

Timothy S. Mitchell

Dept. of Ecology, Evolution and Behavior
University of Minnesota
140 Gortner Lab
1479 Gortner Ave
Saint Paul, MN 55108

Email: mitc0713@umn.edu
Site: <http://timmitchellbiology.weebly.com>
Phone: (952) 261-2264

EDUCATION

2008-13: Doctorate of Philosophy, Iowa State University, Ames IA
Major: Ecology and Evolutionary Biology
Advisor: Fredric Janzen

2003-07: Bachelor of Arts, St. Olaf College, Northfield MN
Majors: Biology, Environmental Studies
Honors: Graduated *cum laude* with Distinction in Biology

PROFESSIONAL EXPERIENCE

2020- Present: Research Associate, College of Biological Sciences, University of Minnesota, Saint Paul, MN

2018-2020: Postdoctoral Associate, College of Biological Sciences, University of Minnesota, Saint Paul, MN

2016-2017: NSF Postdoctoral Research Fellowship in Biology, Department of Biological Sciences, Auburn University, Auburn, AL

2015: NSF Postdoctoral Research Fellowship in Biology, Department of Biology, University of Alabama at Birmingham, Birmingham, AL

2014: Lecturer; Department of Ecology, Evolution and Organismal Biology, Iowa State University, Ames, IA

2013-14: Postdoctoral Research Associate; Department of Ecology, Evolution and Organismal Biology, Iowa State University, Ames IA

PUBLICATIONS [*undergraduate or **high school student under my mentorship]

Peer-reviewed publications

- 30) Warner, D.A., J.M. Hall, A. Fargevieille, A.C. Hulbert*, S. Tiatragul, J.E. Pruett, **T.S. Mitchell**. Dependence on a human structure influences the extinction of a non-native lizard population after a major environmental change. *Biological Invasions* 1-18

- 29) **Mitchell, T.S.**, L. Agnew, R. Meyer, K. L. Sikkink, K. S. Oberhauser, E. T. Borer, E.C. Snell-Rood. 2020. Traffic influences nutritional quality of roadside plants for monarch caterpillars *Science of the Total Environment* 138045
- 28) Hall, J.M, **T.S. Mitchell**, C.J. Thawley, J.T. Stroud, D.A. Warner. 2020. Adaptive seasonal shift towards investment in fewer, larger offspring: Evidence from field and laboratory studies. *Journal of Animal Ecology*
- 27) Shephard, A.M., **T.S. Mitchell**, S. B. Henry, K. S. Oberhauser, M. E. Kobiela, E.C. Snell-Rood. 2020. Assessing zinc tolerance in two butterfly species: consequences for conservation in polluted environments. *Insect Conservation and Diversity*. 13(2): 201-210
- 26) Hulbert, A.C.*, J.M. Hall, **T.S. Mitchell**, D.A. Warner. 2020. Use of human structures facilitates persistence of a non-native ectotherm. *Biological Invasions* 1-15
- 25) Fanter, C.E., Z. Lin, S.W. Keenan, F.J. Janzen, **T.S. Mitchell**, D.E. Warren. 2020 Development-specific transcriptomic profiling suggests new mechanisms for anoxic survival in the ventricle of overwintering turtles. *Journal of Experimental Biology* 223(4)
- 24) Warner, D.A., **T.S. Mitchell**, B.L. Bodensteiner, F.J. Janzen. 2020. Sex and incubation temperature independently affect embryonic development and offspring size in a turtle with temperature-dependent sex determination. *Physiological and Biochemical Zoology* 93(1):62-74
- 23) **Mitchell, T.S.**, A.M. Shephard, C.R. Kalinowski, M.E. Kobiela, E.C. Snell-Rood. 2019. Butterflies do not alter oviposition or larval foraging in response to anthropogenic increases in sodium. *Animal Behaviour* 154:121-129
- 22) Carter, A.L., R. Andrews, B.L. Bodensteiner, J.B. Iverson, C.L. Milne-Zelman, **T.S. Mitchell**, J.M. Refsnider, D.A. Warner, F.J Janzen. 2019. Breadth of the thermal response captures individual and geographic variation in temperature-dependent sex determination. *Functional Ecology* 33(10):1928-1939
- 21) Janzen, F.J., D.M Delaney, **T.S. Mitchell**, and D.A. Warner. 2019. Do covariances between maternal behavior and embryonic physiology drive sex-ratio evolution under environmental sex determination? *Journal of Heredity* 100(4):411-421
- 20) **Mitchell, T.S.**, and F.J Janzen. 2019. Substrate influences turtle nest temperature, incubation period, and offspring sex ratio in the field. *Herpetologica* 75(1):57-62
- 19) Bodensteiner, B. L., D.A. Warner, J. Iverson, C. Milne-Zelman, **T.S. Mitchell**, J.M. Refsnider and F.J. Janzen. 2019. Geographic variation in thermal sensitivity of early life traits in a widespread reptile. *Ecology and Evolution* 2019(9):2791-2802.
- 18) **Mitchell, T.S.**, F.J Janzen, and D.A. Warner. 2018. Quantifying the effects of embryonic phenotypic plasticity on adult phenotypes in reptiles: A review of current knowledge and major gaps. *Journal of Experimental Zoology Part A* 329:203-214

