

## **CURRICULUM VITAE**

**Emily S. Bernhardt**

Professor

Department of Biology

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### **EDUCATION:**

1996, B.S., Biology, minor in Chemistry, University of North Carolina, Chapel Hill, NC

2001, Ph.D., Ecology and Evolutionary Biology, Cornell University, Ithaca, NY

### **RESEARCH INTERESTS:**

Effects of global environmental change (urbanization, N deposition, rising CO<sub>2</sub>) on watershed biogeochemistry; restoration ecology; coupled biogeochemical cycling (C,N,S,O); urban ecology

### **RESEARCH AND PROFESSIONAL EXPERIENCE / AFFILIATIONS:**

2016-present, Professor, Department of Biology, Duke University

2010-2016, Associate Professor, Department of Biology, Duke University

2004-2010, Assistant Professor, Department of Biology, Duke University

2005-Present, Secondary Appointment, Division of Environmental Science & Policy, Nicholas School of the Environment and Earth Sciences, Duke University

2002-2004 Postdoctoral Fellow, Departments of Entomology & Biology, University of Maryland, College Park

2001-2002 Postdoctoral Fellow, Nicholas School of the Environment and Earth Sciences, Duke University

### **HONORS AND AWARDS:**

2015 Mercer Award for best paper by scientists under 40 by the Ecological Society of America together with Marcelo Ardón, Jennifer Morse and Ben Colman

2015 Leopold Leadership Fellow, Leopold Leadership Program, Stanford Woods Institute for the Environment

2015 Friedrich Wilhelm Bessel Award, Alexander von Humboldt Foundation, Germany

2014 International IGB Fellowship in Freshwater Sciences, Leibniz-Institut for Freshwater Ecology and Inland Fisheries, Berlin, Germany

2013 Yentsch-Schindler Early Career Award, Association for the Sciences of Limnology and Oceanography

2010 Thomas Langford Lectureship, Duke University

2008 Outstanding Postdoctoral Mentor Award, Duke University Postdoctoral Association

2005 NSF CAREER Award for New Investigators

2004 H.G. Hynes Award for New Investigators from the North American Benthological Society

**PUBLICATIONS:**

Underline indicates that the author was a member of my research group for some or all of the work reported  
<sup>‡</sup> are used to indicate graduate student authors for whom I served as a minor committee member during the work  
& indicates papers arising from synthesis projects in my graduate Biogeochemistry course

**BOOKS**

Schlesinger, W.H. and **E.S. Bernhardt**. 2013. Biogeochemistry: An analysis of global change. 3<sup>rd</sup> edition. Elsevier. 688pp.

**JOURNAL ARTICLES**

*Published or In Press*

101. Ross, M.R., B.L. McGlynn and **E.S. Bernhardt**. 2016. Deep impact: Effects of mountaintop mining on surface topography, bedrock structure, and downstream waters. Environmental Science and Technology 10.1021/acs.est.5b04532
100. Ardón, M., A.M. Helton and **E.S. Bernhardt**. 2016. Drought and saltwater incursion synergistically reduce dissolved organic carbon export from coastal freshwater wetlands. Biogeochemistry DOI 10.1007/s10533-016-0189-5
99. Somers KA, DL Urban and **E.S. Bernhardt**. 2016. Downstream Dissipation and Management of Storm Flow Heat Pulses: A Case Study and its Implications. Journal of the American Water Resources Association. JAWRA-14-0247-P
98. Gorka, D.E., JS. Osterberg, C.A. Gwin, B.P. Colman, J.N Meyer and **E.S. Bernhardt**. 2015. Reducing Environmental Toxicity of Silver Nanoparticles through shape control. Environmental Science and Technology 49: 10093-10098.
97. Bier, R., **E.S. Bernhardt**, C. Boot, E. Graham, E. Hall, J. Lennon, D. Nemergut, B. Osborne, C. Ruiz Gonzalez, J. Schimel, M. Waldrop, M. Wallenstein. 2015. Linking microbial community structure and microbial processes: an empirical and conceptual overview. FEMS Microbiology Ecology 91: fiv113.
96. Ross, M.R., **E.S. Bernhardt**, M.W. Doyle and J.B. Heffernan. 2015. Designer Ecosystems: Incorporating design approaches into ecosystem management. Annual Review of Environment and Resources. 40: 419-443.
95. <sup>‡</sup>Helton, A.M., M.S. Wright, **E.S. Bernhardt**, G.C. Poole, R.M. Cory and J.A. Stanford. 2015. Carbon supply and bioavailability within the hyporheic zone of an alluvial river floodplain. JGR Biogeosciences 120: 693-706.
94. Helton, A., M. Ardón, and E.S. Bernhardt. 2015. Thermodynamic constraints on the utility of ecological stoichiometry for explaining global biogeochemical patterns. Ecology Letters 18: 1049-1056.

93. Voss, K.A., R.S. King and **E.S. Bernhardt**. 2015. From a line in the sand to a landscape of decisions: a hierarchical diversity decision framework for estimating and communicating biodiversity loss along anthropogenic gradients. Methods in Ecology and Evolution. 6: 795-805.
92. <sup>‡</sup>Duncan, J.M., L.E. Band, P.M. Groffman and E.S. Bernhardt. 2015. Mechanisms driving the seasonality of catchment scale nitrate export: Evidence for riparian ecohydrologic controls. Water Resources Research 51: 3982-3997.
91. <sup>‡</sup>Arnold, M.C., L. Friedrich, T. Lindberg, M. Ross, N. Halden, **E.S. Bernhardt**, V. Palace, and RT Di Giulio. 2015. Microchemical analysis of selenium in otoliths of two West Virginia fishes captured near mountaintop coal removal mining operations. Environmental Toxicology and Chemistry. 34: 1039-1044.
90. Yang, Y., B.P. Colman, **E.S. Bernhardt** and M.F. Hochella, Jr. 2015. The Importance of a Nanoscience Approach in the Understanding of Major Aqueous Contamination Scenarios: A Case Study from a Recent Coal Ash Spill. Environmental Science and Technology 49: 3375-3382.
- 89 <sup>‡</sup>Schoepfer, V., **E.S. Bernhardt** and A.J. Burgin. 2014. Iron Clad Wetlands: Soil iron-sulfur buffering determines coastal wetland response to salt water incursion. JGR Biogeosciences 199: 2209–2219.
88. Bier, R.L., K.A. Voss and **E.S. Bernhardt**. 2014. Bacterial community responses to a gradient of alkaline mountaintop mine drainage in Central Appalachian streams. The ISME Journal. 9: 1378-1390.
87. Payn, R., A.M. Helton, G.C. Poole, C. Izurieta, A.J. Burgin and **E.S. Bernhardt**. 2014. A generalized mechanistic model for applying thermodynamic, kinetic, and stoichiometric ecological theory to the biogeochemistry of aquatic microbial ecosystems. Ecological Modeling. 294:1-18.
86. Appling, A.P., **E.S. Bernhardt** and J.A. Stanford. 2014. Floodplain biogeochemical mosaics: a multidimensional view of alluvial soils. JGR Biogeosciences. 119: 1538-1553.
85. Helton, A.M., **E.S. Bernhardt** and A. Fedders. 2014. Biogeochemical regime shifts in coastal landscapes: the contrasting effects of saltwater incursion and agricultural pollution on greenhouse gas emissions from a freshwater wetland. Biogeochemistry. 120:133-147.
86. <sup>‡</sup>&Carmichael, M.J., **E.S. Bernhardt**, S.L. Bräuer and W.K. Smith. 2014. The Role of Vegetation in Methane Flux to the Atmosphere: Should Vegetation be Included as a Distinct Category in the Global Methane Budget. Biogeochemistry 119: 1-24.
85. Colman, B.P., B. Espinasse. C.J. Richardson, C.W. Matson, G.V. Lowry, D.E. Hunt, M.R. Wiesner, and **E.S. Bernhardt**. 2014. Emerging contaminant or an old toxin in disguise?

