

DR. SANDRA L. COOKE

Thompson Writing Program/ Biology Department

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EDUCATION

- Ph. D.**, Earth and Environmental Science, Lehigh University, Bethlehem, Pennsylvania, January 2006.
Dissertation: *The effects of ultraviolet radiation and dissolved organic matter on zooplankton communities*
- B. A.**, Pre-Professional Zoology/Environmental Studies (summa cum laude), Ohio Wesleyan University, Delaware, Ohio, 2001. Thesis: *Nutrient limitation of phytoplankton across spatial and seasonal gradients in reservoirs of varying productivity.*

PROFESSIONAL EXPERIENCE

Lecturing Fellow, Thompson Writing Program, Duke University, July 2008 – current

Research Scientist, Biology Department, Duke University, Aug. 2008 – current

Postdoctoral Associate, Illinois Natural History Survey, Champaign, IL, May 2006 – May 2008

Adjunct Professor, Biology and Geography Depts., Northampton Community College, Bethlehem, PA, Aug. 2005 – May 2006

RESEARCH INTERESTS

Interactions of ultraviolet radiation (UV) and other stressors in freshwater systems: UV effects on zooplankton; UV interactions with dissolved organic matter (DOM) and temperature, effects of DOM on planktonic food webs

Ecology of aquatic invasive species: distribution and ecological impacts of exotic *Daphnia lumholtzi*; bioenergetics and food-web effects of invasive Asian carp (*Hypophthalmichthys* spp.)

Optical properties of inland waters: relationships between optical properties and zooplankton distribution across spatial and seasonal gradients; development of water quality indicators based on optical parameters

PEER-REVIEWED PUBLICATIONS

Finn, C. B., M. Leung, H. R. Naughton, A. May, X. Wang, and **S. L. Cooke**. Accepted. Observation of the non-native water flea *Daphnia lumholtzi* in B. Everett Jordan Lake, North Carolina. Submitted to the Journal of the North Carolina Academy of Science. (*all co-authors are undergraduate students)

Cooke, S. L., and W. R. Hill. 2010. Can filter-feeding Asian carp invade the Laurentian Great Lakes? A bioenergetic modelling exercise. *Freshwater Biology*. 55: 2138-2152.

Williamson, C. E., C. Salm, **S. L. Cooke**, and J. E. Saros. 2010. How do UV, temperature, and zooplankton influence the dynamics of alpine phytoplankton communities? *Hydrobiologia*. 648: 73-81.

Cooke, S. L., W. R. Hill, and K. P. Meyer. 2009. Bighead carp growth under different zooplankton and phytoplankton densities. *Hydrobiologia*. 625: 185-193.

Cooke, S. L. 2009. Using writing to teach science and policy aspects of drought and water-ecosystem services in the Sacramento-San Joaquin Delta (California, USA). Ecological Society of America's EcoEd Digital Library. <http://www.ecoed.net/pages/millennium/>

Leech, D. M., W. J. Boeing, **S. L. Cooke**, C. E. Williamson, and L. Torres. 2009. UV enhanced fish predation on zooplankton in a transparent lake. *Limnology and Oceanography*. 54: 1152-1161.

Cooke, S. L., C. E. Williamson, D. M. Leech, W. J. Boeing and L. Torres. 2008. Effects of temperature and ultraviolet radiation on diel vertical migration of freshwater crustacean zooplankton. *Canadian Journal of Fisheries and Aquatic Sciences*. 65: 1144-1152.

Cooke, S. L., C. E. Williamson and J. E. Saros. 2006. How do temperature, dissolved organic matter, and nutrients influence the response of *Leptodiatomus ashlandi* to UV radiation in a subalpine lake? *Freshwater Biology*. 51: 1827-1837.

Cooke, S. L., C. E. Williamson, B. R. Hargreaves and D. P. Morris. 2006. Beneficial and detrimental interactive effects of dissolved organic matter and ultraviolet radiation on zooplankton in a transparent lake. *Hydrobiologia*. 568: 15-28.