- 17) **Mitchell T.S.**, J.M. Hall, and D.A. Warner. 2018. Female investment in offspring size and number shifts seasonally in a lizard with single-egg clutches. *Evolutionary Ecology* 32:231-245
- 16) Hulbert A.C.*, **T. S. Mitchell**, J.M. Hall, C.M. Guiffre*, D.C. Douglas*, and D.A. Warner. 2017. The effects of incubation temperature and experimental design on heart rates of lizard embryos. *Journal of Experimental Zoology Part A* 327:466-476
- 15) Warner D.A., **T.S. Mitchell**, B.L. Bodensteiner*, and F.J Janzen. 2017. The effect of hormone manipulations on sex ratios varies with environmental conditions in a turtle with temperature-dependent sex determination. *Journal of Experimental Zoology Part A* 327:172-281
- 14) **Mitchell, T.S.**, J.M. Refsnider, A. Sethuraman, D.A. Warner and F.J Janzen. 2017. Experimental assessment of winter conditions on turtle nesting phenology and behavior. *Evolutionary Ecology Research*. 18:271-280
- 13) **Mitchell, T.S.**, E.M. Myers, J.K. Tucker, and S.E. McGaugh. 2016. Righting ability in hatchling turtles does not predict survival during dispersal in the field. *Biological Journal of the Linnean Society*. 10.1111/bij.12896
- 12) Voves, K.A.*, **T.S. Mitchell**, and F.J Janzen. 2016. Does natural visual camouflage reduce turtle nest predation? *American Midland Naturalist*. 176:166-172
- 11) Telemeco, R.S., E.J. Gangloff, G.A. Cordero, **T.S. Mitchell**, B.L. Bodensteiner, K.G. Holden, S.M. Mitchell , R.L. Polich, and F.J. Janzen. 2016. Reptile embryos lack the opportunity to thermoregulate by moving within the egg. *American Naturalist*. 188:E13-E37
- 10) Bodensteiner, B.L.*, **T.S. Mitchell**, J.T. Strickland and F.J. Janzen. 2015. Hydric conditions during incubation influence phenotypes of neonatal reptiles in the field. *Functional Ecology* 29:710-717
- 9) **Mitchell, T.S.**, J.A. Maciel*, and F.J. Janzen. 2015. Maternal effects influence phenotypes and survival during early life stages in an aquatic turtle. *Functional Ecology* 29:268-276
- 8) **Mitchell, T.S.**, K.R. Rand*, and F.J. Janzen. 2014. *Chrysemys picta*. Predation. *Herpetological Review* 45:482-483
- 7) **Mitchell, T.S.**, J.A. Maciel*, and F.J. Janzen. 2013. Does sex-ratio selection influence nest-site choice in a reptile with temperature-dependent sex determination? *Proceedings of the Royal Society B* 280:20132460. [Highlighted in *Science* Editors' Choice 342:910-911]
- 6) **Mitchell, T.S.**, D.A. Warner, and F.J. Janzen. 2013. Phenotypic and fitness consequences of maternal nest-site choice across multiple early life stages. *Ecology* 94:336-345.
- 5) Warner, D.A., and **T.S. Mitchell**. 2013. Does maternal oviposition site influence offspring dispersal to suitable habitat? *Oecologia* 172:679-688.