- Silver nanoparticle impacts on ecosystems. Environmental Science and Technology 48: 5229-5236.
84. <sup>¶</sup>Wang, S., E.S. Bernhardt and J.P. Wright. 2014 Urban stream denitrifier communities are linked to lower functional resistance to multiple stressors associated with urbanization Hydrobiologia 726: 13-23.
  83. Levard C, Hotze EM, Colman BP, Dale AL, Truong L, Yang X, Bone A, Brown GE, Tanguay RL, Di Giulio RT, **Bernhardt ES**, Meyer JN, Wiesner MR, Lowry GV. 2013 Sulfidation of silver nanoparticles: natural antidote to their toxicity. Environmental Science & Technology, 47, 13440-13448
  82. Lutz, B.D., **E.S. Bernhardt** and W.H. Schlesinger. 2013. The environmental price tag on a ton of mountaintop removal coal. PLoS ONE 8(9): e73203
  81. Riegel, J.B., **E.S. Bernhardt** and J. Swenson. 2013. Estimating above-ground carbon biomass in a newly restored coastal plain wetland using remote sensing. PLoS ONE 8(6): e68251
  80. Ardón, M., J.L. Morse, B.P. Colman and **E.S. Bernhardt**. 2013. Drought-induced saltwater intrusion leads to increased wetland nitrogen export. Global Change Biology. 19: 2976-2985. *\*\*This paper was featured in the Research Highlights section of Nature 498: 274 and received the 2015 Mercer Award from the Ecological Society of America*
  79. Baron, J.S., EK Hall, BT Nolan, JC Finlay, **ES Bernhardt**, JA Harrison, F. Chan, EW Boyer. 2013. The interactive effects of excess reactive nitrogen and climate change on aquatic ecosystems and resources of the United States. Biogeochemistry 114:71-92.
  78. <sup>¶</sup>Sudduth, E.B., S.S. Perakis and **E.S. Bernhardt**. 2013. Nitrate in watersheds: straight from soils to streams? JGR-Biogeosciences 118: 291-302. *\*\*this article selected by the American Geophysical Union as a "Research Spotlight" in EOS*
  77. Colman, B.P., C. Arnaout, S. Anciaux, C. Gunsch, M.F. Hochella, B. Kim, B, McGill, B, Reinsch, C.J. Richardson, J. Unrine, J.P. Wright, L. Yin, **E.S. Bernhardt**. 2013. Low Concentrations of Silver Nanoparticles in Biosolids Cause Adverse Ecosystem Responses under Realistic Field Scenario. PLOS-One 8: e57189.
  76. Morse, J.L. and **E.S. Bernhardt**. 2013. Using <sup>15</sup>N dual tracers to estimate the relative contribution of nitrification and denitrification to N<sub>2</sub>O and N<sub>2</sub> emissions in coastal plain wetlands under contrasting land uses and soil moisture conditions. Soil Biology and Biochemistry 57: 635-643.
  75. <sup>¶</sup>Cha, Y., C. Stow and **ES Bernhardt**. 2013. Dreissenid invasion impacts on chlorophyll and total phosphorus in 25 US lake ecosystems. Freshwater Biology 58: 192-206.
  74. **Bernhardt, E.S.** 2013. Invited *Perspective: Cleaner Lakes are Dirtier Lakes*. Science. 342: 205-206.

73. Somers, K.A., **E.S. Bernhardt**, J.B. Grace, B.A. Hassett, E.B. Sudduth, <sup>ψ</sup>S. Wang, and D.L. Urban. 2013. Streams in the urban heat island: spatial and temporal variability in stream temperatures. Freshwater Science 32: 309-326.
72. Morse, J.L., M. Ardón and **E.S. Bernhardt**. 2012. Using environmental variables and soil processes to forecast denitrification potential and nitrous oxide fluxes in coastal plain wetlands across different land-uses. JGR-Biogeosciences. 117: G02023
71. Yin, L., B. Colman, B. McGill, J.P. Wright, **E.S. Bernhardt**. 2012. Effects of Silver Nanoparticle Exposure on Germination and Early Growth of Eleven Wetland Plants. PLOS One 7(10): e47674.
70. **Bernhardt, E.S.**, B.J. Lutz, R. King, J. Fay, C.A. Carter, A.M. Helton, J. Amos, and D. Campagna. 2012. How many mountains can we mine? Examining the regional impact of surface mining on freshwater ecosystems of the Central Appalachians. Environmental Science and Technology. 46: 8115-8122.
69. Phillips, R.P., I. Meier, S. Grandy, Wickings, **E.S. Bernhardt** and A. Finzi. 2012. Root and mycorrhizal priming effects accelerate the loss of recently fixed carbon in forests exposed to elevated CO<sub>2</sub>. Ecology Letters 15: 1042-1049.
68. Lutz, B.J., P.J. Mulholland and **E.S. Bernhardt**. 2012. Long-Term Data Reveal Patterns and Controls on Streamwater Chemistry in a Forested Watershed: Walker Branch, Tennessee. Ecological Monographs 82: 367-387.
67. Morse, J.L., M. Ardón and **E.S. Bernhardt**. 2012. Greenhouse gas fluxes in coastal plain wetlands under contrasting land uses. Ecological Applications 22: 264-280.
66. Colman, B.P., M. Auffan, Liu, J., M. Wiesner and **E.S. Bernhardt**. 2012. Antimicrobial effects of commercial silver nanoparticles are attenuated in natural streamwater and sediment. Ecotoxicology 21:1867-1877.
65. Lowry, G.V. and 14 coauthors including B.P. Colman and **E.S. Bernhardt**. 2012. Long-Term Transformation and Fate of Manufactured Ag NPs in a Simulated Large Scale Freshwater Emergent Wetland. Environmental Science and Technology
64. Izurieta, C, GC Poole, RA Payn, AM Helton, I Griffith, R Nix, **E Bernhardt**, and AJ Burgin. 2012. Development and application of a simulation environment (NEO) for integrating empirical and computational investigations of system-level complexity. *Proceedings of the International Conference on Information Science and Applications*. doi:10.1109/ICISA.2012.6220928.
63. Baulch, H.M., E.H. Stanley and **E.S. Bernhardt**. 2011. *Can algal uptake stop NO<sub>3</sub><sup>-</sup> pollution?* *Nature* 477:E3

62. Lindberg, T.T., **E.S. Bernhardt**, R. Bier, A. Helton, R. Merola, A. Vengosh, R.T. Di Giulio. 2011. Cumulative impacts of mountaintop mining on an Appalachian watershed. Proceedings of the National Academy of Sciences. 108 (52) 20929-20934.
61. Lutz, B.J., **E.S. Bernhardt**, P.J. Mulholland, B.R. Roberts and R. M. Cory. 2012. Distinguishing terrestrial and autochthonous organic matter dynamics in a forested stream using kinetic enrichments and fluorescence spectroscopy. Limnology and Oceanography 57: 76-89.
60. <sup>‡</sup>Wang, S., **E.S. Bernhardt**, J.P. Wright, M. Wallenstein and E.B. Sudduth. 2011. Watershed urbanization alters the composition and function of stream bacterial communities. PLOS-One 6
59. <sup>‡</sup>Violin, C., P. Cada, E.B. Sudduth, B.A. Hassett, D.L. Penrose and **E.S. Bernhardt**. 2011. Effects of urbanization and urban stream restoration on the physical and biological structure of stream ecosystems. Ecological Applications 26: 1932-1949.
58. **Bernhardt, E.S.** and M.A. Palmer. 2011. River restoration – the fuzzy logic of repairing reaches to reverse watershed scale degradation. Ecological Applications 21: 1926-1931.
57. Sudduth, E.B., B.A. Hassett, P. Cada and **E.S. Bernhardt**. 2011. Testing the Field of Dreams Hypothesis: Functional Responses to Urbanization and Restoration in Stream Ecosystems. Ecological Applications 21: 1972-1988.
56. <sup>‡</sup>Muehlbauer, J., M.W. Doyle and **E.S. Bernhardt**. 2011. Macroinvertebrate community responses to a dewatering disturbance gradient in a restored stream. Hydrology and Earth System Sciences
55. Lutz, B.D., **E.S. Bernhardt**, B.R. Roberts and P.J. Mulholland. 2011. Examining the coupling of carbon and nitrogen cycles in Appalachian streams: the role of dissolved organic nitrogen. Ecology 92: 720-732.
54. <sup>‡</sup>Helton A.M., G.C. Poole and 21 coauthors including **E.S. Bernhardt**. 2011. Thinking outside the channel: modeling nitrogen cycling in networked river ecosystems. Frontiers in Ecology and the Environment 4: 229-238.
53. *Invited Review*. **Bernhardt, E.S.** and M.A. Palmer. 2011. Impacts of mountaintop mining and valley fill operations on aquatic ecosystems of the central Appalachians. Annual Review of Conservation and the Environment. Annals of the New York Academy of Sciences. 1223: 39-57.
52. Cheng, Y., L. Yin, S. Lin, M. Wiesner, **E.S. Bernhardt** and J. Liu. 2011. Toxicity reduction of polymer-stabilized silver nanoparticles by sunlight. The Journal of Physical Chemistry 115: 4425-4432.
51. Yin, L., B.P. Colman, B. Espinasse, Liu, J., Cheng, Y. and **E.S. Bernhardt**. 2011. More than the ions: the effects of silver nanoparticles on *Lolium multiflorum*. Environmental Science & Technology 45: 2360–2367.

