

Nathan E. Mills
CURRICULUM VITA
(January 2024)

Department of Biology
Harding University
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Educational Background

Doctor of Philosophy—May 2002
Division of Biological Sciences
University of Missouri, Columbia, MO

Master of Science—August 1997
Department of Biology
Southwest Missouri State University, Springfield, MO

Bachelor of Science—December 1994
Department of Biology
Harding University, Searcy, AR

Academic Positions

Professor of Biology (2019 – Present). Harding University, Searcy, AR.

Associate Professor of Biology (2009 – 2019). Harding University, Searcy, AR.

Assistant Professor of Biology (2002 – 2009). Harding University, Searcy, AR.

Teaching Assistant (1997 – 2002). General Biology, Environmental Science. University of Missouri, Columbia, MO.

Student Mentor (2001). Life Sciences Undergraduate Research Opportunity Program (UROP). University of Missouri, Columbia, MO.

Teaching Assistant (1995 – 1997). Ecology, Herpetology. Southwest Missouri State University, Springfield, MO.

Research Interests

Current Research (2002-Present). I am interested in understanding how amphibians interact with their environment. The questions I ask are primarily ecological and frequently revolve around understanding how anthropogenic changes in the environment are affecting amphibians. Questions I have investigated include: How does hypoxia affect embryonic growth and development, and in turn, how does the embryo respond to hypoxia through changes in egg capsule oxygen conductance? How do pesticides interact with environmental variables, such as competition and predation, to alter the survival, growth, and timing of metamorphosis in amphibian larvae? And, how does artificial night lighting alter the behavior, spatial distribution, survival, and growth of amphibians? In addition to my primary research interests, I have had the privilege of collaborating with Mike Plummer on research investigating the ecology of turtles and snakes. Most recently, I have begun planning for amphibian surveys at the Gilliam Biological Research Station (GBRS). In addition to gaining valuable information on the diversity and abundance of amphibians at the research station, I expect these surveys to raise interesting questions that will provide the basis for future research activities.

Doctoral Research (1998-2002). Direct and indirect effects of an insecticide on *Rana sphenocephala* tadpoles. Dr. Ray Semlitsch, Advisor. University of Missouri, Columbia, MO.

Master's Research (1995-1997). Effects of hypoxia on embryonic development and egg capsule conductance in amphibians. Dr. Chris Barnhart, Advisor. Southwest Missouri State University, Springfield, MO.

Research Assistant (1992-1995). Life history and ecology of hognose snakes (*Heterodon platirhinos*) and spiny softshell turtles (*Trionyx spiniferus*). Dr. Mike Plummer, Advisor. Harding University, Searcy, AR.

Research Assistant (1990). Ecology and conservation status of the Northern Goshawk (*Accipiter gentilis*) in the Gifford Pinchot National Forest, Washington, USA. Dr. Deb Mueller, Advisor. Harding University, Searcy, AR.

Refereed Research Publications

Mills, N.E. and F.E. Rowland. In Preparation. Artificial night lighting alter amphibian habitat use.

Plummer, M.V. C.S. O'Neal*, S.M. Cooper, R. Stork, N.E. Mills, and A.B. McKinney*. 2020. Leave or die: Dispersal of red-bellied mudsnakes (*Farancia abacura*) from their home ranges in an isolated wetland. *Wetlands* 40:2489-2498. <https://doi.org/10.1007/s13157-020-01362-w>

Mills, N.E. and Z.A. Ward*. 2015. Egg hypoxia decreases posthatching survival and delays metamorphosis in *Ambystoma maculatum* (spotted salamanders). *Journal of Herpetology* 49:616-620.

Plummer, M.V. and N.E. Mills. 2015. Growth and maturity of spiny softshell turtles (*Apalone spinifera*) in a small urban stream. ***Herpetological Conservation and Biology*** 10:688-694.

Plummer, M.V. and N.E. Mills. 2010. Body temperature variation in free-ranging hognose snakes (*Heterodon platirhinos*). ***Journal of Herpetology*** 44:471-474.

Plummer, M.V., T.N. Lee*, and N.E. Mills. 2008. Effect of a sand substrate on the growth and condition of *Apalone mutica* hatchlings. ***Journal of Herpetology*** 42:550-554.

Plummer, M.V., D.G. Krementz, L.A. Powell, and N.E. Mills. 2008. Effects of habitat disturbance on survival rates of softshell turtles (*Apalone spinifera*) in an urban stream. ***Journal of Herpetology*** 42:555-563.