- 4) Delaney, D.M., A.M. Reedy, **T.S. Mitchell**, A.M. Durso, K.P. Durso, A.J. Morrison, and D.A. Warner. 2013. *Anolis sagrei* (Brown Anole). Nest-site choice. *Herpetological Review* 44:314.
- 3) Durso, A.M., D.A. Warner, **T.S. Mitchell**, and A.M. Reedy. 2012. *Ophisaurus compressus*. Swimming. *Herpetological Review* 44:146.
- 2) Refsnider, J.M., **T.S. Mitchell**, H.M. Streby, J.T. Strickland, D.A. Warner, and F.J. Janzen. 2011. A generalized method to determine detectability of rare and cryptic species using the ornate box turtle (*Terrapene ornata*) as a model. *Wildlife Society Bulletin* 35:93-100.
- 1) Durso, A.M., D.A. Warner, **T.S. Mitchell**, and A.M. Reedy. 2011. *Heterodon nasicus*. Diet. *Herpetological Review* 42:439-440.

Submitted manuscripts

Mitchell, T.S., B. Folt, J.M. Hall. Dumpsters and other human structures as habitat for invasive African agama lizards in Florida. In revision: *Biological Invasions*

Fargevieille, A., A.M. Reedy, A.F. Kahrl, **T.S. Mitchell**, A.M. Durso, D.M. Delaney, P.R. Pearson, R.M. Cox, D.A. Warner. Population size and sex ratio influence colonization dynamics after experimental introduction of a non-native lizard. In revision: *Journal of Animal Ecology*

Shephard A.M., L. Agnew, A. Herdtle, **T.S. Mitchell**, E.T. Borer, E.C. Snell-Rood. Traffic patterns, more than landscape context, influence element content of roadside forbs for insect pollinators. Submitted: *Journal of Applied Ecology*

Bodensteiner, B.L., D.A. Warner, A.L. Carter, J.B. Iverson, C.L. Milne-Zelman, **T.S. Mitchell**, J.M. Refsnider, K.A. Voves, F.J. Janzen. Mother knows best: nest-site choice homogenizes embryo thermal environments among population in a widespread turtle. In review *Proceedings of the Royal Society B*.

Popular articles and scientific reports

Mitchell, T.S., 2019. A call for more long-term studies of plasticity in anoles. *Anolis Newsletter* VII. pp 191-193.

Hall, J.M., **T.S. Mitchell**, D.A. Warner. 2019. The brown anole (*Anolis sagrei*) as a model for studying life-history adaptation to seasonality. *Anolis Newsletter* VII. pp 101-107.

Mitchell, T.S. 2015. Meet-the-Expert: Tim Mitchell. *Youngzine*.

Mitchell, T.S., and F.J. Janzen. 2014. Nest substrates influence nest temperature and offspring sex ratio in painted turtles. *Iowa State Research Farm Progress Reports* 14:71-72.

Mitchell, T.S., C.D. Hinsley**, and F.J. Janzen. 2012. Effects of overwintering conditions on nesting behavior of painted turtles. *Iowa State Research Farm Progress Reports* 12:74-75.

