

Raven Lee Bier  
Curriculum Vitae

Microbiology Research Group  
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Stroud Water Research Center  
970 Spencer Rd.  
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## **EDUCATION**

- Ph.D. University Program in Ecology, Duke University, Durham, NC 2016
- Emily S. Bernhardt, advisor
  - Dissertation: *Microbial responses to environmental change*
- B.A. Biology (Magna Cum Laude), Carleton College, Northfield, MN 2007
- Honors: William Carleton Scholar, Dean's List 2004-05 and 2005-06, Phi Beta Kappa, Sigma Xi Research Society

## **PROFESSIONAL EXPERIENCE**

### Postdoctoral Research

Research Associate, Stroud Water Research Center

- *Microbial connections between farm practices and water quality.* Jinjun Kan, advisor 2018-now

Research Fellow, Uppsala University, Sweden

- *Assembly and function of microbial communities.* Silke Langenheder, advisor 2016-2018

### Research

- Visiting Scholar (UVR Effects on Biofilms)– Battin Lab – EPFL, Switzerland Fall 2015
- Research Assistantship (Implications of Nanotechnology) – Duke University Summer 2012
- Research Assistantship (Water Quality Consequences of Mining) – Duke University 2010-2011
- Research Technician (Ecological Effects of Nanoparticles) – UC Santa Barbara 2009-2010
- Research Technician (Ecological & Evolutionary Plant Genetics) – University of Georgia 2008-2009
- Research Associate (Wetland & Soil Biogeochemistry) – Duke University 2007-2008
- Consultant (Effects of Ecosystem Perturbations on Microbial Function) – USGS Summer 2013

### Teaching

- Teaching Assistantship (Microbiology) – Duke University Spring 2014
- Teaching Assistantship (Aquatic Field Ecology) – Duke University Fall 2013
- Teaching Assistantship (Molecular Biology) – Duke University Spring 2011, 2012
- Teaching Assistantship (Biogeochemistry, Developmental Neurobiology)– Carleton College 2006-2007

## **PUBLICATIONS**

**Google Scholar Profile:** <https://scholar.google.com/citations?user=A2gu4vgAAAAJ&hl=en>

Hall E.K., E.S. Bernhardt, **R.L. Bier**, M.A. Bradford, C.M. Boot, J.B. Cotner, P.A. del Giorgio, S.E. Evans, E.B. Graham, S.E. Jones, J.T. Lennon, K. Locey, D.R. Nemergut, B.B. Osborne, J.D. Rocca, J.P. Schimel, M.P. Waldrop, M.D. Wallenstein. Understanding how microbiomes influence the systems they inhabit: Lessons from ecosystem ecology. *In press at Nature Microbiology.*

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- Arnold, M.C., T.T. Lindberg, **R.L. Bier**, E.S. Bernhardt, and R.T. Di Giulio. 2017. Biofilm mediated uptake of selenium in streams with mountaintop coal mine drainage. *Limnologica* 65: 10-13.
- Guy-Haim, T., H. Alexander, T.W. Bell, **R.L. Bier**, L.E. Bortolotti, C. Briseño-Avena, X. Dong, A.M. Flanagan, J. Grosse, L. Grossmann, S. Hasnain, R. Hovel, C.A. Johnston, D.R. Miller, M. Muscarella, A.E. Noto, A.J. Reisinger, H.J. Smith, K. Stamieszkin. 2017. What are the type, direction, and strength of species, community, and ecosystem responses to warming in aquatic mesocosm studies and their dependency on experimental characteristics? A systematic review protocol. *Environmental Evidence* 6: 6.
- Bier, R.L.**, E.S. Bernhardt, C.M. Boot, E.B. Graham, E.K. Hall, J.T. Lennon, D.R. Nemergut, B.B. Osborne, C. Ruiz-González, J.P. Schimel, M.P. Waldrop, M.D. Wallenstein. 2015. Linking microbial community structure and microbial processes: an empirical and conceptual overview. *FEMS Microbiology Ecology* 91: 1-11.
- Bier, R.L.**, K.A. Voss, and E.S. Bernhardt. 2015. Bacteria community responses to a gradient of alkaline mountaintop mine drainage in Central Appalachian streams. *The ISME Journal* 9: 1378-1390.
- Cardinale, B.J., **R. Bier**, and C. Kwan. 2012. Effects of TiO<sub>2</sub> nanoparticles on the growth and metabolism of three species of freshwater algae. *Journal of Nanoparticle Research* 14: 913.
- Kulacki, K.J., B.J. Cardinale, A.A. Keller, **R. Bier**, and H. Dickson. 2012. How do stream organisms respond to, and influence, the concentration of titanium dioxide nanoparticles? A mesocosm study with algae and herbivores. *Environmental Toxicology and Chemistry* 31: 2414-2422.
- Lindberg, T.T., E.S. Bernhardt, **R. Bier**, A.M. Helton, R.B. Merola, A. Vengosh, and R.T. Di Giulio. 2011. Cumulative impacts of mountaintop mining on an Appalachian watershed. *PNAS* 108: 20929-20934.
- Phillips, R.P., Y. Erelitz, **R. Bier**, and E.S. Bernhardt. 2008. A new approach for capturing soluble root exudates in forest soils. *Functional Ecology* 22: 990-999.