Plummer, M.V., and N.E. Mills. 2008. Chapter 7. Structure of an urban population of softshell turtles (*Apalone spinifera*) before and after severe stream alteration. In J.C. Mitchell, R.E. Jung Brown, and B. Bartholomew (eds.) ***Urban Herpetology. Herpetological Conservation Vol. 3.*** Society for the Study of Amphibians and Reptiles. Salt Lake City, UT.

Vall*, J.H. and N.E. Mills. 2007. Intermittent hypoxia in eggs of *Amystoma maculatum*: Embryonic development and egg capsule conductance. ***Journal of Experimental Biology*** 210:2430-2435.

Lee*, T.N., M.V. Plummer, and N.E. Mills. 2007. Use of posthatching yolk and external forage to maximize early growth in *Apalone mutica* hatchlings. ***Journal of Herpetology*** 41:492-500.

Plummer, M.V. and N.E. Mills. 2006. *Heterodon platirhinos* (Eastern Hognose Snake) road crossing behavior. ***Herpetological Review*** 37:352.

Plummer, M.V., T.L. Crabill, N.E. Mills, and S.L. Allen. 2005. Body temperatures of free-ranging softshell turtles (*Apalone spinifera*) in a small stream. ***Herpetological Review*** 36:371-375.

Mills, N.E. and R.D. Semlitsch. 2004. Competition and predation mediate the indirect effects of an insecticide on southern leopard frogs. ***Ecological Applications*** 14:1041-1054.

Mills, N.E., M.C. Barnhart, and R. Semlitsch. 2001. Effects of hypoxia on egg capsule conductance in *Ambystoma* (class Amphibia, order Caudata). ***Journal of Experimental Biology*** 204:3747-3753.

Relyea, R.A. and N.E. Mills. 2001. Predator-induced stress makes the pesticide carbaryl more deadly to gray treefrog tadpoles (*Hyla versicolor*). ***Proceeding of the National Academy of Science*** 98:2491-2496.

Plummer, M.V. and N.E. Mills. 2000. Spatial ecology and survivorship of resident and translocated hognose snakes (*Heterodon platirhinos*). ***Journal of Herpetology*** 34:565-575.

* indicates undergraduate student mentee.

Mills, N.E. and M.C. Barnhart. 1999. Effects of hypoxia on embryonic development in two *Ambystoma* and two *Rana* species. *Physiological and Biochemical Zoology* 72:179-188.

Plummer, M.V., N.E. Mills, and S.L. Allen. 1997. Activity, habitat, and movement patterns of softshell turtles (*Trionyx spiniferus*) in a small stream. *Chelonian Conservation and Biology* 2:514-420.

Plummer, M.V. and N.E. Mills. 1996. Observations on trailing and mating behaviors in hognose snakes (*Heterodon platirhinos*). *Journal of Herpetology* 30:80-82.

Other Publications

Mills, N.E. 2017. A Fellow Fisherman. March Newsletter. Little Red River Foundation.

Mills, N.E. 2004. Laboratory Exercises for Human Anatomy and Physiology I. Department of Biology, Harding University.

Boone, M.D., C.M. Bridges, and N.E. Mills. 2001. Evaluating the risk of chemical contaminants in amphibian communities. *The Glade* (Missouri Society for Conservation Biology) 4:6-7.

Boone, M.D., C.M. Bridges, and N.E. Mills. 2001. A hierarchical approach in studying the effects of an insecticide on amphibian communities. *Froglog* (Declining Amphibian Population Task Force) 48:4-5.

Conference Research Presentations

Finn*, K., J. Savage*, M. Griekspoor*, L. Dillie*, K. Boren*, and N.E. Mills. April 2013. The effects of predation and light variation on the behavior of *Procambarus acutus*. 20th Annual Arkansas Undergraduate Research Conference. Henderson State University, Arkadelphia, Arkansas. (Poster presentation)

Wrench*, Z.C. and N.E. Mills. 3 April 2009. *Bufo fowleri* alters its attraction to light in the presence of a potential predator. Arkansas Academy of Science 93rd annual meeting. University of the Ozarks, Clarksville, Arkansas.

Valls*, J.H. and N.E. Mills. 13 April 2007. Intermittent hypoxia in eggs of *Amystoma maculatum*: Embryonic development and egg capsule conductance. Arkansas Academy of Science 91st annual meeting. Arkansas Tech University, Russellville, Arkansas. (Valls won award for best undergraduate student presentation)

Mills, N.E. and R.D. Semlitsch, and C. Bridges. 16 November 2004. Indirect effects of an insecticide on *Rana sphenocephala* (southern leopard frog) tadpoles. Society of Environmental Toxicology and Chemistry 25th annual meeting. Portland, Oregon.

