Dr. Bradley S. Stevenson

The University of Oklahoma, Department of Botany and Microbiology
805 George Lynn Cross Hall, 770 Van Vleet Oval, Norman, OK 73019-0245
Phone: (405) 325-5970; FAX: (405) 325-7619
Email: bradley.stevenson@ou.edu

Professional Preparation

Miami University (of Ohio)	Microbiology	B.A.	1992
Michigan State University	Microbiology	Ph.D.	2000
Michigan State University	Microbial Ecology	Postdoc	2000-2005

Appointments

2005-Present	Assistant Professor, Department of Botany and Microbiology, University of Oklahoma, Norman OK
2001-Present	Instructor, International Geobiology Course, Wrigley Institute for Environmental Studies, University of Southern California
2002-2005	Agouron Geobiology Postdoctoral Fellow, Michigan State University, East Lansing, MI
2000-2002	Postdoctoral Fellow, Michigan State University, East Lansing, MI
1993-2000	Research Assistant, Center for Microbial Ecology, Michigan State University, East Lansing, MI

Publications (*corresponding author)

Marks, C., Lawson, P.A., and **B.S. Stevenson***. (Submitted) Crenarchaeota dominate moderately thermophilic sediments of artesian springs at Hot Springs National Park, AR. *Environ. Microbiol.*

Stevenson, B.S.*, Drilling, H.S., Lawson, P.A., Duncan, K.E., Parisi, V.A., Suflita, J.M. (Submitted) Microbial communities in bulk fluids and biofilms of a North Slope oil facility have similar composition but different structure. (pending clearance by ConocoPhillips) *Environ. Microbiol*

Stevenson, B.S.*, Suflita, M.T., Moore, E.R., Johnson, N., Stamps, B.A., and P.A. Lawson. (Submitted) *Hoeflea anabaenae* sp. nov., an epiphytic symbiont that attaches to the heterocysts of a strain of *Anabaena*. *Int. J. Syst. Evol. Microbiol.*

Stevenson, B.S.* and L.B. Cameron. (Submitted) Evidence of Genetic Exchange Among Diverse Bacteria Associated with Nodules of the Wild Legume *Desmanthus Illinoiensis*. *BMC Microbiology.*

Kaspari, M.*, **Stevenson, B.S**., Shik, J., and J. Kerekes. (2010) Scaling community structure: body size and the differentiation of bacteria, fungi, and ant taxocenes along a tropical forest floor. *Ecology.* 91: 2221-2226.

Kaspari, M.* and **B.S. Stevenson**. (2009) Evolutionary ecology, antibiosis, and all that rot. *Proc. Natl. Acad. Sci. USA.* 105: 10927-10928.

Behrens, S., Lösekann, T., Pett-Ridge, J., Weber, P.K., Ng, W.O., **Stevenson, B.S.**, Hutcheon, I.D., Relman, D.A., and A.M. Spormann*. (2008) Linking microbial phylogeny to metabolic activity at the single cell level using enhanced element labeling - catalyzed reporter deposition fluorescence *in situ* hybridization (EL-FISH) and NanoSIMS. *Appl. Environ. Microbiol.* 74: 3143-3150.

Stevenson, B.S.* and J.B. Waterbury. (2006) Isolation and Identification of an Epibiotic Bacterium Associated with Heterocystous *Anabaena* Cells. *Biol. Bull.* 210: 73-77.

Stevenson, B.S., Eichorst, S.A., Wertz, J.T., Schmidt, T.M., and J.A. Breznak*. (2004) New strategies for the cultivation and detection of previously uncultured microbes. *Appl. Environ. Microbiol.* 70: 4748-4755.

Stevenson, B.S. and T.M. Schmidt*. (2004) Life history implications of ribosomal RNA gene copy number in *Escherichia coli*. *Appl. Environ. Microbiol.* 70: 6670-6677.

Hashimoto, J.G., **Stevenson, B S.**, and T.M. Schmidt*. (2003) Rates and consequences of recombination between Ribosomal RNA operons. *J. Bacteriol.* 185: 966-972.

Stevenson, B.S. and T.M. Schmidt*. (1998) Growth rate-dependent accumulation of RNA from plasmid-borne rRNA operons in *Escherichia coli*. *J. Bacteriol.* 180: 1970-1972.

