

Mary Beth Leigh, PhD

Associate Professor of Microbiology

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Education

- Ph.D. Microbiology (2003) University of Oklahoma, Co-advisors: John S. Fletcher and David P. Nagle
- M.S. Botany (1997) University of Oklahoma, Advisor: John S. Fletcher
- B.F.A. Modern Dance, Minor in Botany (1994) University of Oklahoma

Additional Training

- Postdoctoral Research Associate, Center for Microbial Ecology, Michigan State University, Mentor: James M. Tiedje (2005-2006)
- NSF Postdoctoral Fellow, NERC Center for Ecology and Hydrology, Oxford, U.K., Mentor: Mark J. Bailey (2004)
- NSF Postdoctoral Fellow, Center for Microbial Ecology, Michigan State University, Mentor: James M. Tiedje (2003-2005)
- E.U – U.S. Short Course in Molecular Biology for the Environment, Madrid, Spain (2003)
- David L. Boren Graduate International Fellow (1999-2001 Prague, Czech Republic)
- NASA Space Life Sciences Training Program (1994, Kennedy Space Center)

Experience in Research and Teaching

- Associate Professor of Microbiology, Institute of Arctic Biology, Department of Biology and Wildlife, University of Alaska Fairbanks (2011-present)
- Assistant Professor of Microbiology, Institute of Arctic Biology, Department of Biology and Wildlife, University of Alaska Fairbanks (2006 – 2011)
 - Courses regularly taught at UAF:BIOL 457/657 Environmental Microbiology (3 credit undergrad/graduate course, Writing Intensive), BIOL 342 Microbiology (4 credit undergrad course, with lab)
- Visiting Instructor, ERASMUS International Master of Science in Environmental Technology and Engineering IMETE Program. Institute of Chemical Technology, Prague, Czech Republic (2014)
- Fulbright Scholar in Teaching and Research, Hat Yai, Thailand (2013)
- American Society for Microbiology International Professorship to Latin America. Taught “Stable Isotope Probing: A Short Course” to students and faculty from across Brazil at the University of Sao Paulo, Sao Paulo, Brazil. (August 2008)
- Plant Physiologist and Biochemist, U. S. Environmental Protection Agency, Environmental Research Lab, Corvallis, OR (1997)
- NNEMS Research Fellow, U. S. Environmental Protection Agency, Environmental Research Lab, Corvallis, OR (1995, 1995)
- Student research assistant, NASA Environmental Analytical Chemistry lab, Kennedy Space Center (1994)

Publications (peer-reviewed)