Mills, N.E. and R.D. Semlitsch. 5 July 2002. Indirect Effects of an insecticide mediated by competition and predation. American Society of Ichthyologists and Herpetologists 82nd annual meeting. Kansas City, Missouri.

Mills, N.E. and R.D. Semlitsch. 1 February 2002. Indirect effects of an insecticide on the southern leopard frog. Missouri Natural Resources Conference. Osage Beach, Missouri.

Mills, N.E. and R.D. Semlitsch. 30 September 2001. Direct and indirect effects of a chemical pesticide on amphibians. Missouri Herpetological Association 14th annual meeting. Reis Biological Station, Missouri.

Mills, N.E. and M.J. Parris. 26 September 1998. Effects of dehydration on the jumping performance of parental and hybrid genotypes in the *Rana pipiens* complex. Missouri Herpetological Association 11th annual meeting. Jefferson City, Missouri.

Plummer, M.V., N.E. Mills, and S.L. Allen. 27 September 1997. Activity, habitat, and movement patterns of *Trionyx spiniferus* in a small stream. Missouri Herpetological Association 10th annual meeting. Jefferson City, Missouri.

Mills, N.E. and M.C. Barnhart. 29 June 1997. Effects of hypoxia on amphibian eggs. American Society of Ichthyologists and Herpetologists 77th annual meeting. Seattle, Washington.

Mills, N.E. and M.C. Barnhart. 28 September 1996. Effects of dissolved oxygen on development and hatching of *Amystoma maculatum* and *Rana sphenocephala*. Missouri Herpetological Association 9th annual meeting. Lebanon, Missouri.

Invited Seminar Presentation

Mills, N.E. and R.D. Semlitsch. 2003. Integrating community ecology and ecotoxicology: Indirect effects of an insecticide on *Rana sphenocephala* tadpoles. Invited Speaker, Department of Biology, University of Memphis, Memphis, Tennessee.

Mills, N.E. and R.D. Semlitsch. 8 November 2002. Integrating community ecology and ecotoxicology: Indirect effects of an insecticide on *Rana sphenocephala* tadpoles. Invited Speaker, Department of Biology, Southwest Missouri State University, Springfield, Missouri.

Mills, N.E. and R.D. Semlitsch. 3 December 2001. Integrating community ecology and ecotoxicology: Indirect effects of an insecticide on anuran tadpoles. Invited Speaker, Biological Sciences Seminar, University of Missouri, Rolla, Missouri.

* indicates undergraduate student mentee.

Mills, N.E. and M.C. Barnhart. 9 February 1998. Effects of hypoxia on embryonic development and hatching in two *Ambystoma* species. Invited Speaker, Department of Biology, Harding University, Searcy, Arkansas.

Other Presentations and Seminars

Guest Speaker, Introduction to Snakes and Snake Bites, OTC Pharmacotherapy (PHA 7540), College of Pharmacy, Harding University (annually 2017 – 2019)

Professional Communication Workshop, McNair Scholars Program, Harding University (annually 2006 – 2021)

Scientific Writing Workshop, Summer Research Internship Program, Arkansas School for Math, Science, and the Arts (8 June 2017)

Guest Speaker, Westwood Garden Club, Little Rock, Arkansas (annually 2004 – 2012)

Mills, N.E. 2 May 2008. Developing a Christian Environmental Ethic. In the lecture series: The Creation Declares the Glory of God: Exploring the Relationship between Humanity and the Environment. 65th Annual Pepperdine University Bible Lectures. Malibu, California .

Mills, N.E. 2 October 2007. The Psalmist view of creation: Practical applications for today. In the lecture series: The Creation Declares the Glory of God: Exploring the Relationship between Man and His Environment. 84th Annual Harding University Bible Lectureship. Searcy, Arkansas.

Research Grants

Wrench*, Z. and N.E. Mills. \$1,500. Urban lighting: a catalyst of predation on *Bufo fowleri*? Margaret M. Plummer Memorial Research Grant (May 2008).

Mills, N.E. \$250. Harding University Faculty Development Grant (April 2008).

Plummer, M.V. and N.E. Mills. \$300. Harding University Faculty Development Grant (July 2007).