Bratina, B.J., **Stevenson, B.S.**, Green, W.J., and T.M. Schmidt*. (1998) Manganese reduction by microbes from oxic regions of the Lake Vanda (Antarctica) water column. *Appl. Environ. Microbiol.* 64: 3791-3797l.

Stevenson, B.S., A. A. DiSpirito, and T. M. Schmidt*. (1994) Reduction of enzyme adsorption to polypropylene surfaces in the presence of a nonionic detergent. *BioTechniques* 17: 1048-1050.

Invited Lectures

B.S. Stevenson, May 2010. Molecular approaches for optimizing conversion of synthesis gas to liquid biofuels by novel microbial catalysts. Oklahoma EPSCoR Annual State Conference, University of Oklahoma

B.S. Stevenson, December 2009. Sex in a nodule: lateral transfer of nitrogenase genes. Darwinathon, University of Oklahoma

B.S. Stevenson, September 2009. From Pipeline Corrosion to Landfill Leachate: A Microbiological Perspective. Oklahoma Department of Environmental Quality, Oklahoma City, OK

B.S. Stevenson, September 2008. Cyanobacterium-Rhizobium Symbiosis: a model system for microbial symbioses**.** Oklahoma Central University

B.S. Stevenson, April 25, 2007. Ecological and Economical Drivers of Biofuels Feedstock Production, Oklahoma NSF EPSCoR RII Theme Competition

B.S. Stevenson, November 6, 2006. Cyanobacterium-Rhizobium symbiosis: a model system to study microbial symbioses. Oklahoma State University, Department of Microbiology

B.S. Stevenson, August 2004. Using molecular approaches to aid in the isolation of previously uncultured microbes. Roundtable session entitled *Brainstorming the phenomenon of "uncultivables": new ideas to solve the old riddle.* 10th International Symposium of Microbial Ecology. Cancun, Mexico

B.S. Stevenson. July 1998. Ribosomal RNA operons as a component of bacterial life history strategies. 4th Midwestern Molecular Microbial Ecology Meeting. East Lansing, MI

Symposia convened

Co-convener: Geobiology; Microorganism-Rock Interactions from the Deep Subsurface through the Rock Record. 109th ASM General Meeting, Philadelphia, PA

Student Lectures

Lauren Cameron and **Bradley S. Stevenson**. March 27, 2009. A case for transfer of Nitrogenase genes (*nifH*) across a broad range of bacteria. Missouri Valley ASM Branch Meeting, University of Kansas, Lawrence, KS

Heather Drilling and **Bradley S. Stevenson**. March 27, 2009. Differences in Bacterial Community Composition Influenced by Oil Reservoir and Production Characteristics on the North Slope of Alaska, Missouri Valley ASM Branch Meeting, University of Kansas, Lawrence, KS

Blake Stamps (undergrad) and **Bradley S. Stevenson**. March 28, 2009. Biochemical characterization of the *Hoeflea*, and WH2K, a Novel Marine Bacterium, Missouri Valley ASM Branch Meeting, University of Kansas, Lawrence, KS

Michael Ukpong and **Bradley S. Stevenson**. March 28, 2009. Genetic Characterization of Clostridium strain P11 a novel Synthesis gas fermenting bacteria, Missouri Valley ASM Branch Meeting, University of Kansas, Lawrence, KS

Poster Presentations

Lauren Cameron, P. Matt Joyner, Robert Cichewicz and **Bradley S. Stevenson**. May 2009. Community Organizing: The effect of fungi and their secondary metabolites on soil bacterial community structure. ASM General Meeting, Philadelphia, PA

Heather Drilling, Paul A. Lawson, and **Bradley S. Stevenson**. May 2009. Differences in bacterial community composition influenced by oil reservoir and production characteristics on the North Slope of Alaska. 109th ASM General Meeting, Philadelphia, PA

Cherilyn Ewert, Paul Smith, and **Bradley Stevenson.** April 2007. Investigations of a Symbiosis between a Cyanobacterium and Heterotrophic Bacteria. Oklahoma Research Day, University of Central Oklahoma