Cooke, S. L. and C. E. Williamson. 2006. Positive effects of UV radiation on a calanoid copepod in a transparent lake: do competition, predation, or food availability play a role? *Journal of Plankton Research*. 28: 171-179.

Boeing, W. J., D. M. Leech, C. E. Williamson, **S. Cooke**, and L. Torres. 2004. Damaging UV radiation and invertebrate predation: Conflicting selective pressures for zooplankton vertical distribution in the water column of low DOC lakes. *Oecologia*. 138: 603-612.

TECHNICAL REPORTS & OTHER PUBLICATIONS

Cooke, S. L., and S. Johnsen. 2011. Distribution of the exotic water flea *Daphnia lumholtzi* in central North Carolina and its impacts on local sport fish species. Final Technical Report to the North Carolina Wildlife Resources Commission. Federal Aid in Sport Fish Restoration Project F-68-12-S-14.

Cooke, S. L. 2010. Affidavit of Dr. Sandra L. Cooke. United State District Court for the Northeastern District of Illinois, Eastern Division. Case no. 1:10-cv-04457.

Cooke, S. L., and W. R. Hill. 2008. Bioenergetics of Invasive Asian Carp. Illinois Natural History Survey Report No. 394. Winter.

INVITED PRESENTATIONS

“Plankton food resources for Asian carps in the Great Lakes: a feast or famine?” Annis Water Resources Institute, Grand Valley State University. May 13, 2011

“From invasive species to global warming: Effects of environmental change on aquatic ecosystems.” Central Michigan University. February 11, 2011

“An introduction to natural selection.” Keene State College. February 9, 2011

“Plankton food resources for Asian carps in the Great Lakes: a feast or famine?” Saint Mary-of-the Woods College. January 21, 2011

“Predictive ecology: understanding how freshwater ecosystems respond to environmental change.” University of Wisconsin – Green Bay. December 9, 2010

“Plankton food resources for Asian carps in the Great Lakes: a feast or famine?” Aquatic Nuisance Species Dispersal Barrier Panel Meeting. Chicago, IL. January 13, 2010

“Using a bioenergetic approach to test the capability of Great Lakes plankton to support Asian carp.” International Joint Commission 2007 Biennial Meeting and Great Lakes Conference. Chicago, IL. June 2007.

COURSE DEVELOPMENT AND TEACHING

Duke University (2008 – current)

Writing 20: Ocean Acidification

- Responsible for developing and teaching this required freshman seminar course

Environ 181S: Global Change Ecology in a Connected World

- Designed this research- and writing-intensive seminar course with a focus on environmental sensor networks

Writing 20: The Billion Dollar Problem of Aquatic Invasive Species

- Responsible for developing and teaching this required freshman seminar course

Writing 20: Freshwater Resources & Society: Communicating Science & Policy

- Responsible for developing and teaching this required freshman seminar course
- Published teaching materials for this course (see Cooke 2009 above)

Northampton Community College (2005 – 2006)

BIOS 206: General Ecology

- Responsible for teaching lecture and lab; required course for biology majors
- Developed and implemented a new lab curriculum

GEOG 210: Meteorology

- Responsible for teaching lecture and lab; course for science majors and non-majors
- Developed and implemented a new lab curriculum

BIOS 115: Essentials of Biology

- Responsible for teaching lecture and lab; required course for science majors

Lehigh University (2002)

EES 21: Introduction to Planet Earth

- Taught two laboratory sections to undergraduate majors and non-majors
- Assisted with organizing and leading field trips, grading, and test administration

MENTORING EXPERIENCE

Duke University

- Mentored five undergraduates (freshmen and sophomores) on writing and publishing their first peer-reviewed scientific research article

Illinois Natural History Survey

- Co-advised M.S. student on his research project (nutrient budgets and energetics of Asian carp)
- Trained and fully supervised three undergraduate lab interns.