Lee*, T.N., M.V. Plummer, and N.E. Mills. \$550. The effect of sand substrate on the laboratory maintenance of *Apolone mutica* hatchlings. Margaret M. Plummer Memorial Research Grant (August 2005)

Plummer, M.V. and N.E. Mills. \$135. Harding University Faculty Development Grant (April 2005)

Lee*, T.N., M.V. Plummer, and N.E. Mills. \$800. Post-hatching yolk reserves: The effect of starvation on growth and performance of *Apalone mutica* hatchlings. Margaret M. Plummer Memorial Research Grant (July 2004)

Lee*, T.N., M.V. Plummer, and N.E. Mills. \$700. Post-hatching yolk reserves: The effect of starvation on growth and performance of *Apalone mutica* hatchlings. Margaret M. Plummer Memorial Research Grant (June 2003)

Mills, N.E. \$1000. Direct and indirect effects of carbaryl on an amphibian community. Declining Amphibian Population Task Force (DAPTF) Seed Grant (January 2000).

Mills, N.E. \$600. Direct and indirect effects of carbaryl on an amphibian community. Charles P. Bell Conservation Scholarship. Conservation Federation of Missouri and the Conservation Foundation of Missouri Charitable Trust. (February 2000)

Service to the Profession

Associate Editor, *Herpetologica* (2004 – 2007)

Peer reviewer for the following journals:

Evolutionary Ecology (2015)

Environmental Toxicology and Chemistry (2013)

Fundamental and Applied Limnology (2010)

Copeia (2009)

American Midland Naturalist (2001, 2009)

Journal of Herpetology (1998, 1999, 2001, 2008, 2009)

Canadian Journal of Zoology (2000, 2008)

Herpetologica (1998, 2004, 2005, 2006, 2007)

Ecology (2003, 2005)

Freshwater Biology (2004)

Ecological Applications (2003)

Functional Ecology (2000)

Oecologia (2000)

Doctoral Dissertation Committee Member (2010 – 2016), Department of Biological Sciences, University of North Texas. Student: Sarah K.G. Sirsat. Dissertation Title: Maturation of endothermic capacity within the avian developmental spectrum: A characterization of thermoregulatory metamorphosis of modern archosaurs.

* indicates undergraduate student mentee.

Professional Societies

American Association for the Advancement of Science (2015 – Present)

Ecological Society of America (1998 – Present)

Society for the Study of Amphibians and Reptiles (2009 – 2021)

Herpetologists' League (2002 – 2008)

Professional Development

Ecological Society of America Annual Meeting: Vital Connections in Ecology. Virtual. (2-6 August, 2021). Participated in the following workshops:

- 13th REEFS: Resources for Ecology Education, Fair and Share
- Telling Stories, Sharing Knowledge, and Seeing the Nature of Things: Teaching Scientific Communication in Ecology Courses
- Aligning Your Teaching with the Four-Dimensional Ecology Education (4DEE) Framework
- Backward Design and Inclusive Pedagogy for Teaching Ecology Courses
- Assess What's Important: Creating Assessments That Show How Students Use Their Ecological Knowledge

BioLogos Conference: Beyond Conflict. Baltimore, MD (27-29 March 2019)

BioLogos Conference: Christ and Creation. Houston, TX (29-31 March 2017)

Arkansas Academy of Science 98th Annual Meeting, Harding University, Searcy, AR (4-5 April 2014)

Christian Scholars Conference 31st Annual Meeting: The Path of Discovery: Science, Theology, and the Academy. Pepperdine University, Malibu, CA (16-18 June 2011)

Arkansas Academy of Science 93rd Annual Meeting, University of the Ozarks, Clarksville, AR (3-4 April 2009)

Society for the Study of Amphibians and Reptiles 50th Annual Meeting, St. Louis, MO (11-16 July 2007)

Arkansas Academy of Science 91st Annual Meeting, Arkansas Tech University, Arkadelphia, AR (13-14 April 2007)

Arkansas Academy of Science 89th Annual Meeting, Hendrix College, Arkadelphia, AR (8-9 April 2005)

Courses Taught, Harding University

BIOL 170/1500: Principles of Biology (majors)—Fall 2018 – Present
BIOL 171/1500L: Principles of Biology Lab (majors)—Fall 2018 – Present
BIOL 406/3690L: Ecology Lab—Fall 2009 – Present
BIOL 307/3600: Ecology—Fall 2009 – Present
BIOL 416: Herpetology—Spring of even years, 2012 – 2016*, 2020
BIOL 314/2300: Topics: Ornithology—Intersession 2005 – Present
PHS 410/4100: Christian View of Science and Scripture (team taught)—Spring 2003 – Present*
BIOL 161: Biological Theory and Process (majors)—Fall 2013 – Spring 2018*
BIOL 111: General Biology (non-majors)—Fall 2011 – Spring 2018
BIOL 440: Senior Seminar (coordinator)—Fall 2009 – Spring 2018
BIOL 140: Freshman Seminar (coordinator)—Fall 2006 – Spring 2011
BIOL 249: Human Anatomy and Physiology I—Fall 2002 – Spring 2011
BIOL 250: Environmental Science (Harding University Australasia)—Fall 2010
PHS 115: Energy, Pollution, and Society (Harding University Australasia)—Fall 2010
HUM 201: International Studies (Harding University Australasia)—Fall 2010
BIOL 254: Biostatistics—Fall 2009
BIOL 253: Human Anatomy and Physiology II—Fall 2002