*In Preparation/Review*

- Bier, R.L.**, J. Wernegreen, R. Vilgalys, and E.S. Bernhardt. Subsidies or stressors? How alkaline mine drainage shapes microbial communities. *In preparation*.
- Bier, R.L.**, A.J. Székely, M. Vass, S. Langenheder. Effects of environmental fluctuations on the temporal dynamics of community assembly mechanisms. *In preparation*.
- Bier, R.L.**, A.J. Székely, M. Vass, S. Langenheder. Coalescence of soil and water bacteria on the diversity, function, and stability of microbial communities. *In preparation*.
- Simonin, M., K.A. Voss, B.A. Hassett, J.D. Rocca, S. Wang, **R.L. Bier**, C.R. Violin, J.P. Wright, E.S. Bernhardt. What is the microbial mayfly? Identifying bacterial indicator taxa along an urbanization gradient in stream ecosystems. *In review at ISME J.*
- Guy-Haim, T., H. Alexander, T.W. Bell, **R.L. Bier**, L.E. Bortolotti, C. Briseño-Avena, X. Dong, A.M. Flanagan, J. Grosse, L. Grossmann, S. Hasnain, R. Hovel, C.A. Johnston, D.R. Miller, M. Muscarella, A.E. Noto, A.J. Reisinger, H.J. Smith, K. Stamieszkin. 2017. How do experimental characteristics of aquatic mesocosms change the direction and magnitude of effect sizes in climate change research? *In preparation*. Eco-DAS participant required manuscript
- Johnson, W., H. Alexander, M. Muscarella, **R. Bier**, D. Miller, K. Pitz, H.J. Smith. Functional redundancy in auxotrophy. *In preparation*. Eco-DAS participant required manuscript

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**Bier, R.L.** , B. Csitári, S. Langenheder. The influence of lake inlets on assembly of methanotrophs in small, boreal lakes. *In preparation*.

**PRESENTATIONS**

- Symposium on Aquatic Microbial Ecology. September 2017. "Effects of environmental fluctuations on the temporal dynamics of community assembly mechanisms." with Anna J. Székely, Máté Vass, and Silke Langenheder. (*oral presentation*)
- Eco-DAS XII (Ecological Dissertations in Aquatic Sciences). 2016. "Tunnel vision? How gradient study characteristics influence our interpretation of microbial responses." (*oral presentation*)
- Gordon Research Conference and Seminar for Applied and Environmental Microbiology. 2015. "Moving beyond lip service: How are we forging conceptual, analytical, and mechanistic links between microbial structure and ecosystem function?" with USGS Powell Center for Analysis and Synthesis Working Group: Next-Generation of Ecological Indicators (*oral presentation and poster*)
- Duke University's Human and Environmental Microbiome Symposium. 2014. "Mining Microbiomes: Stream sediment microbial communities below mountaintop coalmines." with Emily S. Bernhardt, Jennifer Wernegreen, and Rytas Vilgalys. (*oral presentation*)
- Joint Aquatic Sciences Meeting. 2014 and University of North Carolina – Chapel Hill Curriculum for the Environment and Ecology Symposium. 2015. "Meromictic lakes in Central Appalachia? Characterization of biogeochemistry downstream from Appalachia's largest surface coalmine." with Emily S. Bernhardt. (*poster*)
- American Geophysical Union Fall Meeting. 2012. "Examining microbial community response to a strong chemical gradient: the effects of surface coal mining on stream bacteria." with Richard T. Di Giulio, Ty Lindberg, Si-Yi Wang, and Emily S. Bernhardt. (*poster*)
- Ecological Society of America Annual Meeting. 2011. "Effects of surface coal mine drainage on stream microbial communities." with Ty Lindberg, Si-Yi Wang, and Emily S. Bernhardt. (*oral presentation*)
- Society for Comparative and Integrative Biology Annual Meeting 2009, Boston, MA. "Fiddler crab locomotion: are tide-related rhythms the same in lab and field studies?" with Renae Brodie, Richard Tankersley, and Paola Lopez-Duarte. (*poster*)
- Benthic Ecology Annual Meeting 2007, Atlanta, GA. "Behavioral, developmental and physiological constraints on the distribution of fiddler crab (*Uca minax*, LeConte, 1855) larvae within a river-dominated estuary." with Renae Brodie, Stephen Borginani, and Jennifer Mraz. (*poster*)

Invited Presentations, Workshops

2018. Oak Ridge National Laboratory, USA.
2018. Validation & reporting of single-species eDNA analyses, University of Innsbruck, Austria. DNAqua-Net, EU COST Action CA15219
2016. Ecological Dissertations in the Aquatic Sciences, funded by NSF, sponsored by University of Hawai'i, USA.
2016. Université du Québec à Montréal, Montréal, QC, Canada.
2016. University of Colorado at Denver, USA.