Lehigh University

- Advised two undergraduate students in design and implementation of research projects
- Trained four undergraduate interns in field, lab, and data analysis techniques, including use of spectrophotometers and UV radiometers and analysis of optical data

Ohio Wesleyan University

- Tutored two undergraduate students taking general chemistry and environmental chemistry courses

GRANTS

How does the exotic water flea *Daphnia lumholtzi* impact fish communities in Falls Lake and the Neuse River? North Carolina Wildlife Resources Commission, 2010, \$10,130.

Examining seasonal trends of the invasive water flea *Daphnia lumholtzi* in Jordan Lake, North Carolina: A Proposal for Trinity College Fall 2010 Course Enhancement. Trinity College of Arts and Sciences at Duke University, 2010, \$940

Foraging selectivity of North Carolina sport fishes on the exotic water flea *Daphnia lumholtzi*. Duke University Thompson Writing Program, 2010, \$1,392.

Assessment of drought-related trends in zooplankton communities and underwater irradiance in Falls Lake. Duke University Thompson Writing Program, 2009, \$2,000.

International School on Alpine Ecology and Global Change. Duke University Thompson Writing Program, 2009, \$1,200.

CONFERENCE PRESENTATIONS (SELECTED)

Cooke, S. L. 2010. Spatial and seasonal dynamics of nonindigenous *Daphnia lumholtzi* and other zooplankton in Falls Lake (central North Carolina). SE Lakes Management Conference. Winston-Salem, NC. May (Oral)

Cooke, S. L., Fischer, J. M., Williamson, C. E., and Morris, D. P. 2008. Effects of increased dissolved organic matter on zooplankton vertical distribution in a UV-transparent lake: Results from large-scale mesocosms. AGU Chapman Conference on Lakes and Reservoirs as Sentinels, Integrators, and Regulators of Climate Change. Incline Village, NV. September. (Poster)

Cooke, S. L., Hill, W. R., and Hogue, J. L. 2008. Using a bioenergetics model to predict the invasion potential of planktivorous silver carp in the Laurentian Great Lakes. Advancing the Science of Limnology and Oceanography. St. John's, Newfoundland. June. (Oral)

Cooke, S. L., Williamson, C. E., and Saros, J. E. 2006. How do temperature, dissolved organic matter, and nutrients influence the response of *Leptodiptomus ashlandii* to UV radiation in a sub-alpine lake? American Society of Limnology and Oceanography Aquatic Sciences Meeting. Victoria, British Columbia. June. (Oral)

Cooke, S. L., Williamson, C. E., and Saros, J. E. 2005. UV radiation effects on calanoid reproduction are altered by temperature, dissolved organic carbon, and nutrients in alpine lakes. American Society of Limnology and Oceanography Aquatic Sciences Meeting. Salt Lake City, UT. February. (Oral)

Cooke, S. L., Williamson, C. E., Morris, D. P., and Hargreaves, B. R. 2004. Allochthonous dissolved organic matter and UV radiation alter zooplankton community structure in a transparent lake. Ecological Society of America. Portland, OR. August. (Oral)

Cooke, S. L., and Williamson, C. E. 2003. Effects of UV radiation and chromophoric dissolved organic matter additions on zooplankton in transparent lakes. American Society of Limnology and Oceanography Aquatic Sciences Meeting. Salt Lake City, UT. February. (Oral)*

*co-organized & co-chaired special session "Landscape context of UV radiation effects on aquatic ecosystems"

AWARDS & ACADEMIC HONORS

- NSF Graduate Research Fellowship Honorable Mention (2002, 2003)
- Kravis Fellowship (Lehigh, 2003)
- Lehigh University Fellowship (2001-2002)

- Richard B. Alexander Award for Excellence in Environmental Studies (OWU, 2001)
- Elizabeth Cass Wills Prize for senior in Zoology; George B. Harris Award for Zoology (OWU, 2001)
- Phi Beta Kappa (OWU, 2001)
- Phi Sigma Iota (Modern Foreign Language Honors Society, 2001)
- Phi Sigma (Biological Honors Society, 2000)
- Kraus Research Fellowship (1999)
- Faculty Scholarship recipient (OWU, 1997-2000)