* Team Taught

Committees, Harding University

Institutional Animal Care and Use Committee (IACUC, 2018 – Present)
Academic Integrity Committee (2005 – Present)
Health Sciences Committee (2002 – 2012)
Faculty Evaluation Committee (2010 – 2011)

Service to the Department of Biology, Harding University

Gilliam Biological Research Station (GBRS) Oversight Committee (2018 – Present).

Department of Biology Assessment Leader (2010 – 2021). Responsibilities include the collecting and analyzing of assessment data, writing the annual assessment reports, and developing the action plans for the upcoming year.

Department of Biology Interim Chair (2015). Oversaw the day-to-day administrative activities of the Department of Biology while Dr. Ben Bruner was on sabbatical.

Department of Biology Academic Planning and Program Review (APPR) (2015). Assisted the department chair (Dr. Ben Bruner) with the performance review of the Department of Biology, developing a five-year plan, and writing the final APPR report.

Departmental of Biology Learning Outcomes Development (2015). Developed and wrote the learning outcomes adopted by the Department of Biology.

Department of Biology Curriculum Review (2012 – 2013). This review included 1) assessing the academic strengths and weaknesses of our graduates, 2) assessing how our degree requirements compare to degree requirements at other universities, 3) evaluating the appropriateness of our core curriculum (required of all our majors), and 4) developing a strategic plan to guide future changes in our curriculum and degree programs. This strategic plan provided the template from which the Department of Biology worked as we made modifications to the curriculum over the next five years.

Lumina Degree Qualification Profile (DQP) (2011 – 2012). Part of a two-person team responsible for completing the DQP for the Department of Biology as a part of Harding University's preparation for the Higher Learning Commission site visit.

Curriculum Development, Department of Biology, Harding University

For each of the following new or re-imagined classes, I played a major role in developing the curriculum and teaching the classes for the first time using the new curriculum.

BIOL 171/1500L: Principles of Biology Lab (2019)—an introductory freshman biology lab for all students planning to take advanced classes in the Department of Biology.

BIOL 170/1500: Principles of Biology (2018)—an introductory freshman biology class for all students planning to take advanced classes in the Department of Biology. Replaced BIOL 161.

BIOL 161: Biological Theory and Process (2013)—an introductory freshman biology class for all students planning to earn a degree from the Department of Biology.

BIOL 111: General Biology (2012)—a liberal arts biology class for students not planning to major in the biological sciences.

BIOL 140: Freshman Seminar (2006)—a seminar class for incoming freshman who were considering majoring in the biological sciences.

BIOL 249: Anatomy and Physiology I (2004)—the first semester of a two semester sequence introducing student to the biology of the human body.

Achievements/Honors

Teacher Achievement Award nominee (2021). Department of Biology, Harding University, Searcy, AR.

Teacher Achievement Award (2013). Harding University, Searcy, AR.

Division of Biological Sciences Graduate Teaching Award (2001). University of Missouri, Columbia, MO.

Department of Biology nominee for the Boritzki Outstanding Graduate Student Scholarship (1996). Southwest Missouri State University, Springfield, MO.

Alpha Chi Honor Society (1993). Harding University, Searcy, AR.

NAIA All-America Scholar-Athlete (1992). Harding University, Searcy, AR.

Service to church and community

Shepherd, Downtown Church (2020 – Present)

Bible Class Teacher, Downtown Church (2012 – 2020)

Deacon over Adult Bible Classes, Downtown Church (2013 – 2020)

Children's Ministry Steering Team, Downtown Church (2012 – 2019)

Adult Staff, Camp Tahkodah (2011 – 2021)

Breakout Session Leader, Wellspring Summit, Downtown Church (2016 – 2017)

Youth Baseball Coach, Searcy, Arkansas (2009 – 2013)

Youth Soccer Coach, Searcy, Arkansas (2012)

Bible Class Teacher, Cloverdale Church of Christ (2003 – 2011)

References

Dr. Rebekah Rampey, Department Chair
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Dr. Ben Bruner, Former Department Chair
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