Graduate student advisees underlined

* *Visiting international grad students/scholars*

** *Postdoctoral advisee*

1. McFarlin, K.M., R.C. Prince, R. Perkins and M.B. Leigh. 2014. Biodegradation of dispersed oil in arctic seawater at -1°C. *PloS one* 9 (1), e84297. DOI: 10.1371/journal.pone.0084297.
2. Leewis, M.-C., C.M. Reynolds and M.B. Leigh. 2013. Long term effects of nutrient addition and phytoremediation on diesel and crude oil contaminated soils in subarctic Alaska. *Cold Regions Science and Technology*. 96: 129-137.
3. Montazeri, N., B. Himelbloom, A. Oliveira, M.B. Leigh, and C. Crapo. 2013. Refined liquid smoke: a potential antilisterial additive to cold-smoked sockeye salmon (*Oncorhynchus nerka*). *Journal of Food Protection*. 76(5): 812-819.
4. King, M.G., C. M. Catranis, J. A. Soria and M. B. Leigh. 2013. Phytochemical and Toxicological Analysis of *Albizia falcataria* Sawdust. *International Wood Products Journal*. 4(4): 232-241. DOI: 10.1179/2042645312Y.0000000029.
5. Montazeri, N., A. Oliveira, B. Himelbloom, M.B. Leigh, and C. Crapo. 2013. Chemical Characterization of Commercially Refined Liquid Smokes. *Food Science & Nutrition* 1(1): 102-115. DOI: 10.1002/fsn3.9.
6. *Uhlik, O., Leewis, M.C., *Strejcek, M., Musilova, L., Leigh, M.B., Macek, T. 2012. Stable isotope probing in the metagenomics era: a bridge towards improved bioremediation. *Biotechnology Advances* 31(2): 154-165. <http://dx.doi.org/10.1016/j.biotechadv.2012.09.003>. PMC3578049. NIHMS413861.
7. **He, R. M. J. Wooller, J. W. Pohlman, C. Catranis, J. Quensen, J. M. Tiedje, M. B. Leigh. 2012. Identification of functionally active aerobic methanotrophs in sediments from an arctic lake using stable isotope probing. *Environmental Microbiology* 14(6):1403-1419.
8. **He, R. M. J. Wooller, J. W. Pohlman, J. Quensen, J. M. Tiedje, M. B. Leigh. 2012. Diversity of active aerobic methanotrophs along depth profiles of arctic and subarctic lake water column and sediments. *The ISME Journal*. doi:10.1038/ismej.2012.34. PMC3446799.
9. **He, R. M. J. Wooller, J. W. Pohlman, J. Quensen, J. M. Tiedje, M. B. Leigh. 2012. Shifts in identity and activity of methanotrophs in arctic lake sediments in response to temperature changes. *Applied and Environmental Microbiology* 78(13):4715-4723. PMC3370501.
10. *Štursová, M., Žifčáková, L., Leigh, M. B., Burgess, R., & Baldrian, P. 2012. Cellulose utilization in forest litter and soil: identification of bacterial and fungal decomposers. *FEMS Microbiology Ecology*,80(3): 735-746.
11. Wang, P., M. Qi, P. Barboza, M.B. Leigh, E. Ungerfeld**, L.B. Salinger, T. A. McAllister, R. J. Forster. 2011. Isolation of high-quality total RNA from rumen anaerobic bacteria and fungi, and subsequent detection of glycoside hydrolases. *Canadian Journal of Microbiology* 57:590-598.
12. Qi M, Wang P, O'Toole N, Barboza PS, **Ungerfeld E, M.B. Leigh, L.B. Selinger, G. Butler, A. Tsang, T.A. McAllister, R.J. Forster. 2011. Snapshot of the Eukaryotic Gene Expression in Muskoxen Rumen—A Metatranscriptomic Approach. *PLoS ONE* 6(5): e20521. doi:10.1371/journal.pone.0020521. PMC3105075.

13. Slater, H., T. Gouin & M.B. Leigh. 2011. Assessing the potential for rhizoremediation of PCB contaminated soils in northern regions using native tree species. *Chemosphere* 84:199-206. PMC3502615. NIHMS292411.
14. Leigh, MB, K Katalenich, C Hardy, & P Kohler. 2011. Climate change and creative expression. In *North by 2010*. H Eicken & A Lovecraft (Eds.). Univ. Alaska Press.
15. Cardenas, E, W.-M Wu, MB Leigh, J Carley, S Carroll, T Gentry, J Luo, D Watson, B Gu, M Ginder-Vogel, PK Kitanidis, PM Jardine, J Zhou, CS Criddle, TL Marsh & JM Tiedje. 2010. Significant Association between Sulfate-Reducing Bacteria and Uranium-Reducing Microbial Communities as Revealed by a Combined Massively Parallel Sequencing-Indicator Species Approach. *Appl. Environ. Microbiol.* 76: 6778-6786. PMC2953039.
16. Taylor, DL, IC Herriott, KE Stone, JW McFarland, MG Booth & MB Leigh. 2010. Structure and resilience of fungal communities in Alaskan boreal forest soils. *Can. J. For. Res.* 40:1288-1301.
17. Thomas, S.H., R.A. Sanford, B.K. Amos, M.B. Leigh, E. Cardenas and F.E. Löffler. 2010. Unique ecophysiology among U(VI)-reducing bacteria as revealed by evaluation of oxygen metabolism in *Anaeromyxobacter dehalogenans* strain 2CP-C. *Applied and Environmental Microbiology* 76:176-83. PMC2798628.
18. Larsen, T., D.L. Taylor, M.B. Leigh and D.M. O'Brien. 2009. Stable isotope fingerprinting: a novel method for identifying plant, fungal or bacterial origins of amino acids. *Ecology* 90:3526-3535.
19. Leigh, M.B., D.L. Taylor and J. Neufeld. 2009. Clone libraries of ribosomal RNA gene sequences for characterization of bacterial and fungal communities. Pages 3969-3993 in: Timmis, K.N. (Ed) *Microbiology of Hydrocarbons, Oils, Lipids, and Derived Compounds*. Springer (Heidelberg, Germany).
20. Green, S.J., Leigh, M.B. and Neufeld, J.D. 2009. Denaturing gradient gel electrophoresis (DGGE) for microbial community analysis. Pages 4137-4158 in: Timmis, K.N. (Ed) *Microbiology of Hydrocarbons, Oils, Lipids, and Derived Compounds*. Springer (Heidelberg, Germany).
21. *Uhlik, O., K. Jecna, M. B. Leigh, M. Mackova, T. Macek 2009. DNA-based stable-isotope probing: a link between community structure and function. *Science of the Total Environment* 407(12):3611-9.
22. Wooller MJ, Ruppel C, Pohlman JW, Leigh MB, Heintz M. 2009. Permafrost gas hydrates and climate change: Lake-based seep studies on the Alaskan north slope. *Fire in the Ice* 4: 6-9.
23. Cardenas, E., M.B. Leigh, W.-M. Wu, J. Carley, C. Criddle, T.L. Marsh and J.M. Tiedje. 2008. Microbial communities in contaminated sediments, associated with bioremediation of uranium to submicromolar levels. *Applied and Environmental Microbiology* 74(12):3718-29. PMC2446554.
24. *Uhlik, O., K. Francová, M. Mackova, M. B. Leigh and T. Macek. 2008. New approaches in microbial population analysis: Stable isotope probing (SIP) for the detection of active microorganisms active in xenobiotic degradation. *Chemicke Listy* 102:474-479.
25. M. Saleem, H. Brim, S. Hussain, M. Arshad, M. B. Leigh and Zia-ul-hassan. 2008. Perspectives on microbial cell surface display in bioremediation. *Biotechnology Advances.* 26: 151–161.