PROFESSIONAL SERVICE AND ACTIVITIES

Reviewer: peer reviewer for ca. 10-12 journals including *PNAS*, *Ecology*, *Oecologia*, *Environmental Science and Technology*, *Photochemical and Photobiological Sciences*, *Canadian Journal of Fisheries & Aquatic Sciences*, *Hydrobiologia* (2004 – current)

UNEP EEAPP Reviewer: invited reviewer for the United Nations Environmental Programme 2010 Assessment Report “Environmental Effects of Ozone Depletion and Interactions with Climate Change”

Proposal Reviewer: National Science Foundation (2008 – current)

Editorial Board Member: Duke University’s journal of first year writing, *Deliberations* (2009 – current)

Campus Sustainability Committee, Education Sub-Committee Member: goal is to make sustainability a part of the curriculum and educational experience for all Duke students (Jan. 2011-current)

Search Committee Member: committee to select new Thompson Writing Program Postdoctoral Fellows (Sept. 2009 – Feb. 2010)

Selected Workshop Participant, Sustainability Across the Curriculum, Duke University – included \$500 research stipend (May 2011)

Selected Workshop Participant, Aquatic GIS Workshop, Saint Louis University (Jun. 2011)

Selected Course Participant, International School on Alpine Ecology and Global Change, Obergurgl, Austria, (Oct. 2009)

Selected Course Participant, “Fundamentals of Ecosystem Ecology,” Institute for Ecosystems Studies, Millbrook, New York, (Jan. 2003)

Society Affiliations: American Society of Limnology and Oceanography (ASLO); North American Lake Management Society (NALMS); Ecological Society of America (ESA); Sigma Xi

Consultant: Served as an expert witness and consultant to the Law Offices of Stuart R. Krauskopf, P.C. representing Wendella Sightseeing Company, Inc. regarding the invasion ability and potential impacts of Asian carps in Lake Michigan (Mar.-Oct. 2010)

SCIENCE OUTREACH & VOLUNTEER WORK

North Carolina Museum of Natural Science Volunteer, Raleigh, NC, July 2011 – current

- Working with Dr. Eric Hanneman (Director of Living Collections) to culture freshwater mussels for an aquarium exhibit at the museum’s new Nature Research Center.

Ecology of Our Wild Lives, North Carolina Museum of Natural Science, June 30, 2011

- Presented a research poster “Asian carp in the Great Lakes: A feast or famine?” at this outreach event intended to show public audiences how science is connected to their daily lives.

Poster Judge, ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico, February 2011

- Judged student posters in the biological invasions session

Eno Environmental Education for Kids (EEEEK) Volunteer, Durham, NC, July 2010

- Volunteered at the EEEK exhibit at the Eno River Association's "Festival for the Eno"

Science Fair Judge, Delaware County, Ohio, April 2001

- Served on a panel of judges for the Delaware County Middle and High School Science Fair..

Maryland-National Capital Parks & Planning Commission (M-NCPPC) Natural Resources Division, Silver Spring, Maryland, June-August 1998

- Downloaded data from stream temperature loggers across Montgomery County for analysis.
- Assisted naturalists with county-wide bird and fish surveys, including electroshocking.

REFERENCES

Dr. Kristen Neuschel, Director, Thompson Writing Program, Duke University, 111 Art building, Durham NC 27708; 919-613-4409; kneusche@duke.edu (current postdoctoral teaching advisor)

Dr. Walter Hill, Professional Scientist, Illinois Natural History Survey, University of Illinois, 1816 S. Oak Street, Champaign, IL 61820; 217-244-2103; whill@inhs.uiuc.edu (former postdoc. research advisor)

Dr. Craig Williamson, Ohio Eminent Scholar, Professor, Dept. of Zoology, Miami University, 212 Pearson Hall, Oxford, OH 45056; 513-529-3180; craig.williamson@muohio.edu (Ph. D. advisor)

Dr. Sönke Johnsen, Associate Professor, Biology Department, Duke University, 301 Biological Sciences Building, Durham, NC; 919-660-7321; sjohnsen@duke.edu (current postdoctoral research advisor)