

Dr. Shem D Unger

3122 Laurelwood Drive
Matthews, North Carolina 28105

Phone: *cell* (765) 414-5435
email: cryptobranchus11@gmail.com

EDUCATION

Ph.D.	Purdue University	Wildlife Genetics	2012
M.S.	Missouri State University	Biology	2003
B.S.	Texas A & M University	Wildlife & Fisheries Sciences	1999

RESEARCH INTERESTS

Outreach Science and Education, Vertebrate Biology & Evolution, Amphibian & Reptile Ecology, Conservation Genetics

PROFESSIONAL EXPERIENCE

Executive Director

2016-present

Carolina Headwaters L.L.C., Matthews, North Carolina. My focus of projects with Carolina Headwaters LLC involves contract work for the State of North Carolina biological research projects focused on conservation of water resources and state amphibians, as well as outreach education in Mecklenburg County. Website: www.carolinaheadwaters.com

Assistant Professor of Biology

2015-present

Biology Department, Wingate University. Wingate, North Carolina. My current research involves assessing occupancy modeling and life history of larval eastern hellbenders in North Carolina. I currently teach Organismal Biology, Herpetology, and Evolution courses within the Biology Department.. As part of Wingate Science Outreach Program I provide opportunities for undergraduates to engage their community in citizen science.

Postdoctoral Researcher

2013-2015

Savannah River Ecology, University of Georgia. Aiken, South Carolina. I worked on a proteomic/glycomic mass spectrometry based approach to examine the effects of environmental contamination (low dose irradiation) on aquatic organisms to elucidate the biological and evolutionary responses behind DNA damage and protein synthesis. Additional projects included non-invasive genetic sampling in feral hogs, and developing genetic markers for invasive brown tree snakes from Guam, & mentoring several undergraduates in developing research projects on the Savannah River Site.

Graduate Assistant

2008–2012

Purdue University. West Lafayette, Indiana. My research involved conservation genetics of eastern hellbenders at multiple spatial scales, range-wide and landscape scale. I developed highly polymorphic microsatellite markers to address genetic variation & structure, and assessed population viability through stage structure modeling. This project involved working closely with state/federal researchers, coordinated/conducted field work across entire species' range. I also co-taught an upper level Advanced Herpetology course.

Biological Science Technician 2006 -2008
USGS-Forest and Rangeland and Ecosystems Science Center. Corvallis, Oregon. I was crew leader for Amphibian Research and Monitoring Initiative (ARMI) projects including statewide assessment of chytrid fungus. Experience included surveying, backpacking, wetland monitoring, electro-shocking & marking with Visible Elastomer (Pacific giants, tailed frogs), and identification of herpetological species.

Research Technician 2004 - 2006
Resource Management. Fort Jones, California. I was Crew leader working on BMP's (best management plan proposals), monitoring salmonid thermal refugia habitat, and macro-invertebrate surveys.

Siskiyou Resources Conservation District. Etna, California. My focus was Coho salmon surveys involving snorkel stream surveys and fyke trapping of anadromous salmonids.

California Department of Fish and Game/Shasta Valley Resources Conservation District. Yreka, California. I was Crew leader for adult, and juvenile surveys for Coho, Chinook, and Steelhead salmonids. Techniques such as collection of biological information, PIT tagging, marking, and radio tracking of salmonids, rotary screw trapping, diving surveys, and habitat typing were used. I also developed training materials for new employees, wrote annual reports, and worked closely with state, federal, tribal, and private agencies regarding surveys in our district.

Graduate Assistant 2001 - 2003
Missouri State University. Springfield, Missouri. My thesis focused on the reproductive biology and larval development of eastern and Ozark hellbenders. In addition I was a teaching assistant instructing introductory biology laboratories.

Research Technician 1998 - 2001
Humboldt State/University of Minnesota. Willow Creek, California. My professional experience here involved being a field crew leader for Northern Spotted Owl research. I conducted point-call and walk-in surveys, nest surveys involving tree climbing and banding of juvenile/adult birds.