26. Filler, D.M., D. Van Stempvoort and M.B. Leigh. 2008. Remediation of frozen ground contaminated with petroleum hydrocarbons: feasibility and limits. *Permafrost Soils*. R. Margesin (Ed.). Springer-Verlag. p 279-302.
27. Leigh, M.B., V.H. Pellizari, O. Uhlik, R. Sutka, J. Rodrigues, N.E. Ostrom, J. Zhou and J.M. Tiedje. 2007. Biphenyl-utilizing bacteria and their functional genes in a pine root zone contaminated with polychlorinated biphenyls (PCBs). *ISME Journal* 1:134-148.
28. Wu, W.-M., J. Carley, J. Luo, M. A. Ginder-Vogel, E. Cardenas, M.B. Leigh, C. Hwang, S.D. Kelley, C. Ruan, L. Wu, T. Gentry, K. Lowe, T. Melhorn, S. Carroll, M.W. Fields, B. Gu, D. Watson, K.M. Kemner, T.L. Marsh, J.M. Tiedje, J. Zhou, S. Fendorf, P.K. Kitanidis, P.M. Jardine and C.S. Criddle. 2007. In situ bioreduction of Uranium (VI) to submicromolar levels and reoxidation by dissolved oxygen. *Environmental Science & Technology* 41:5716-5723.
29. Leigh, M.B. 2006. Methods for rhizoremediation research, p. 32-55. In *Phytoremediation and Rhizoremediation*, M. Mackova, T. Macek and D. Dowling (ed.), *Focus on Biotechnology*, vol. 9A, Springer, Berlin.
30. Leigh, M.B., P. Prouzova, M. Mackova, T. Macek, D.P. Nagle and J.S. Fletcher. 2006. Polychlorinated biphenyl (PCB)-degrading bacteria associated with trees in a PCB contaminated site. *Applied and Environmental Microbiology* 72(4):2331-2342. PMC1449058.
31. Manefield, M., R. Griffiths, M.B. Leigh, R. Fisher and A. Whiteley. 2005. Functional and compositional comparison of two activated sludge communities remediating coke effluent. *Environmental Microbiology* 7(5)715-722.
32. Olson, P.E., T. Wong, M.B. Leigh and J.S. Fletcher. 2003. Allometric modeling of plant root growth and its application in rhizosphere remediation of soil contaminants. *Environmental Science and Technology* 37:638-643.
33. Demnerova, K., M. Mackova, P. Kucerova, L. Chroma, H Novakova, M.B. Leigh J. Burkhard, J Pazlarova and T. Macek. 2003. Bioremediation of PCBs from Contaminated Soil. *The Utilization of Bioremediation to Reduce Soil Contamination: Problems and Solutions* 19:341 Springer.
34. Demnerova, K, H Stiborova, MB Leigh, D Pieper, J Pazlarova, V Brenner, T Macek and M Mackova. 2003. Bacteria degrading PCBs and CBs isolated from long-term PCB contaminated soil. *Water, Air, & Soil Pollution: Focus*. 3(3):47-55.
35. Demnerova, K, M Mackova, J Pazlarova, M Vosahlikova, H Novakova, E Jindrova, E Ryslava, T Macek, N Vrchotova, V Brenner, L Pavlů, S Totevova, T Kristoffer, DD Focht, F Fava, D Gioia, L Marchetti, JS Fletcher, MB Leigh, P Kucerova, H Stiborova, V Mateju, M Sobotka, F Kastanek, P Kastanek, L Kasak. 2003. PCB – Approaches to Removal from the Environment. *Innovative Approaches to the On-site Assessment and Remediation of Contaminated Sites*. P 217-263. Springer, Netherlands.
36. Leigh, M.B., J.S. Fletcher, X. Fu and F.J. Schmitz. 2002. Root turnover: an important source of microbial substrates in rhizosphere remediation of recalcitrant contaminants. *Environmental Science and Technology* 36:1579-1583.
37. Leigh, M.B., J.S. Fletcher, D.P. Nagle, M. Mackova and T. Macek. Vegetation and Fungi at Czech PCB-Contaminated Sites as Bioremediation Candidates. In *Phytoremediation, Wetlands and Sediments*, the Sixth International In Situ and On-Site Bioremediation Symposium, San Diego, Calif., June 4-7, 2001; Leeson, A., Foote, E. A., Banks, M. K., Magar, V., Eds. Battelle Press: Columbus, Ohio. p 61-68.