50. Drake, J.E., E.H. DeLucia, A. Gallet-Budynek, K.S. Hofmockel, **E.S. Bernhardt**, S.A. Billings, R. D. Jackson, J. Lichter, M.L. McCormack, D.J. P. Moore, R. Oren, S. Palmroth, R.P. Phillips, J.S. Phippen, S.G. Pritchard, K.K. Treseder, and A.C. Finzi. 2011. Increases in the flux of carbon belowground stimulate nitrogen uptake and sustain the long-term enhancement of forest productivity under elevated CO<sub>2</sub> Ecology Letters 14: 349-357.
49. Phillips, R.P., **E.S. Bernhardt** and A.C. Finzi. 2011. Enhanced root exudation induces microbial feedbacks to N cycling in a pine forest under long-term CO<sub>2</sub> fumigation. Ecology Letters 14: 187-194.
48. Doyle, M.W. and **E.S. Bernhardt** 2011. What is a stream? Environmental Science and Technology
47. Ardón, M., J.L. Morse, S. Montenari, M.W. Doyle, and **E.S. Bernhardt**. 2010. Phosphorus export from a restored wetland ecosystem in response to natural and experimental hydrologic fluctuations. JGR Biogeosciences 115: G04031.
46. **Bernhardt, E.S.**, B.P. Colman, M. Hochella, B. Cardinale, R. Nisbet, C. Richardson and L. Yin. 2010. An Ecological Perspective on Nanomaterial Impacts in the Environment. Journal of Environmental Quality. 39: 1954-1965.
45. Lowry, G.V., E.M. Hotze, **E.S. Bernhardt**, D.D. Dionysiou, J. A. Pedersen, M.R. Wiesner, Baoshan Xing. 2010. Environmental occurrences, behavior, fate and ecological effects of nanomaterials. Journal of Environmental Quality. 39: 1867-1874.
44. Ardón, M., J.L. Morse, M.W. Doyle, and **E.S. Bernhardt**. 2010. The water quality consequences of restoring wetland hydrology to a large agricultural watershed in the southeastern coastal plain. Ecosystems 13:1060-1078.
43. Palmer, M.A., H.L. Menninger, **E.S. Bernhardt**. 2010. River restoration, habitat heterogeneity and biodiversity: a failure of theory or practice? Freshwater Biology 55:205-222.
42. Palmer, M.A., **E.S. Bernhardt**, W.H. Schlesinger, K.N. Eshleman, E. Foufoula-Georgiou, M.S. Hendryx, A.D. Lemly, G.E. Likens, O.L. Loucks, M.E. Power, P.S. White, and P.R. Wilcock. 2010. Environmental and Human Health Consequences of Mountaintop Removal Mining. Science 327:148-149.
41. Wenger, S.J., A.H. Roy, C.R. Jackson, **E.S. Bernhardt**, T.L. Carter, S. Filoso, C.A. Gibson, W.C. Hession, S.S. Kaushal, E. Marti, J.L. Meyer, M.A. Palmer, M.J. Paul, A.H. Purcell, A. Ramirez, A.D. Rosemond, K.A. Schofield, E.B. Sudduth, C.J. Walsh. 2009. Twenty-six key research questions in urban stream ecology: an assessment of the state of the science. Journal of the North American Benthological Society. 28: 1080-1098.
40. Phillips, R.P., **E.S. Bernhardt** and W.H. Schlesinger. 2009. Elevated CO<sub>2</sub> increases root exudation from loblolly pine (*Pinus taeda* L.) seedlings as an N-mediated response. Tree Physiology 29: 1513-1523.

39. Wiesner, M.R., G.V. Lowry, K. Jones, M.F. Hochella, R.T. DiGiulio, E. Casman, and **E.S. Bernhardt**. 2009. Viewpoint. Decreasing uncertainty in assessing environmental exposure, risk and ecological implications of nanomaterials. Environmental Science and Technology
38. Ardón, M. and **Bernhardt, E.S.** 2009. Restoring Rivers and Streams. In: Encyclopedia of Life Sciences. John Wiley & Sons, Ltd: Chichester <http://www.els.net/> [DOI: 10.1002/9780470015902.a0020148]
37. Phillips, R.P., Y. Erlitz, R. Bier, and **E.S. Bernhardt**. 2008. A new approach for capturing soluble root exudates in forest soils. Functional Ecology 22: 990-999.
36. **Bernhardt, E.S.** and W.H. McDowell. 2008. Twenty years apart: comparisons of DOM uptake during leaf leachate releases to Hubbard Brook Valley streams 1979 vs. 2000. JGR Biogeosciences 113, G03032. doi:10.1029/2007JG000618
35. *Invited Review:* **Bernhardt, E.S.**, L.A. Band, C. Walsh and P Berke. 2008. Understanding, managing and minimizing urban impacts of surface water nitrogen loading. Annual Review of Conservation and the Environment. Annals of the New York Academy of Sciences, 1134: 61-96
34. Poole, G.C., S.J. O'Daniel, K.L. Jones, **E.S. Bernhardt**, A.M. Helton, J.A. Stanford, W.W. Woessner, and B.R. Boer. 2008. Hydrologic Spirals: Conceptualizing the Hydrologic Template of Stream and River Ecosystems. River Research and Applications. 24: 1018-1031.
33. Craig, L.S., M.A. Palmer, D.C. Richardson, S. Filoso, **E.S. Bernhardt**, B.P. Bledsoe, M.W. Doyle, P.M. Groffman, *B.A. Hassett*, S.S. Kaushal, P.M. Mayer, S.M. Smith, and P.R. Wilcock. 2008. Stream restoration strategies for reducing river nitrogen loads. Frontiers in Ecology and the Environment. 6: 529-538.
32. Fierer, N., J.L. Morse, <sup>‡</sup>S. Berthrong, **E.S. Bernhardt**, R.B. Jackson. 2007. The landscape-level biogeography of stream bacterial communities. Ecology 88: 2162-2173.
31. Warren, D.R., **E. S. Bernhardt**, R. O. Hall, Jr., G.E. Likens. 2007. Forest age, woody debris, and nutrient dynamics in headwater streams of the White Mountains, NH. Earth Surface Processes and Landforms 32: 1154-1163.
30. Palmer, M.A., J.D. Allan, J.L. Meyer, and **E.S. Bernhardt**. 2007. River Restoration in the 21<sup>st</sup> Century: Data and experiential future efforts. Restoration Ecology. 15: 472-481.
29. **Bernhardt, E.S.**, E.B. Sudduth, M.A. Palmer, J.D. Allan, J.L. Meyer, G. Alexander, J. Follstad-Shah, B. Hassett, R. Jenkinson, R. Lave, J. McFall, L. Pagano. 2007. Restoring Rivers one Reach at a Time: Results from a survey of U.S. river restoration practitioners. Restoration Ecology. 15:482-493.