Chalita Thankyakoop, Kamrun Zargar, Fernando Gomez, Hallgerd Eydal and Will Berelson, Scott Dawson, Frank Corsetti, Kurt Hanselmann, Hope Johnson, John Spear, **Bradley S. Stevenson**, José de la Torre' and GeoBio2008. December 2008. A silica budget reveals much about how bacteria might regulate the formation of silica stromatolites in YNP Hot Springs. AGU Fall meeting. San Francisco, CA

Susan E. Alford, Dana Kapitulinová, Benjamin Kotrc, Alice T. Langerhuus, Will Berelson, Scott Dawson, Frank Corsetti, Kurt Hanselmann, Hope Johnson, John Spear, **Bradley S. Stevenson**, José de la Torre, and GeoBio2008. December 2008. The Role of Sulfur Oxidation in Carbonate Precipitation and Dissolution Within Sulfidic Yellowstone Hot Springs. AGU Fall meeting. San Francisco, CA

B.S. Stevenson and J.B. Waterbury. May 2006. Isolation and Identification of an epibiotic bacterium attached to the heterocysts of an *Anabaena* sp. 106th General Meeting of the American Society for Microbiology. Orlando, FL

B.S. Stevenson, T.M. Schmidt, and J.A. Breznak. August 2001. Effect of microoxic incubation and oxyprotective enzymes on the recovery of bacteria from soil. 9th International Symposium on Microbial Ecology. Amsterdam, The Netherlands

B.S. Stevenson, J.B. Waterbury, and T.M. Schmidt. August 2001. Isolation and characterization of a bacterium attached specifically to heterocysts of the filamentous cyanobacterium *Anabaena*. 9th International Symposium on Microbial Ecology. Amsterdam, The Netherlands

B.S. Stevenson, T.M. Schmidt, and J.A. Breznak. May 2001. Increased recovery of bacteria from soil in the presence of catalase and superoxide dismutase. 101st General Meeting of the American Society for Microbiology. Orlando, FL

B.S. Stevenson and T.M. Schmidt. May 1999. Consequences of altering the number of ribosomal RNA operons: simulations and direct studies of competitive ability of *Escherichia coli*. 99th General Meeting of the American Society for Microbiology. Chicago, IL.

B.S. Stevenson and T.M. Schmidt. August 1998. Advantage of multiple rRNA operons in fluctuating environments. 8th International Symposium on Microbial Ecology. Halifax, Nova Scotia

B.S. Stevenson, D.H. Buckley, and T.M. Schmidt. May 1996. Adaptive significance of rRNA operon copy number. 96th General Meeting of the American Society for Microbiology. New Orleans, LA

B.S. Stevenson, R.E. Lenski, and T.M. Schmidt. August 1995. Phylogenetic distribution and adaptive significance of multiple rRNA operons. 7th International Symposium on Microbial Ecology. Sao Paulo, Brazil

Synergistic activities

Undergraduate training and research: I have had 17 different undergraduate students working in my laboratory over the past 5 years. Eleven of these students have been female and/or from underrepresented groups (African-American, Native American and Asian American). Each student has applied for research fellowships (NSF, OU Honors College, and others), eight have received support, and all have presented their work at campus-wide and regional scientific meetings. All 11 of the students who have graduated are in graduate or medical school. I am also the faculty co-advisor for the OU Microbiology Club.

Graduate training and research: I am developing a "pipeline" and database for molecular ecology sequencing data at OU with the Bioinformatics Core Facility (http://www.ou.edu/microarray/). This will be a university and eventually a world-wide resource for sequence data management and analysis. This work was initiated from workshops in ecoinformatics (SEEK Postdoctoral and New Faculty Training, Jan. 2006) and bioinformatics (ASM/BioQUEST Bioinformatics Institute, 2007), and during the development of a graduate level course called "Measuring Microbial Diversity and Distribution." I continue to train graduate students in Microbiology, Botany, and Zoology in the use of bioinformatics tools.

Instructor (since 2001) for the **International Geobiology Course** offered by the University of Southern California at the Wrigley Institute for Environmental Studies. I have taught the theory and practice of molecular microbial ecology to over 180 early to mid-level graduate students from around the world. The first of these students are now faculty, participating in the course and sending their own students for training. I was also a **co-convenor** of a **Geobiology symposium** at the 109th general meeting of the American Society for Microbiology in May 2009.

