie restoration. International Symposium on Soil Organic Matter Dynamics: Land Use, Management, and Global Change, Colorado Springs, CO, 6-9 July, 2009
6. Filley TR, Jastrow JD, **O'Brien SL**, Moran KK, Boutton TW. Selective stabilization of root and leaf-derived lignin and aliphatic biopolymers among soil organic matter fractions: Comparison of ambient and elevated atmospheric CO<sub>2</sub> rings in the sweetgum free air CO<sub>2</sub> enrichment (FACE) experiment. 2nd North American Carbon Program (NACP) All-Investigators Meeting, San Diego, CA. 17-20 February 2009
7. Jastrow JD, Swanston CW, **O'Brien SL**, Moran KK, Torn MS, Hanson PJ. Incorporation of root and surface litter inputs into soil carbon pools: What do different physical fractionation approaches tell us? 3<sup>rd</sup> International Conference on Mechanisms of Organic Matter Stabilization and Destabilization in Soils and Sediments, Adelaide, Australia, 23-26 September 2007
8. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Soil organic matter accrual and protection by aggregates in a restored tallgrass prairie chronosequence. Ecological Society of America 92<sup>nd</sup> Annual Meeting, San Jose, CA, 5-10 August, 2007
9. Jastrow JD, Six J, **O'Brien SL**, Moran KK, Boutton TW. Comparison of density-based versus particle-size fractionations for investigating microaggregate stabilization of soil organic matter. Soil Ecology Society 11<sup>th</sup> Biennial Meeting, Moab, UT, 29 April–2 May, 2007
10. Moran KK, Jastrow JD, **O'Brien SL**, Boutton TW. Changing sampling depth captures effects of tree species, elevated carbon dioxide and ozone on soil carbon stock in a forest ecosystem. Soil Ecology Society 11<sup>th</sup> Biennial Meeting, Moab, UT, 29 April – 2 May, 2007.
11. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Soil organic matter accrual and protection by aggregates in a restored tallgrass prairie chronosequence. Soil Ecology Society 11<sup>th</sup> Biennial Meeting, Moab, UT, 29 April–2 May, 2007.
12. Jastrow JD, **O'Brien SL**, Moran KK, Swanston C, and Hanson P. Incorporation of Radiocarbon from Forest Litter and Roots into Microaggregate-Protected and Unprotected Soil Carbon Pools. Soil Science Society of America International Annual Meetings, Indianapolis, IN, 12-16 November, 2006
13. Moran KK, Jastrow JD, **O'Brien SL**. Physical Fractionation of Soil Organic Matter Using Sodium Hexametaphosphate Requires Caution. Soil Science Society of America International Annual Meetings, Indianapolis, IN, 12-16 November, 2006
14. Jastrow JD, Six J, **O'Brien SL**, Moran KK, Boutton TW. Comparison of density-based versus particle-size fractionations for investigating microaggregate stabilization of soil organic matter. 2<sup>nd</sup> International Conference on Mechanisms of Organic Matter Stabilization and Destabilization in Soils, Asilomar, CA, 9-13 October 2005.
15. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Hydrologic and vegetative controls on soil carbon accumulation in restored tallgrass prairie. 2<sup>nd</sup> International Conference on Mechanisms of Organic Matter Stabilization and Destabilization in Soils, Asilomar, CA, 9-13 October 2005
16. Jastrow JD, **O'Brien SL**, Dria KJ, Filley TR, Boutton TW. Nature and dynamics of carbon accrued in a forest soil during five years of atmospheric CO<sub>2</sub> enrichment. Soil Ecology

Society 10<sup>th</sup> Biennial International Conference, Argonne National Laboratory, Argonne, IL, 22-25 May 2005

17. **O'Brien SL**, Jastrow JD, Gonzalez-Meler MA. Soil carbon accrual from C<sub>3</sub> and C<sub>4</sub> plant sources in a restored tallgrass prairie chronosequence. American Geophysical Union Fall Meeting, San Francisco, CA, 13-17 December 2004
18. Matamala R, **O'Brien SL**, Smith E, Jastrow JD, Gonzalez Meler MA. Soil carbon cycling and storage in a restored tall grass prairie chronosequence. Carbon Respired from Terrestrial Ecosystems National Science Foundation Workshop, Laguna Beach, CA, December 2003
19. **O'Brien SL**, Jastrow JD, Pregitzer KS, Zak DR. Effect of soil fertility on physically fractionated soil C and N pools of sandy soils exposed to elevated atmospheric CO<sub>2</sub>. Soil Ecology Society 9<sup>th</sup> Biennial International Conference, Palm Springs, CA, 11-14 May 2003
20. **O'Brien SL**, Jastrow JD, Pregitzer KS, Zak DR. Effect of soil fertility on physically fractionated soil C and N pools of sandy soils exposed to elevated atmospheric CO<sub>2</sub>. Soil Science Society of America International Annual Meetings, Indianapolis, IN, 10-14 November 2002

## **Teaching Experience**

### **Teaching Assistant**

Summer 2005	Midwestern Ecosystems, The Notebaert Nature Museum
Spring 2005	Life Evolving (Biology for Non-Majors), UIC
Fall 2004	Field Ecology Laboratory, UIC

### **Undergraduate Research Mentor**

UIC Undergraduate Independent Study	Krupa Patel
ANL Pre-college Internship Program	Adam Newkirk, Kirsten Swanson
ANL Pre-Service Teachers Program	Elizabeth Hofreiter, Melissa Payton

## **Professional Service Activities**

### **Organizer for Scientific Meetings**

Chair of Organizing Committee for 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> Annual Argonne Soil Metagenomics Workshops, 6–8 October 2010, 5–7 October 2011, 3–5 October 2012  
<http://press.mcs.anl.gov/asmw12/>

Member of Local Organizing Committee for Challenges in Environmental Molecular Microbiology Workshop, Argonne IL, 26-27 April 2010.

Lead Organizer for Organized Oral Session “Missing Links in the Root-Soil Organic Matter Continuum”, Ecological Society of America Annual Meeting, Albuquerque, NM, 2–7 August 2009.

Member of Local Organizing Committee for Soil Ecology Society Tenth Biennial International Conference, Argonne National Laboratory, Argonne, IL. 22–25 May 2005.

### **Outreach**

Tour provider for “Introduce a Girl to Engineering and Science Day”, Argonne National Laboratory, 24 February 2011 and 23 February 2012.

Poster presenter or tour provider for “Science Careers in Search of Women”, Argonne National Laboratory, April 2009, 2010, 2011, 2012.  
STEM Career Expo presenter, Fermi National Accelerator Laboratory, 7 April 2010.

### **Peer Reviewer**

*Agriculture, Ecosystems and Environment; Annals of Applied Biology; Biogeochemistry; Biology and Fertility of Soils; Ecological Applications; Environmental Management; European Journal of Soil Science; Global Change Biology; Journal of Environmental Quality; Plant and Soil; PLoS One; Soil Science; Wetlands*

### **Professional Affiliations**

American Geophysical Union  
American Society for Microbiology  
Ecological Society of America  
Soil Ecology Society  
Soil Science Society of America