28. Sudduth, E.B., J.L. Meyer, **E.S. Bernhardt**. 2007. Stream restoration practices in the southeastern US. Restoration Ecology. 15: 573-583.
27. Hassett, B.A., M.A. Palmer and **E.S. Bernhardt** 2007. Evaluating stream restoration in the Chesapeake Bay watershed through practitioner interviews. Restoration Ecology. 15:563-572.
26. Kondolf, G.M., S. Anderson, R. Lave, L. Pagano, A. Merelender, **E.S. Bernhardt**. 2007. Two Decades of River Restoration in California: Trends in Implementation and Reporting. Restoration Ecology. 15: 516-523.
25. Follstad-Shah, J.J., C.N. Dahm, S.P. Gloss, **E.S. Bernhardt**, and D.A. Price. 2007. River and riparian restoration in the Southwest: Results of the National River Restoration Science Synthesis Project. Restoration Ecology 15: 550-562.
24. **Bernhardt, E.S.** and M.A. Palmer. 2007. Restoring streams in an urbanizing world. Freshwater Biology 52: 738-751.
23. **Bernhardt, E.S.**, S.E. Bunn, D.D. Hart, B. Malmqvist, T. Muotka, R.J. Naiman, C. Pringle, M. Reuss, and B. van Wilgen. 2006. Perspective: The challenge of ecologically sustainable water management. Water Policy. 8:475-479. **\*\* authors in alphabetical order**
22. Schlesinger, W. H., **E. S. Bernhardt**, E. H. DeLucia, D. S. Ellsworth, A. C. Finzi, G. R. Hendrey, K. S. Hofmockel, J. Lichter, R. Matamala, D. Moore, R. Oren, J. S. Phippen, and R. B. Thomas. 2006. The Duke Forest FACE experiment: CO<sub>2</sub> enrichment of a loblolly pine forest. *in*. J. Nösberger, S. P. Long, R. J. Norby, M. Stitt, G.R.Hendrey, and H.Blum, (editors). Managed Ecosystems and CO<sub>2</sub> Case Studies, Processes, and Perspectives. Springer-Verlag, Heidelberg Berlin.
21. Jenkinson, R., K. Barnas, J. Braatne, **E.S. Bernhardt**, M. Palmer, J.D. Allan, and the National River Restoration Science Synthesis. 2006. Stream restoration databases and case studies: a guide to information resources and their utility in advancing the science and practice of restoration. Restoration Ecology. 14: 177-186.
20. Palmer, M.A. and **E.S. Bernhardt**. 2006. Hydroecology and river restoration: ripe for research and synthesis. Water Resources Research . Vol. 42: W03S07
19. **Bernhardt, E.S.**, J. Barber, J.S. Phippen, L.A. Taneva, J. Andrews, and W.H. Schlesinger. 2006. Long-term effects of free air CO<sub>2</sub> enrichment (FACE) on soil respiration. Biogeochemistry 77:91-116
18. Schlesinger, W.H., K.H. Reckhow, and **E.S. Bernhardt**. 2006. Global change: the nitrogen cycle and rivers. Water Resources Research 42: W03S06.

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*Publications below this line were completed prior to beginning my faculty position at Duke University*

17. Hassett, B., M.A. Palmer, **E. S. Bernhardt**, S. Smith, J. Carr, and D. Hart. 2005. Restoring Watersheds Project by Project: Trends in Chesapeake Bay Tributary Restoration. Frontiers in Ecology and the Environment 5: 259-267.
16. **Bernhardt, E.S.**, M.A. Palmer, J.D. Allan, R. Abell, G. Alexander, S. Brooks, J. Carr, S. Clayton, C. Dahm, J. Follstad Shah, D.L. Galat, S. Gloss, P. Goodwin, D.H. Hart, B. Hassett, R. Jenkinson, S. Katz, G.M. Kondolf, P.S. Lake, R. Lave, J.L. Meyer, T.K. O'Donnell, L. Pagano, E. Sudduth. 2005. River Restoration in the United States: A national synthesis. Science 308:636-637.
15. **Bernhardt, E.S.**, G.E. Likens, R.O. Hall, Jr., D.C. Buso, S.G. Fisher, T.M. Burton, J.L. Meyer, W.H. McDowell, M.S. Mayer, W.B. Bowden, S.E.G. Findlay, K.H. Macneale, R.S. Stelzer, W.H. Lowe. 2005. Can't See the Forest for the Stream? The capacity of instream processing to modify terrestrial nitrogen exports. BioScience 52:219-230.
14. Palmer, M.A., **E.S. Bernhardt**, J.D. Allan, P.S. Lake, G. Alexander, S. Brooks, J. Carr, S. Clayton, C. Dahm, J. Follstad Shah, D.L. Galat, S. Gloss, P. Goodwin, D.H. Hart, B. Hassett, R. Jenkinson, G.M. Kondolf, R. Lave, J.L. Meyer, T.K. O'Donnell, L. Pagano, P. Srivastava, E. Sudduth. 2005. Standards for Ecologically Successful River Restoration. Journal of Applied Ecology 42: 208-217.
13. Palmer, M.A., **E.S. Bernhardt**, E.A. Chornesky, S.L. Collins, A.P. Dobson, C.S. Duke, B.D. Gold, R. Jacobson, S. Kingsland, R. Kranz, M.J Mappin, M.L. Martinez, F. Micheli, J.L. Morse, M.L Pace, M. Pascual, S. Palumbi, O.J. Reichman, A.L. Simons, A. Townsend, and M.G. Turner. 2005. Ecological Science and Sustainability for the 21<sup>st</sup> Century. Frontiers in Ecology. 3: 4-11
12. Likens, G.E. D.C. Buso, B. Dresser, **E.S. Bernhardt**, R.O. Hall, Jr., K.H. Macneale, and S.W. Bailey. 2004. Buffering an acidic stream in New Hampshire with a silicate mineral, Restoration Ecology, 12: 419-428.
11. King J.S., P.J. Hanson, **E.S. Bernhardt**, P. DeAngelis, R.J. Norby, and K.S. Pregitzer. 2004. A multi-year synthesis of soil respiration responses to elevated atmospheric CO<sub>2</sub> from four forest FACE experiments. Global Change Biology 10: 1027-1042.
10. Palmer, M.A., **E.S. Bernhardt**, E.A. Chornesky, S.L. Collins, A.P. Dobson, C.S. Duke, B.D. Gold, R. Jacobson, S. Kingsland, R. Kranz, M.J Mappin, M.L. Martinez, F. Micheli, J.L. Morse, M.L Pace, M. Pascual, S. Palumbi, O.J. Reichman, A.L. Simons, A. Townsend, and M.G. Turner. 2004. Ecology for a crowded planet. Science 304 (5675): 1251-1252
9. **Bernhardt, E.S.** and G.E. Likens. 2004. Controls on periphyton biomass in heterotrophic streams. Freshwater Biology 49: 14-27.
8. **Bernhardt, E.S.**, G.E. Likens, D.C. Buso, and C.T. Driscoll. 2003. Instream uptake dampens the effect of major disturbance on watershed nitrogen export. Proceedings of the National Academy of Science 100 (18): 10304-10308

7. Houlton, B.Z., C.T. Driscoll, T.J. Fahey, P.M. Groffman, G.E. Likens, **E.S. Bernhardt** and D. Buso. 2003. The effects of ice storm damage on the biogeochemical cycle of a northern hardwood forest ecosystem—linking an exogenous perturbation to nutrient loss and acidification of drainage water. Ecosystems 6 (5): 431-443
6. **Bernhardt, E.S.** 2002. Lessons from kinetic releases of ammonium in streams of the Hubbard Brook Experimental Forest (HBEF). Verhandlungen Internationale Vereinigung Limnologie. 28: 429-433.
5. **Bernhardt, E.S.** and G.E. Likens. 2002. DOC enrichment alters nitrogen dynamics in a forest stream. Ecology. 83(6): 1689-1700.
4. **Bernhardt, E.S.**, R.O. Hall and G.E. Likens. 2002. Whole-system estimates of nitrification and nitrate uptake in streams of the Hubbard Brook Experimental Forest. Ecosystems 5: 419-430.
3. Flecker, A.S., B.W. Taylor, **E.S. Bernhardt**, J.Hood, W.K. Cornwell, S.H. Cassat, and M.J. Vanni. 2002. Interactions between herbivorous fishes and limiting nutrients in a tropical stream ecosystem. Ecology. 83(7): 1831–1844.
2. Hall, R.O. Jr., **E.S. Bernhardt** and G.E. Likens. 2002. The effect of transient storage zone size on nutrient uptake efficiencies in streams of the Hubbard Brook Experimental Forest. Limnology and Oceanography. 47 (1): 255-265.
1. Hall, Robert O., K.H. Macneale, **E.S. Bernhardt**, G.E. Likens and M. Field. 2000. Biogeochemical responses of two forest streams to a two-month calcium addition. Freshwater Biology 46: 291-302.