38. Demnerova, K., M. Mackova, P. Kucerova, M.B. Leigh H. Novakova, J. Burkhard and T. Macek. 2000. Practical use of bioremediation for PCB removal from contaminated soil. *Focus on Biotechnology*, (M. Hofman and J. Anne, series eds.), Vol 3, Kluwer Academic Publishers, Dordrecht.
39. Fletcher, J, P Olson and MB Leigh. 1997. The Role of Phytoremediation in Intrinsic Bioremediation. *Proceedings of the Fourth International In Situ and On-Site Bioremediation* 4(2).

Awards

- Fulbright Award to Thailand (2013)
- Outstanding Biology Teaching Award, University of Alaska Fairbanks Department of Biology and Wildlife (2011-12)
- American Society for Microbiology International Professorship to Latin America (2008)

Service

- Editorial board, *International Journal of Phytoremediation* and *Frontiers in Systems Microbiology*
- Vice President, *International Phytotechnologies Society*
- President, American Society for Microbiology Alaska Branch (2009-10)
- External reviewer for U.K. Natural Environment Research Council (NERC)
- Review panelist for proposals for U. S. Department of State Science Center Programs
- Review panelist for David L. Boren National Security Education Program (NSEP) Fellowships
- Ad hoc reviewer and panelist for NSF DEB – Ecosystems Sciences
- Ad hoc reviewer for journals including *Proceedings of the National Academy of Sciences*, *Environmental Science and Technology*, *Applied and Environmental Microbiology*, *Microbial Ecology*, *The ISME Journal*, *Biodegradation*, *Cold Regions Science and Technology*, *Food Technology and Biotechnology Journal*, *Environmental Pollution* and others

Professional Society Memberships

- International Society for Microbial Ecology
- American Society for Microbiology
- American Association for the Advancement of Science
- International Phytotechnologies Society

Outreach

- Producer and Director of *In a Time of Change* program, series of artist-scientist workshops on climate change ecology, and resultant performances and art exhibits. Also choreographed and danced in performances (2008-present).
- Produced, choreographed, performed and lead post-show discussion for “Perspectives”, a modern dance concert by Deliquescent Designs Dance based in part on Alaskan climate change science. New York City International Fringe Festival (2010).
- Organized and co-taught early college course for middle school children in “Climate Change and Creative Expression” through Effie Kokrine Charter School and UAF

College of Rural and Community Development. Included climate change science, creative writing and dance, and culminated in free public performance and book of student poetry (Spring 2009).

- Mentored Rural Alaska Honors Institute 2 (RAHI-2) high school students in research projects
- Mentored Alaska State High School Science Symposium and REAP students (2007-2014, 2 placed in the top 3 statewide).