Mitchell, T.S. 2012. Live Science: Tracking Turtles. *Youngzine*.

Mitchell, T.S. 2012. The Fascinating World of Turtles. *Youngzine*.

Reedy, A.M., D.A. Warner, and **T.S. Mitchell**. 2011-2012. Wide World Science: Lizard Project! *Youngzine*.

Warner D.A., **T.S. Mitchell**, and F.J. Janzen. 2011. The effects of egg-incubation temperature on growth and survival of hatchling painted turtles. *Iowa State Research Farm Progress Report* 10:84-86.

FUNDING

2015-2017: National Science Foundation Postdoctoral Research Fellowship in Biology (\$207,000)

2012-13: National Science Foundation GK-12 Fellowship, Iowa State University (\$30,000)

2011-12: National Science Foundation GK-12 Fellowship, Iowa State University (\$30,000)

2011: Instructor Development Grant, Iowa State University (\$500)

2008-09: Biotechnology Fellowship, Iowa State University (\$20,000)

TEACHING EXPERIENCE [* I was instructor of record]

2021: EEB3408W*—Ecology: University of Minnesota

- Co-taught upper level, writing intensive course with lab in ecology

2019: BIOL 1951—Foundations of Biology I: University of Minnesota

- Trained in modern pedagogy methods in a large-enrollment active-learning classroom; I was a mentee, instructor and mentor was David Matthes

2017: Ecology Guest Lecture; Auburn University

2014: BIOL/A ECOL 457*-- Herpetology; Iowa State University

- Upper level 3 credit course with lab on the ecology, evolution, physiology and conservation of reptiles and amphibians

2013-14: BIOL 495*-- Herpetology Course Supplement; Iowa State University (x2)

- Developed and taught undergraduate seminar focused on discussing peer reviewed literature

2014: EEB 585-- Ecology and Evolution in the Desert Southwest; Iowa State University

- Co-taught field biology course for graduate students

2013: Herpetology Guest Lectures (x3); Iowa State University

2012-13: Resident Scientist; Harding Middle School, Des Moines, IA (NSF GK-12)

- Designed and implemented classroom activities and lesson plans for a 7th grade life science class

2011-12: Resident Scientist; Meredith Middle School, Des Moines, IA. (NSF GK-12)

- Designed and implemented classroom activities and lesson plans for a 7th grade life science class

2011: HON 321*--Current Topics in Evolution; Iowa State University

- Co-developed and taught seminar on evolution for non-majors in ISU Honors program

2010: BIOL 212*--Principles of Biology Laboratory II; Iowa State University

- Biology lab focusing on molecular/cellular biology, anatomy, form and function of life

2009-11: BIOL 211*--Principles of Biology Laboratory I; Iowa State University (x3)

- Biology lab focusing on biodiversity, evolution and ecology

2006: Field Ecology Laboratory; St Olaf College (as undergraduate assistant)

2006: Cellular Biology and Genetics Laboratory; St Olaf College (as undergraduate assistant)

2005: Biological Sciences Laboratory; St Olaf College (as undergraduate assistant)

STUDENT MENTORING (** indicates high-school student)

2020: Ashley Darst; Undergraduate Research Scholarship

2020: Luke Tonsfeldt; Undergraduate Research Scholarship

2019: Samantha Waddell; Postgraduate employee

2019: Lili Hagg; Postgraduate employee

2019: Katie Schroeder; Undergraduate Honors Thesis

2018: Andres Rivera-Cruz; Student employee

2018: Isaac Jackson**; Post-secondary enrollment volunteer

2016-17: Austin Hulbert; NSF Research Experience for Undergraduates

2016: Dani Douglas; Independent research project

2016: Cassia Guiffre; Independent research project

2015: Sarin Tiatragul; HHMI Gonzaga University Off-Campus Research Experience Program