*In Review\**

- <sup>ψ</sup>Arnold, M.C., TT Lindberg, RL Bier, E Bernhardt, RT Di Giulio. *In review*. Biofilm mediated uptake and trophic transfer of selenium to fathead minnows
- \*<sup>&</sup>Singh, N., W. Reyes, **E.S. Bernhardt**, R. Bhattacharya, J.L. Meyer, J.D. Knoepp, and R.E. Emanuel. *In review* Hydro-Climatological Influences on the Multi-Decadal Trends of Dissolved Organic Carbon in a Headwater Stream of the Southern Appalachians
- \*Hiers, J.K., **E.S. Bernhardt**, R.A. Hobbs, S.T. Jackson and L.E. Valentine. *In review* Overly narrow targets constrain conservation success.
- \*Rosi-Marshall, E.J., **E.S. Bernhardt**, G.E. Likens, D.C. Buso. *In review* The forest grows but the ecosystem leaks: calcium enrichment increases both forest biomass and nitrogen export.
- \***Bernhardt, E.S.** E.J. Rosi-Marshall and M.O. Gessner. *In review*. Synthetic chemicals: a neglected driver of global change.

*In Circulation in Final Preparation for Submission*

- Appling, A.P., **E.S. Bernhardt**, J. Kimball and J.A. Stanford. Patterns and mechanisms of nitrogen accumulation during floodplain succession.
- Glodzik, K., A.M. Helton, and **E.S. Bernhardt**. The biogeochemical consequences of saltwater intrusion to freshwater wetland sediments

## MAJOR REPORTS

JS Baron (lead), EK Hall, BT Nolan, JC Finlay, **ES Bernhardt**, JA Harrison, F. Chan, EW Boyer. 2012. “*The interactive effects of excess reactive nitrogen and climate change on aquatic ecosystems and water resources of the United States*” Chapter 5 in Suddick, E.C., Davidson, E.A. *The Role of Nitrogen in Climate Change and the Impacts of Nitrogen/Climate Interactions on Terrestrial and Aquatic Ecosystems, Agriculture, and Human Health in the United States: A Technical Report Submitted to the US National Climate Assessment*. North American Nitrogen Center of the International Nitrogen Initiative (NANC-INI), Woods Hole Research Center, 149 Woods Hole Road, Falmouth, MA, 02540--1644 USA.

National Research Council. *Challenges and Opportunities in the Hydrologic Sciences*. Washington, DC: The National Academies Press, 2012. [authored by GM Hornberger (lead), **ES Bernhardt**, WE Dietrich, D Entekhabi, GE Fogg, E Foufoula-Georgiou, WJ Gutowski, WB Lyons, KW Potter, SW Tyler, HJ Vaux, Jr., CJ Vorosmarty, C. Welty, CA Woodhouse, C Zheng] Available online for free download at [http://www.nap.edu/catalog.php?record\\_id=13293esa](http://www.nap.edu/catalog.php?record_id=13293esa)

Ecological Society of America Visions Committee, *Ecological Science and Sustainability for a Crowded Planet: 21st Century Vision and Action Plan for the Ecological Society of America*. [authored by MA Palmer (lead), **ES Bernhardt**, EA Chornesky, SL Collins, AP Dobson, CS Duke, BD Gold, R Jacobson, S Kingsland, R Kranz, MJ Mappin, ML Martinez, F Micheli, JL Morse, ML Pace, M Pascual, S Palumbi, OJ Reichman, AL Simons, A Townsend, and MG Turner] Available at <http://www.esa.org/ecovisions/>

## BOOK CHAPTERS

Wright, J.P., A. Symstad, J.M. Bullock, K. Engelhardt, L. Jackson and **E.S. Bernhardt**. 2009. Restoring biodiversity and ecosystem function: will an integrated approach improve results? Ch. 12 in *Biodiversity, Ecosystem Functioning, and Human Wellbeing: an Ecological and Economic Perspective*. Naeem, Bunker et al. (eds).

Aber, J., **E.S. Bernhardt**, F. Dijkstra, R.H. Gardner, K.H. Macneale, W.J. Parton, S.T.A. Pickett, D.L. Urban, and K.C. Weathers. 2003. Standards of practice for review and publication of models. Chapter 11 in C.D. Canham, J.J. Cole, and W.K. Lauenroth (Eds.) *The Role of Models in Ecosystem Science*. Princeton University Press, Princeton, NJ. **\*\*except for 1<sup>st</sup> author, authors alphabetical**

## RESEARCH SUPPORT:

### *Current*

- National Science Foundation, COASTAL SEES: COLLABORATIVE RESEARCH: Salinization of the inland coastal plain through saltwater intrusion: landscapes in transition along the leading edge of climate change (*Ryan Emmanuel (NCSU) Lead PI, Bernhardt, Duke PI*). Duke award \$509,680.

- National Science Foundation, Hydrology Panel. “The effects of mountain top mining on watershed hydrology and biogeochemistry: Learning from manipulation of the critical zone. Lead PI: Brian McGlynn (Duke NSOE), CoPI E.S. Bernhardt. Total amount \$578,934
- 4R Research Fund. Understanding Controls on Nitrogen Use Efficiency and Pathways of Nitrogen Loss. Joint PIs: Emily S. Bernhardt, Jim Heffernan (Duke NSOE) and Lydia Olander (Duke Nicholas Institute). Total amount \$70K
- National Science Foundation, Ecosystem Panel. “Streams in urbanizing landscapes: from syndrome diagnosis to watershed prescription. Bernhardt (lead PI) with Dean Urban (Duke NSOE). Total amount \$560K
- National Science Foundation and U.S. Environmental Protection Agency, Center for Environmental Implications of Nanotechnology. PHASE II. 2014-2019. M. Wiesner (PI, Duke Engineering) [Total award \$12 million]. Bernhardt – lead investigator for Ecosystems component of center research. (Bernhardt portion ~\$600K in direct costs)
- Foundation for the Carolinas unrestricted gift in support of research of the environmental impacts of mountain top mining to Duke University researchers (led by ecotoxicologists Rich DiGulio with collaborators Bernhardt Ferguson, Hsu Kim, Meyer, Miranda, Stapleton, venGosh. (\$240,000 to ESB)

*Pending*

*Submitted to NSF Macrosystems Program, April 2014 – recommended but still pending.*

**Defining stream biomes to understand and forecast ecosystem change.** Bernhardt is lead PI with collaborators Brian McGlynn and Jim Heffernan (Duke), Nancy Grimm (ASU), Bill McDowell (UNH), Emily Stanley (UWI), Matt Cohen (U FL), Bob Hall (UWY) and Jordan Read (USGS). Amount requested: \$1,700K.

*Invited to submit as full proposal to NSF Ecosystems, August 2015:*

**(1) The Forest Grows but the Watershed Leaks: examining how calcium enrichment is converting a forested ecosystem to a net source of nitrogen to downstream** with Emma Rosi-Marshall (lead PI) and Gene Likens (Cary Institute of Ecosystem Studies).

**(2) StreamPULSE: the changing ecosystem energetics of flowing waters in the Anthropocene,** Bernhardt (lead PI) with B. McGlynn (Duke), J. Heffernan (Duke), R.O. Hall (UWY), N.B. Grimm (ASU), M. Cohen (UFL), A. Helton (U Conn), W.H. McDowell (UNH)

*Past:*

- National Science Foundation, Ecosystems Panel, “ETBC: Collaborative Proposal: Coupled C, N and S cycling in coastal plain wetlands: how will climate change and salt water intrusion alter ecosystem dynamics, Bernhardt (lead PI) with A. Burgin (Wright State) and G. Poole & C. Izurieta (Montana State). Total amount \$1300K – Duke portion \$525K
- National Science Foundation and U.S. Environmental Protection Agency, Center for Environmental Implications of Nanotechnology. 2014-2019. M. Wiesner (PI, Duke

Engineering) [Total award \$12 million]. Bernhardt – lead investigator for Ecosystems component of center research. (Bernhardt portion ~\$600K)