US Geological Survey-Biological Research Division. Corpus Christi, TX. I was a technician for Kemp Ridley and Green turtle nesting surveys. Trained co-workers on survey methodology, ATV use, and head-starting program.

Grupo Ecologico de la Costa Verde. Nayarit, Mexico. I was a sea turtle research assistant on Olive Ridley Sea turtles and conducted nesting surveys, maintained captive rearing center, outreach programs, and served as translator for project.

Ontario Ministry of Natural Resources/Student Conservation Association. Algonquin Provincial Park, Canada. I conducted population surveys for mink, tree, and green frogs, as well as bear and moose. I also developed a blood stress hormone experimental study on the effects of corticosteroids on mink frogs.

TEACHING EXPERIENCE

Wingate University- Biological Department

2015-Present. **Assistant Professor of Biology**. Currently teaching Organismal Biology (BIO160), Herpetology (BIO 493) and Evolution (Bio 450) undergraduate courses.

American Allied University- Physical and Biological Sciences

2013-2015. **Adjunct Faculty**. I have taught Principles of Ecology (BIO330), Fundamentals of Biology (BIO130), Anatomy & Physiology (BIO 106, 107) and Marine Biology (BIO345) undergraduate courses. My primary focus centered on engaging students with biological concepts.

Purdue University – Department of Forestry and Natural Resources

2012. **Teaching assistant**. FNR 37000: Natural Resources Practicum. Taught wildlife techniques lectures and led field projects in U. P., Michigan. Taught amphibian survey methodology, VIE marking, NAAMP routes, species identification & amphibian biology. (~20 students per class, 60 students).

2012. **Co-Instructor**. FNR 598: Advanced Herpetology. Developed course materials including lectures, field trips, examinations, and labs closely with co-instructor Dr. Rod Williams. This class emphasized taxonomy, field methods, marking & monitoring local populations, & experimental design & current research methodologies (~14 students).

2009-10. **Teaching Assistant**. FNR 252, 251: Laboratory in Ecology and Systematics of Amphibians, Reptiles, Birds. Taught labs in Herps/Ornithology. (~15-20 students per class, 6 sections).

Missouri State University – Department of Biology

2002-3. **Teaching Assistant**. BIO 121, 122: General Biology I Laboratory. Responsible for organizing and teaching a weekly lab section of introductory biology for biology majors. Creating lectures, developing teaching labs. (~15 students per class, 2 sections).

HONORS AND AWARDS

2016. Undergraduate Summer Research Grant – Wingate University

2014. Distinguished Faculty – Allied American University.

2014. Eastern hellbender larvae microhabitat and the effects of sedimentation – Georgia DNR grant.

2010. Cryptobranchid Interest Group – Ron Goellner Research Award.

2008. Ross Graduate Fellowship – Purdue University.

2003. Best Graduate Thesis Award – Missouri State University.

PUBLICATIONS (*research*)

2017. Unger, S., L. Williams, J. Groves, C. Lawson, & J. Humphries. Anthropogenic associated mortality in the Eastern Hellbender. *Southeastern Naturalist* (*in press*).

2016. Kierepka, E, S. Unger, D. Keiter, J. Beasley, O. Rhodes, F. Cunningham, & A. Piaggio. Identification of Robust Microsatellite markers for wild pig fecal DNA. *Journal of Wildlife Management* 80 (6): 1120-1128.

2016: Unger, S., E. Chapman, K. Regester, and R. N. Williams. Genetic signatures follow dendritic patterns in the eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*). *Herpetological Conservation and Biology* 11 (1) 40-51.

2015. Unger, S., S. Lance, B. Kimball, T. McAuliffe, E. Abernathy, and O.E. Rhodes, Jr. Development and characterization of 36 polymorphic microsatellite markers for the brown tree snake *Boiga irregularis*, using Illumina sequencing. *BMC Research notes* 8:658.