Instructor, 2009. The Theoretical and Practical Course on Molecular Approaches for *in situ* Biodegradation, The United States - European Commission Task Force on Biotechnology Research.

Referee for the Journal of Applied and Environmental Science, Environmental Science and Technology, Plant and Soil, Antonie van Leeuwenhoek, Trends in Microbiology, Experimental Biology and Medicine, International Society for Microbial Ecology Journal.

National Science Foundation, ad hoc reviewer, 2007, 2008, 2009, 2010.

North Carolina Biotechnology Center, ad hoc reviewer, 2009

National Academy of Sciences, Panel member, NRC/FCPRAC Citrus Greening Proposal Review Panel: Genomics/Microbial Ecology/Isolation/Culture (GMEIC), October 2008.

Department of Energy, Panel member, Role of Microbial Communities in Carbon Cycling, February 2010

Thesis and Doctoral Students Mentored

Lauren Cameron (M.S., Aug 2009)

Michael Ukpong (Ph.D. 2007-Present)

Heather Drilling (Ph.D. 2008-Present)

Awards, Service, and Professional Memberships

2010	Biofuels Research Search Committee, Departmental Representative, OU
2008-present	Graduate Student Recruitment Committee
2008	Search Committee, Department of Botany and Microbiology, OU
2007-present	Computer Committee, Chair, Department of Botany and Microbiology
2007-present	Steering Committee, Ecology and Evolutionary Biology Program, OU
2005-2007	Seminar Committee, Department of Botany and Microbiology, OU
2004	Geobiology Postdoctoral Fellowship, Agouron Insitute
2000	Scholarship, Microbial Diversity course, Marine Biological Laboratories
1999	DuVall Scholar Award, Department of Microbiology, MSU
1994-2000	Graduate Assistantship, Center for Microbial Ecology, MSU
1992-1993	Graduate Assistantship, Department of Microbiology, Miami University
1998-1999	Dean's Student Advisory Council
1998-1999	Scholarship and Awards Committee, College of Natural Science
1998-1999	Judiciary Hearing Committee, College of Natural Science
1998-2000	Seminar Committee, Center for Microbial Ecology
Since 2005	American Academy for the Advancement of Science
Since 2001	International Society for Microbial Ecology
Since 1999	Sigma Xi, The Scientific Research Society
Since 1996	American Society for Microbiology

EPSCoR-related Research

Enhancement of Microbial Biofuels Production

- **Genetic Manipulation and Monitoring Gene Expression in Clostridia Capable of Converting Synthesis Gas to Liquid Biofuels**

  I am developing a genetic system and tools to monitor gene expression in novel strains of clostridia that are capable of converting synthesis gas (CO, CO_2, and H_2) to liquid biofuels such as ethanol and butanol. My colleague, Dr. Ralph Tanner (OU Botany and Microbiology), originally isolated these organisms, which are part of a patented method to make bioethanol from renewable feedstocks (e.g. switchgrass) through conversion to syngas (i.e. gasification) and secondary fermentation of this syngas to ethanol. We have developed a genetic system that we are *now* using to genetically manipulate these strains (Ukpong et al., in preparation). One goal is to increase the copy number of genes for key enzymes in the metabolic pathway (e.g. alcohol dehydrogenase and carbon monoxide dehydrogenase). We have also developed primers for each targeted gene, allowing us to clone the gene and monitor its expression. We are currently using these tools to monitor the expression of key genes, along with related enzyme activities, rates of syngas utilization, and ethanol production in pilot-scale fermenters run by collaborators at Oklahoma State University. The resulting data will be the first of its kind and should provide unprecedented insight into this metabolism at the reactor-scale. This work has been funded by grants from NSF-EPSCoR, (Co-PI; $562,359, 2008-2013); Oklahoma Bioenergy Center, (Co-PI; $542, 978, 2009-2011); and Coskata Energy, Inc. (Co-PI, $400,000, completed). Through a grant with the Department of Energy Joint Genome Institute, two of these syngas-fermenting, ethanol producing clostridia are in the draft genome stage. A proposal to the DoE's program "Genomic Science and Technology for Energy and the Environment" is anticipated to conduct genome-based research on these organisms to better understand the regulation of this novel and extremely useful metabolism.