- Department of Energy, National Institute of Climate Change Research Coastal Research Program, “Farm fields to wetlands: biogeochemical consequences and climate feedbacks due to sea level rise in coastal plain agricultural landscapes”. 2008-2012. Bernhardt (sole-PI) (\$375K)
- National Science Foundation, Urban Long-Term Research Area (ULTRA) exploratory award. Reconciling human and natural systems for the equitable provision of ecosystem services in the Triangle of North Carolina (2010-2011) Hess & McHale (NCSU PIs); Band and Bertsch (UNC PIs); Urban and Bernhardt (Duke PIs). (Duke portion – shared by Urban & Bernhardt to support a student \$80,669)
- Environmental Protection Agency AWPPG Program: National River Restoration Science Synthesis (2005-2007), Bernhardt (PI)
- NC WRRI: Restoring Biogeochemical Functions in Degraded Urban Stream Ecosystems (2006–2007), Bernhardt (PI)
- NC Department of Environment and Natural Resources. “Restoring Biogeochemical Functions in Degraded Urban Stream Ecosystems” (supplement to NC WRRI proposal), Bernhardt (PI)
- Packard Foundation, National River Restoration Science Synthesis: Phase II (2005-2008), M. Palmer (PI)
- NC Department of Environment and Natural Resources. “Biogeochemical consequences of NC’s largest wetlands mitigation bank”, Bernhardt (PI)
- Department of Energy, FACTS-1 Renewal Grant (2004-2007), R. Oren & A. Finzi (PIs)
- NC WRRI: “Biogeochemical consequences of NC’s largest wetlands mitigation bank”(April 1, 2007-March 30, 2008) Bernhardt & Ardon (co-PIs)
- Unrestricted gift in support of research, Great Dismal Swamp Mitigation Bank (\$165K)
- Gordon and Betty Moore Foundation, The Salmonid Rivers Observatory Network (SaRON): Relating Habitat Quantity and Quality to Salmon Productivity for Pacific Rim Rivers (subcontract to Bernhardt from University of Montana’s Flathead Lake Biological Station) (\$75K)
- USDA, Soil Processes Panel. “Rhizosphere priming effects on soil N availability: the role of root exudates in coupling ecosystem C and N cycles under elevated CO<sub>2</sub>”. 2008-2010. Phillips (PI, through U Indiana) with Bernhardt (coPI) and Finzi (coPI, BU). (Bernhardt portion \$80K)
- NC WRRI, Assessing the impacts of watershed development history and levels of hydrologic alteration on stream ecosystem health in the NC Piedmont. Dean Urban, Duke NSOE (PI), Bernhardt (coPI) (\$49K)

- National Science Foundation, Ecosystems Panel, “CAREER: Potential for the recovery of biogeochemical function in degraded stream ecosystems” (2006-2011), Bernhardt (sole PI) (\$577K)
  - >REU Supplement Request, 2007 (\$12K)
  - >ROA Supplement Request, 2008 (with Dr. A Moore, Guilford College) (\$25K)
  - >RET Supplement Request, 2009 (with Dr Christine Muth, NC School of Science & Math) (\$18K)

Other Major External Support for Bernhardt lab members

**\*\*Collectively, my PhD students have been awarded > \$1 million USD in federally funded fellowships**

**\*\*Collectively, my postdoctoral researchers have been awarded > \$500,000 in fellowship funding from US NSF or Chinese Academy of Sciences**

- NC WRRI Research Grant (2015) of ~\$65K to Ph.D. student Jessica Brandt
- EPA STAR Graduate Fellowship (2014-2016) to Ph.D. student Raven Bier
- NSF Graduate Fellowship (2013-2016) to Ph.D. student Joanna Blaszczyk
- NSF Graduate Fellowship (2012-2015) to Ph.D. student Richard Marinos
- NSF Postdoctoral Fellowship (2013-2015) to postdoctoral associate Tim Covino
- NSF IGERT fellowship (2012-2014); and NSF Graduate Research Fellowship (2014-2017) to Ph.D. student Matthew Ross
- NSF Doctoral Dissertation Improvement Grant to Ph.D. student Kayleigh Somers (2012)
- EPA STAR Graduate Fellowship to Ph.D. student Kris Voss (2012-2015)
- EPA STAR Graduate Fellowship to Ph.D. student Alison Appling (2008-2011)
- NSF Bioinformatics Postdoctoral Fellowship to Jennifer Follstad-Shah (2007-2009)
- NSF Minority Postdoctoral Fellowship to M. Ardon (2008-2010)
- NSF Graduate Research Fellowship and NSF Nordic Research opportunity fellowship to Ph.D. student Brian Lutz.
- EPA STAR Graduate Fellowship, NCALM LIDAR imagery grant, and Charles Lindbergh Foundation grants to Ph.D. student Jennifer Morse (2005-2010).
- EPA STAR Graduate Fellowship to Ph.D. student Elizabeth Sudduth (2005-2008)

**INVITED LECTURES:**

- Invited Symposium Speaker, *Saltwater Intrusion: the leading edge of climate change for coastal plain ecosystems*. Lead talk of a special session. Association for the Science of Limnology and Oceanography. Sante Fe, NM. June 2016.
- Invited Symposium Speaker, *Ecosystem Toxicology? Recognizing contaminants as agents of global change affecting ecosystem processes*. Lead talk of a special session. Society of Freshwater Science. Sacramento, CA., May 2016.

- Invited Symposium Speaker, *Nanomaterial impacts in the real world: Ecological context and ecological impacts of nanomaterials*. 36<sup>th</sup> Annual Meeting, Society of Environmental Toxicology and Chemistry. Salt Lake City, November, 2015.
- Invited Keynote Speaker, *More than the meters squared: how land use intensity, position and connectivity leads to differential impacts for receiving waters*. 17<sup>th</sup> International Water Association Conference on Diffuse Pollution and Eutrophication. Berlin, Germany. September 2015.
- Invited Symposium Speaker, “*From the Ivory Tower to the Halls of Justice: Science in the Courtroom.*” Joint Aquatic Sciences Meeting, Portland, OR, May 2014.
- Invited Keynote Speaker, “*Buying and Selling Freshwater Ecosystems*” Symposium for European Freshwater Sciences. Munster, Germany. July 2013.
- Invited Plenary Speaker, “*When experiments are insufficient: Dealing with the multidimensionality of environmental change*” BIOGEMON, the 7th International Conference on Ecosystem Behavior, July 2012, Northport, Maine.
- Invited Symposium Speaker, *Managing aquatic systems for resilience and human well-being*. Ecological Society of America meeting, Austin, TX August 2011.
- Invited Symposium Speaker, *The water quality consequences of mountaintop removal - valley fill coal mining*. Ecological Society of America meeting, Pittsburgh, PA August 2010.
- Invited Speaker, “*Nanomaterials in the environment – should we worry*” – a public talk through the NC Museum of Life and Science’s informal lecture series, “Periodic tables”. Broad Street Café, March 2010.
- Invited Symposium Speaker, “*The environmental impacts of mountain top mining - an overview*”, lead talk in Mountaintop Coal Mining: Human Health and Ecological Concerns, Spring 2010 Symposium of the Integrated Toxicology Environmental Health Program, Duke University
- Invited Keynote Speaker, “*Biotic responses to climate change and hydrologic drought variability*” Ecological Society of America’s Inaugural Millenium Conference on Water-Ecosystem Services, Drought and Environmental Justice, Athens, GA. November 2009.
- Invited Keynote Speaker, International Conference on the Environmental Implications of NanoTechnology. September 2009. Howard University.
- Invited Keynote Speaker, American Water Resources Association Summer Specialty Conference, Riparian Ecosystems and Buffers, Virginia Beach, VA. “*Old Approaches and New Challenges to Restoring River and Floodplain Ecosystems*” July 2008



- Invited Speaker, Second Symposium on Urbanization and Stream Ecology, Salt Lake City, UT. *“Do we understand what’s broken? Current and future challenges to restoring urban streams”* May 2008.
- Invited Plenary Speaker, Third International Symposium on Riverine Landscapes, Brisbane, Australia, Global change and river-floodplain ecosystems. *“Can we put urban streams together again? The potential for restoring and redesigning degraded urban streams to provide critical ecosystem services.”* August 2007.
- Invited Keynote Speaker, 2006 North Carolina Stream Restoration Institute Conference, Charlotte, NC. *“Evaluating Restoration Effectiveness - Lessons from a National Synthesis”* October 2006
- Invited Keynote Address, Montana River Center Symposium: Assessing Stream Restoration Success: Developing Sustainable Ecological and Physical Systems. *“Ecological Systems and Renaturalization Success”* September 2006.
- Invited Speaker, SESSION: Interactions Between Watershed Characteristics, Stream Dynamics, and Water Quality, American Geophysical Union, Washington, D.C., *“Propagation and dissipation of watershed biogeochemical signals in stream networks”* May 2006.
- Invited Speaker, Presentation to the Science Advisory Board and the Board of Trustees of Environmental Defense, San Francisco, CA *“River Restoration in the United States: the Challenge of Restoring Reaches to Manage Catchments”* February, 2006.
- Invited Keynote Speaker, Opening Symposium of the Catchment Science Centre, University of Sheffield, UK *“River Restoration in the United States: the Challenge of Restoring Reaches to Manage Catchments”* February 2006.
- Invited Speaker, River Restoration Symposium, American Geophysical Union, San Francisco, *“River Restoration in the United States: the Challenge of Restoring Reaches to Manage Catchments”* December 2005.
- Symposium Organizer and Speaker, Watershed Ecosystem Symposium, Ecological Society of America, Montreal *“Uplands to streams: Key challenges to integrating watershed subcomponents”* August 2005.
- Invited Speaker, Gordon Conference on Catchment Science, Colby College, Maine *“River Restoration in the United States: the Challenge of Restoring Reaches to Manage Catchments”* July 2005
- Invited Speaker, River Restoration Symposium, American Geophysical Union and North American Benthological Society joint meetings, New Orleans, *“River restoration in the United States”* May 2005
- Invited Speaker, Second International Symposium on Riverine Landscapes, Storforsen, Sweden, *“Restoring streams in an urbanizing world”* August 2004.