2014. Bossle, B., R. Goforth, S. Unger, and O.E. Rhodes, Jr. The effects of suspended sediment on Japanese Medaka (*Oryzias latipes*) and mosquitofish (*Gambusia affinis*) metabolism. *South Carolina Academy of Science* 13 (1): 7.

2013. Unger, S., T. Sutton, O. E. Rhodes, Jr., and R. N. Williams. Population genetics of a cryptic, lotic species, the eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) across multiple spatial scales. *PLoSone* (DOI: 10.1371/journal.pone.0074180).

2013. Unger, S., T. Sutton, and R.N. Williams. A stage-structured population model of eastern hellbenders in Indiana. *Journal for Nature Conservation* 21(6):423-432.
2013. Unger, S., A. Mathis, and R. Wilkinson. A comparison of sperm health in declining and stable populations of hellbenders (*Cryptobranchus alleganiensis alleganiensis* and *C. a. bishopi*). *American Midland Naturalist* (170(2):382-392).
2013. Unger, S. and A. Mathis. Larval growth and the potential for head-starting of eastern and Ozark hellbenders (*Cryptobranchus alleganiensis alleganiensis* and *C. a. bishopi*). *Herpetological Review* 44: 89-91.
2012. Unger, S. and R.N. Williams. Genetic markers reveal high pit tag retention in giant salamanders (*Cryptobranchus alleganiensis*). *Amphibia-Reptilia* 33: 313-317.
2012. Mathis, A. and S. Unger. Learning to avoid dangerous habitat types by aquatic salamanders, *Eurycea tynnerensis*. *Ethology* 118(1): 57-62.
2011. Burgmeier, N.G., S. Unger, T. Sutton, and R.N. Williams. Health and habitat quality assessment for the eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) in Indiana. *Journal of Wildlife Diseases* 47(4): 836-848.
2011. Burgmeier, N.G., S. Unger, T. Sutton, and R.N. Williams. Population status of the eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) in Indiana. *Herpetology* 45(2): 195-201.
2010. Burgmeier, N.G., S. Unger, T. Sutton, and R.N. Williams. The bender board a new design for the restraint and measurement of hellbenders. *Herpetological Review* 41(3): 319-320.
2010. Albanese, B., J. Jensen, and S. Unger. Occurrence of the eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) in the Coosawattee River System (Mobile River Basin), Georgia. *Southeastern Naturalist* 10 (1): 181-184.
2009. Unger, S., J. Fike, T. Sutton, O.E. Rhodes, Jr., and R.N. Williams. Isolation and development of 12 polymorphic tetranucleotide microsatellite markers for the eastern hellbenders (*Cryptobranchus alleganiensis alleganiensis*). *Conservation Genetics Resources* 2: 89-91.

PUBLICATIONS (*extension, outreach, technical reports, and notes*)

2016. Unger, S. Necrophagy (scavenging) on *Cambarus robustus* (Crustacea: Cambaridae) by the black bellied salamander *Desmognathus quadramaculatus* (Caudata: Plethodontidae) in the Appalachian mountains of North Carolina, southeastern USA. *Herpetology Notes* 9: 227-228.
2016. Unger, S., C. Lawson, J. Groves, S. Spear, & C. More. Unusual Mortality of *Cryptobranchus alleganiensis alleganiensis* (Eastern hellbender), a Natural History Note. *Herpetological Review* 47 (4) in press.
2016. Unger, S. Cold-Blooded Creatures Don't Catch Colds in the Winter. *Habitat & Wildlife Keepers (HAWK)* Winter newsletter Natural History note.
2015. Unger, S. *Dendrobates auratus* (Green and black dart-poison frog) tadpole deposition site. *Herpetological Review* 46 (1): 74.
2014. Unger, S., Creature Feature, The Eastern Hellbender. *Outdoor Indiana* magazine. (November/December issue).
2014. T. Floyd and S. Unger. Reign of the den master. Georgia Department of Natural Resources Georgia Wild: September 29. <http://www.georgiawildlife.com/node/3726>.
2013. Unger, S., T. Floyd, and B. Kraus. Geographic distribution: *Necturus maculosus*. *Herpetological Review* 44: 619.
2012. Unger, S., and R.N. Williams. The Declining Giant Salamander. Purdue University Cooperative Extension Service. West Lafayette, IN, FNR-471.
2010. Burgmeier, N., S. Unger, and R.N. Williams. The Hellbender. Purdue University Cooperative Extension Service. West Lafayette, IN, FNR-418-W.