Additional Selected Presentations (collaborating author)

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- SETAC Europe. 2018. "OECD 308 tests to explore differences in persistence of pharmaceuticals and bacterial diversity." presented by Claudia Coll with Zhe Li, **Raven Bier**, Silke Langenheder and Anna Sobek. (*poster presentation*)
- SETAC Europe. 2017. "How important is sediment microbial diversity for degradation of pharmaceuticals?" presented by Claudia Coll with Zhe Li, **Raven Bier**, Silke Langenheder and Anna Sobek. (*poster presentation*)
- Carolina Society of Environmental Toxicology and Chemistry. 2014 "Bioaccumulation and trophic transfer of selenium in biofilms and fish from a mountaintop removal coal mining-impacted stream." presented by Mariah C. Arnold with Ty Lindberg, L. Friedrich, **Raven Bier**, V. Palace, Emily S. Bernhardt, Richard T. Di Giulio.

**AWARDS**

- Olsson-Borghs Research Grant (293000 SEK ~\$31,000 USD)  
2017
- US-EPA STAR Fellowship 2014-2016
- Gordon Research Seminar for Applied and Environmental Microbiology – Invited Speaker  
2015
- Duke University Department of Biology One-Semester Fellowship 2014
- Duke University Graduate School Summer Research Fellowship Summer 2014
- Keever Fund (\$1000 for research proposal) – Department of Biology, Duke University 2012

**APPOINTMENTS**

- Uppsala Water Centre (UVC) Forum planning committee Spring 2017
- Uppsala University Limnology Department Retreat Co-organizer Winter 2017
- Duke University Graduate and Professional Student Council General Assembly 2014-2015
- Duke University Committee on Facilities and the Environment, Graduate Student Rep. 2014-2015
- Co-leader of Duke University Program in Ecology Seminar 2011-2013
- Communications Chair of Duke Chapter Sigma Xi Research Society 2011-2014

**SERVICE**

Journal Referee

- The ISME Journal, Aquatic Microbial Ecology, Biogeosciences, Environmental Microbiology, FEMS Microbiology Ecology, Freshwater Biology, Molecular Ecology, npj Biofilms and Microbiomes, Limnologica, PLOS One, Scientific Reports

Students Mentored

- Claudia Coll, PhD Student, Stockholm University
- Sophia Renes, PhD Student, Swedish University of Agricultural Sciences (half-time examiner)
- Mayra Rulli, visiting Masters Student, Uppsala University
- Anders Lundqvist, Research Training Student, Uppsala University
- Karsten Meier, Masters Student Internship, Uppsala University
- Gaurav Sen, Undergraduate Independent Study, Duke University
- Sidhartha Jandhyala, Summer Research Student, NC State University

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Outreach Activities

- SciFest Science Festival in Uppsala, Sweden "Microbes in the Kitchen" March 2017
- Research lab introduction for middle school children, Uppsala University December 2016
- North Carolina School of Science and Math Mini-course Spring 2016
- Assisted with a high school mini-course on microbial stress responses
- NIH DNA Day for North Carolina Spring 2015
- Taught genomics lesson and activities for 3 local high school biology classes
- Women in Mathematics Mentoring Program 2013-2014
- Mentoring 8<sup>th</sup> grade girls and encouraging interest in math through field trips and activities
- Museum of Life and Science – Weekend Program: NanoDays Spring 2013
- Created and implemented activities on nanotechnology and microorganisms for children at local museum
- Museum of Life and Science – Meet a Scientist Spring 2012
- Created and implemented activities on osmosis, biological indicators, and rock weathering for children at local museum
- Museum of Life and Science – After Hours Program: NanoNights Spring 2012
- Created and implemented activities on nanotechnology and microorganisms for adults at local museum
- North Carolina Regional Science Olympiad – forensics judge Spring 2012
- FEMMES Capstone Day Mentor 2011, 2012
- Undergraduate Mentor (designed and worked on projects in the lab) Spring 2011, Summer 2012
- Projects: 1) Identifying regional water quality patterns  
2) Comparing pulse and press additions of silver nanoparticles to river sediments
- FEMMES Mentor (Females Excelling More in Math, Engineering, and Science) 2010-2011
- Visited local elementary school weekly to implement hands-on activities