## **INVITED SEMINARS:**

Cary Institute of Ecosystem Studies, March 2016

Department of Plant Science and Landscape Architecture, University of Maryland, March 2016

Program in Ecology, Michigan State University, December 2015

Kellogg Biological Station, December 2015

Department of Biology, Freie Universität, Berlin, Germany, May 2015.

Department of Limnology and Bio-Oceanography, University of Vienna, November 2014

EAWAG, Zurich, Switzerland, November 2014

Institute of Biochemistry and Biology, University of Potsdam, Potsdam, Germany, November 2014

University of Minnesota, Department of Ecology and Evolutionary Biology, April 2014

North Carolina State University, Department of Forestry, Spring 2014

University of North Carolina, Chapel Hill, Department of Geology, Spring 2014

Leibniz-Institut für Gewässerökologie und Binnenfischerei, Berlin, Germany July 2013

Wake Forest University, Fall 2012

Colorado State University, Graduate Program in Ecology Distinguished Ecologist series, Spring 2012

Arizona State University, School of Life Sciences Seminar Series, Spring 2012

North Carolina State University, Department of Ecotoxicology, Spring 2011

University of Umea, Sweden, Fall 2010

Boston University Program in Biogeochemistry, Fall 2010

University of Wisconsin Center for Limnology, Department of Botany and Women in Science and Engineering, Spring 2010

Stroud Water Research Center, Spring 2010

Kellogg Biological Station, Michigan State University, Fall 2009

Dartmouth College, Department of Biology, Fall 2009.

University of Wyoming, Department of Zoology, Fall 2008, *Graduate Student Association Invited Speaker*

University of Georgia, Odum School of Ecology, Fall 2007 *Graduate Student Association Invited Speaker*

Eastern Carolina University, Department of Geology, Fall 2007

Utah State University, Ecology Center, Spring 2007 *Graduate Student Association Invited Speaker*

Virginia Tech, Department of Biology, Spring 2007

University of North Carolina Greensboro, Department of Biology, Fall 2006  
Flathead Lake Biological Station, Polson, MT, Summer 2006  
Cornell University, IGERT Program in Biogeochemistry & Biocomplexity, Spring 2006  
North Carolina State University, Botany Department, Fall 2005  
University of North Carolina, Chapel Hill, Curriculum in Ecology, Fall 2004  
Appalachian Laboratory, Frostburg, MD, Fall 2003  
University of Maryland, College Park, Department of Entomology, Fall 2002  
Duke University, Durham, NC, Program in Ecology & Department of Biology Fall 2001, Spring 2003  
University of Montana, Department of Biology, Spring 2003  
UC Irvine, Departments of Biology and Earth & Environmental Science, Spring 2003  
UC Santa Barbara, Department of Ecology and Evolution, Spring 2003  
Washington State University, Departments of Biology, Geology and Environmental Science, Spring 2003  
URI, Department of Natural Resources, Fall 2002  
Institute of Ecosystem Studies, Millbrook, NY, Fall 2002

## **PROFESSIONAL SERVICE:**

### ***Service to the Discipline:***

- External Advisory Board of SMART, the European Doctoral program in River Science a 3-years Joint PhD programme offered in the framework of the Erasmus Mundus Action by the University of Trento (Italy), Queen Mary, University of London (UK) and the Freie Universität, Berlin (2013-2016)
- Member of National Academy of Sciences Committee on Challenges and Opportunities in the Hydrologic Sciences (2010-2011)
- Editorial Board Member: JGR Biogeosciences (2010-present); PeerJ (2012-present)
- Member of Domain Science and Education Coordination Committee for Domain 2 of the National Ecological Observatory Network (2009 - ongoing)
- Member of the NSF funded Frontiers in Ecosystem Science working group (2012-2014)
- Association for the Sciences of Limnology and Oceanography: Nominating Committee (2013-2015); Early Career Yentsch-Schindler Award Committee (2013-2015)
- Ecological Society of America: Visions Committee (2002-2003); Publications Committee (2003-2014); Secretary of the ESA Biogeosciences Section (2006-2008)
- North American Benthological Society Executive Committee (2002-2004); Journal of the North American Benthological Society (JNABS) assessment committee (2006-2007); Distinguished Service Award committee (2008-2009); Hynes Award Committee (2010-2011)
- Biogeochemistry Panel for evaluation of the Consortium of Universities for Advancement of Hydrologic Science, Incorporated (CUASHI) Hydrological Measurement Facility (2005-2006)
- Editorial Board, Freshwater Ecology Series, University of California Press (2007-2013)

- Habitat Priorities Committee, Environmental Defense (2006)
- *Grants panelist*: NSF Doctoral Dissertation Improvement Grant panel; NC Water Resources Research Institute; American Association of University Women Fellowships Panelist; NSF Ecosystems (2X)
- *Reviewer for*: Aquatic Conservation, Biogeochemistry, BioScience, Ecology, Ecological Applications, Ecology Letters, Ecosystems, Environmental Management, Environmental Science and Technology, Freshwater Biology, Freshwater Science, Frontiers in Ecology and the Environment, Geophysical Research Letters, Global Change Biology, Hydrobiologia, JGR Biogeosciences, Journal of Applied Ecology, Journal of the American Water Resources Association, Limnology and Oceanography, PNAS, River Research and Applications, Soil Science Society of America Journal, Science, Water Resources Research
- *Ad hoc Proposal Review*: National Science Foundation Ecosystems, RUI, LTRB, and Ecology panels. Department of Energy National Institutes for Climate Change Research (NICCR) program.
- External reviewer of NRC panel review of the St. John's River water management plan

### ***Major Outreach and Research Communication Commitments***

- Trustee and member of the Executive Council, North Carolina Office of Environmental Defense Fund (2009- ongoing)
- Coauthor (with M.A. Palmer), of white paper on the environmental impacts of mountain top mining and valley fill operations provided to the White House Council on Environmental Quality and the office of Director Lisa Jackson, US EPA. Provided to the US Senate during senate testimony by Dr. M.A. Palmer in July 2009.
- *Expert testimony* during preliminary injunction hearing Ohio Valley Environmental Coalition et al. vs. US Army Corps of Engineers et al. (Fall, 2008, Huntington, WV); expert testimony in Southern Environmental Law Center vs. Progress Energy, (Fall, 2010, Raleigh NC); *expert testimony* during hearing of the State of WV Water Quality Board in (December 2010, Charleston, WV); expert testimony, Ohio Valley Environmental Coalition et al. vs. US Army Corps of Engineers et al. (Spring 2012, Huntington, WV).
- *Congressional staff briefing on the environmental impacts of surface coal mining in Appalachia (May 2012)*
- *Pro bono* consulting, Great Dismal Swamp Mitigation Bank (2005-ongoing); Southern Environmental Law Center (2008-ongoing); Appalachian Center for the Economy and the Environment, Sierra Club, Earth Justice (2008- ongoing)
- Educational Outreach: Together with Dr. Christine Muth, faculty of NC School of Science and Math (residential public highschool) developed, tested and published an online curriculum module on Aquatic Ecology for highschool Biology and Environmental Science students (funded by NSF Career proposal), Fall 2006-2011.