OUTREACH

2016. Wingate Science Outreach Program. Implemented over 10 separate science outreach programs including "Hands on Herpetology", "Snakes, the Scaley", and "Halloween Herpetology" at local public elementary schools, local nature meetings (Master Gardeners, Habitat & Wildlife Keepers), Discovery Place, & other Charlotte area events. All these events involved Wingate University Biology majors engaging their community to teach the general public about common & interesting amphibians & reptiles and their ecology in the state of North Carolina.
2013. Marion University Eco-Lab and Boys Scouts of America Reptile and Amphibian Study Merit Badge Program. ~30 participants.

2012. Marion University Eco-Lab summer camp herpetology workshop. I worked with k-6 age groups to lead an educational workshop entitled Hands on Herpetology. ~60 participants.
2011. Blue River Days Festival. Milltown, Indiana. Interacted with local land owners regarding hellbender research and education.~50 participants.
2009. West Lafayette District elementary schools. Assisted in teaching kids genetics and evolution unit using strawberry DNA extractions. ~60 participants.

PRESENTATIONS

2017. North Carolina Herpetology, Habitat and Wildlife Keepers (HAWK), Matthews, NC. *Oral presentation.*
2016. Association of Southeastern Biologist. Filial Cannibalism in Eastern hellbenders. Concord, NC. *Oral presentation.*
2016. *Invited speaker.* Snakes, the Good, the Bad, the Scaly. Master Gardeners of Union County, Monroe, NC. *Oral presentation.*
2016. *Invited speaker.* Cold-blooded Creatures. Atomz Laboratory Programs for Youth. Charlotte, NC. *Oral presentation.*
2015. *Invited speaker.* Charlotte Nature Museum. Salamanders of North Carolina. Fall festival, Charlotte, NC. *Oral presentation.*
2014. Joint Meeting of Ichthyologist and Herpetologist. Proteomic profiling of ionizing radiation in Medaka fish. Chattanooga, Tennessee. *Poster presentation.*
2013. *Invited speaker.* Georgia Southern University Biology Department. Ecology and Conservation of Hellbenders: North America's giant salamander. Statesboro Georgia. *Oral presentation.*
2012. World Congress of Herpetology. Population Genetics of hellbenders at multiple spatial scales. Vancouver Canada. *Oral presentation.*
2012. Indiana Academy of Science 127th Annual Meeting. Unraveling the mystery of hellbenders using conservation genetics. West Lafayette, Indiana. *Oral presentation.*
2011. Joint meeting of Ichthyologist and Herpetologist. The genetics of hellbenders. *Oral presentation.*

REFERENCES

- Allison Brown, Ph.D.** Faculty/Biology Dept. Chair, Wingate University, Wingate, NC 28174. Tel. (704) 233-8236 email: a.brown@wingate.edu
(Current supervisor, Department Chair)
- Rod N. Williams, Ph.D.** Assistant Professor, Purdue University, 195 Marsteller Street, West Lafayette, IN 47907. Tel: (765) 494-3568 Email: rodw@purdue.edu
(Ph.D. Major Advisor)
- Alicia Mathis, Ph.D.** Department Head/Professor, Missouri State University, Department of Biology, 901 S. National Av. Springfield, MO 65897. Tel: (417) 836-5699 Email: AliciaMathis@missouristate.edu
(M.S. Major Advisor)