### **UNIVERSITY SERVICE:**

- Academic Priorities Committee, appointed by the Provost of Duke University (2013-2016)
- Duke University Department of Biology committee service: Graduate Affairs (2004-2007), Performance Review (2005-2007), Junior Faculty representative, Steering Committee (2006), Seminar Series Co-coordinator (2006-2007), Departmental Retreat Organizer (2008), Curriculum committee (2012-2014); Strategic Plan CoAuthor (2013)

- Duke University Program in Ecology service: UPE Director of Graduate Studies (2011-2013); UPE Deputy Director (2011); UPE Executive Committee (2004-2014); UPE Seminar Coordinator (2005-2007), Oosting Lecture Organizer (2005,2006)
- Academic Council, Duke University (2010-2011)
- Science Advisory Board, Center for the Environmental Implications of Nanotechnology (CEINT) (2008-*present*)
- Provost's working group, *Water Resources Science, Engineering, and Policy* (Fall 2005)
- Duke Forest Scientific Advisory Committee (2007-*present*)
- Duke University Committee for Facilities and the Environment (2010-2011)
- Ad hoc faculty committee, *Global water initiative* (Spring 2008)
- Executive Committee, Duke University Center on Global Change (since Spring 2006)
- Faculty Search Committee Member: NSOE Dean Search (2013-2014); Ecology & Hydrology cluster hire, Nicholas School (2011); Watershed Hydrologist search committee, Nicholas School (2009); Harvey W. Smith Chair in marine ecology, Nicholas School (2006-2007)
- Duke Performance Review committee, Dean Stephen Nowicki (Spring 2012)

## TEACHING:

Duke: BIO 209: Ecology for a Crowded Planet, Spring 2011, Fall 2012, Fall 2013, Spring 2016

Duke: BIO 181LS: Aquatic Field Ecology, Spring 2010, Fall 2011, Fall 2013

Duke: BIO172S: Ecosystem Ecology for a Crowded Planet, Fall 2009

Duke: UPE 301: Ecosystem Ecology module for incoming UPE PhD students, Fall 2006

Duke: BIO 116: Ecology and Evolutionary Biology (with J.H. Willis), Spring 2006, 2007

Duke: BIO/EOS 272: Biogeochemistry: An analysis of global change  
Fall 2005, 2006, 2007, 2015, Spring 2009, 2011, 2013

### *Past:*

2001 Stream Ecology, Rocky Mountain Biological Laboratory summer field course

1997-98 Introductory Biology Laboratory, Cornell University

## ADVISING:

### *Current Ph.D. Advisees:*

Raven Bier, Ph.D. candidate (2010-) US EPA STAR Fellow (2014-2016)

Matthew Ross, Ph.D. candidate (2011-); Duke University Scholar, James B. Duke Fellow, WISENet IGERT Fellow. NSF Graduate Research Fellow (2013-2016)

Joanna Blaszczak, Ph.D. candidate (2013-); NSF Graduate Research Fellow (2013-2016)

Richard Marinos, Ph.D. candidate (2012-); NSF Graduate Research Fellow (2012-2015)

Jessica Brandt, Ph.D. candidate (2013-); ITEHP training fellow (2013-2015)

Yongli Wen, (2015-2016); visiting PhD student from the College of Resources and Environmental Sciences, Nanjing Agricultural University

### *Past PhD students:*

Jennifer Morse, Duke Ph.D. 2010, *currently* Assistant Professor, Portland State University

Elizabeth Sudduth, Duke Ph.D. 2011; *currently* Assistant Professor, Georgia Gwinnet College

Brian Lutz, Duke Ph.D. 2011; *currently* running a large private farm in Ohio, *formerly* Assistant Professor, Kent State University

Alison Appling, Ph.D. 2012; *currently* Postdoctoral associate, University of New Hampshire  
Kayleigh Somers, Ph.D. 2013; *currently* employed at Pacific States Fisheries Commission,  
Seattle, WA  
Kristofer Voss, Ph.D. 2015. *currently* faculty member, Regis University, Denver, CO.

*Current Postdoctoral Associates:*

Marie Simonin, 2016-

*Past Postdoctoral Associates*

Richard Phillips, 2005-2008, *currently* Associate Professor, Department of Biology, Indiana  
University

Jennifer Follstad-Shah, 2007-2009, *currently* Adjunct Assistant Professor, Department of  
Biology, Utah State University

Liyan Yin, 2009, *currently* Associate Professor, Wuhan Botanical Garden, Chinese Academy of  
Sciences

Marcelo Ardon, 2007-2011, *currently* Assistant Professor, Department of Biology, East Carolina  
University

Ashley Helton, 2010-2013, *currently* Assistant Professor, University of Connecticut

Tim Covino, 2012-2013, *currently* Assistant Professor, Colorado State University

Ben Colman, 2010-2015, *currently* Assistant Professor University of Montana

*Graduate Committee Minor Member:*

Current:

Marissa Lee (Ph.D., Duke University Program in Ecology; Wright lab)

Scott Winton (Ph.D., Duke University Environment Program; Richardson lab)

Alyse Larkin (Ph.D., Duke University Marine Lab, Johnson lab)

Cari Ficken (Ph.D., Duke University Program in Ecology; Wright lab)

Meghan Fork (Ph.D., Duke University Environment Program, Heffernan lab)

Kendra Kaiser (Ph.D., Duke University Earth and Ocean Sciences Program, McGlynn lab)

Erin Seybold (Ph.D., Duke University Program in Ecology, McGlynn lab)

Bryan Brown (Ph.D., Duke University Environment Program, Wernergreen lab)

Lauren Koenig (Ph.D., University of New Hampshire, McDowell lab)

Past:

Adam Riggsbee (Ph.D. 2006, UNC School of Public Health, Wetzel & Doyle labs);

Melanie Small (M.S. 2006 UNC Department of Geography, Doyle lab)

Erich Hester (Ph.D. 2008, UNC Ecology curriculum; Doyle lab)

Sean Berthong (Ph.D. 2009 Duke University Program in Ecology; Jackson lab)

Julie DeMeester (Ph.D. 2008 Duke University Program in Ecology; Richter lab)

Jason Jackson (Ph.D. 2009 Duke University Program in Ecology; Vilgalys/Richter lab)

Lindsay Dubbs (Ph.D. 2009, UNC School of Public Health; Whalen lab)

Roxolana Kashuba (Ph.D. 2010, Nicholas School of the Environment, Reckhow lab)

Ashley Helton (Ph.D. 2011, University of Georgia, Institute of Ecology; Poole lab)

Wyatt Hartman (Ph.D. 2011, Duke University Program in Ecology, Richardson lab)

Christy Violin (Ph.D.2011, UNC Ecology Curriculum; Reice lab)

Siyi Wang (Ph.D 2011, Duke University Department of Biology; Wright lab)

Meg Mobley (Ph.D. 2011, Nicholas School of the Environment; Richter lab)

Yoon Kyung Cha (Ph.D. 2012, Nicholas School of the Environment, Reckhow lab)  
Andrew Procter (Ph.D., 2012, Duke University Program in Ecology; Jackson lab)  
Valerie Schoepfer (M.S. 2013, University of Nebraska; Burgin lab)  
Allan Bacon (Ph.D., 2013, Duke University Program in Ecology; Richter lab)  
Jon Duncan (Ph.D., 2013, UNC Department of Geography; Band lab)  
Mariah Arnold (Ph.D. 2014, Duke Ecotoxicology Program; DiGiulio lab)  
Adrian Down (Ph.D. 2014, Duke University Program in Ecology; Jackson lab)

*Masters of Environmental Management Students:*

1. Peter Cada (May '07) *Changes in stream ecosystem structure as a function of urbanization: Potential recovery through stream restoration*
2. Hayes Neely (May '08) *Restoring Farmland to Wetlands: The Potential for Carbon Credits in Eastern North Carolina*
3. Catherine Carter (May '10) *Linking upstream mining to downstream water quality: Mountaintop mining in West Virginia*
4. Joseph Riegel (May '12), *Biomass accumulation in restored coastal wetlands estimated from LIDAR and hyperspectral image analysis*
5. Katie Glodzik (May '13), *Saltwater intrusion in the NC coastal plain – assessing the scale of the phenomenon and its impacts*
6. Diane Allen, MD (May '14) *Identifying headwater fragments in urbanizing landscapes – how small is too small to protect aquatic ecosystems*

*Undergraduate Honors Thesis Advising*

Hayes Neely, B.S. Biology with Distinction, '06  
Shankar Mundluru, B.S. Biology with Distinction '08  
Michelle Lotker, B.S. Biology with Distinction and B.A. Documentary Studies '08  
Jacquelyn Burmeister, B.S. Biology with Highest Distinction '09  
Temistocles Molinar, B.S. Biology with Distinction '12  
Ethan Baruch, B.S. Environmental Science '15