2015 Dalton Williams; NSF Research Experience for Undergraduates

2014: Kameron Voves; NSF Research Experience for Undergraduates

2014: Mitchell Barazowski; ISU Undergraduate Research Experience

2014: Kyla Rand; First Year Honors Mentor Program

2013: Adrian Ortiz; NSF Research Experience for Undergraduates

2012: Cecilia Hinsley**; George Washington Carver Summer Internship Program

2012: Jaqueline Fuentes; NSF Research Experience for Undergraduates

2011-13: Brooke Bodensteiner; NSF Research Experience for Undergraduates

2011: Melissa Moody; George Washington Carver Summer Internship Program

2010-12: Jessica Maciel; NSF Research Experience for Undergraduates

2009-12: Maribel Piñon; NSF Research Experience for Undergraduates

2009: Manuel Columba**; George Washington Carver Summer Internship Program

2009: Blanka Leyderer; ISU Program for Women and Science in Engineering

2009: Alyssa Hoffmeister; ISU Program for Women and Science in Engineering

PRESENTATIONS

Invited seminars

- 2019: Maternal effects matter in ecology: case studies in reptiles and butterflies, Biology Department Seminar; University of Missouri, Columbia, MO
- 2018: Maternal effects matter: ecological consequences of oviposition behaviors, Behavior Group Seminar; University of Minnesota, Saint Paul, MN
- 2018: How to survive and thrive during early life: my advice to young reptiles, Biology Department Seminar; University of St. Thomas, Saint Paul, MN
- 2018: How to survive and thrive during early life: my advice to young reptiles, Biological & Environmental Sciences Colloquium Series; University of Rhode Island, Kingston, RI
- 2015: Does mother know best? The role of maternal effects in population response to climate change, Oregon Department of Fish and Wildlife; Salem, OR
- 2014: Location matters: Maternal nesting behavior influences offspring phenotypes in painted turtles, Iowa Wildlife Society; Ames, IA
- 2013: Phenotypic consequences of maternal effects during early life stages of the painted turtle, Biology Department Seminar, St. Olaf College; Northfield, MN
- 2013: Sex-ratio selection influences nest-site choice in a reptile with temperature-dependent sex determination, Society for Integrative and Comparative Biology; San Francisco, CA

Oral presentations

- 2019: Delicious ditches: Do butterflies prefer sodium-enriched host plants typical of salted roadsides? Society for Integrative and Comparative Biology; Tampa, FL
- 2018: Nutrition of roadside plants for pollinators, Center for Transportation Studies Transportation Research Conference; Minneapolis, MN
- 2017: *Agama* the Grouch: Testing dumpster selection of non-native rock lizards in an urban landscape, Joint Meeting of Ichthyologists and Herpetologists; Austin, TX
- 2017: Do covariances between maternal behavior and embryonic physiology drive sex-ratio evolution under environmental sex determination?, Society for Integrative and Comparative Biology; New Orleans, LA
- 2016: Abiotic conditions influence winter nest temperatures and hatchling mortality in the painted turtle (*Chrysemys picta*), Society for Integrative and Comparative Biology; Portland, OR
- 2015: Experimental analysis of the influence of nest substrate on offspring reptile phenotypes in the field, Society for Integrative and Comparative Biology; West Palm Beach, FL
- 2014: Do hydric conditions during embryonic development in the field influence phenotypes of neonatal painted turtles? Society for Integrative and Comparative Biology;

Austin, TX

2012: Sex-ratio selection influences nest-site choice in a reptile with temperature-dependent sex determination, World Congress of Herpetology; Vancouver, BC

2012: Maternal and abiotic influences on physiology and survival during hatchling painted turtle (*Chrysemys picta*) hibernation, World Congress of Herpetology; Vancouver, BC

2011: Phenotypic effects of clutch and nest-site choice revealed by cross-fostering during two life-history stages, American Society of Ichthyologists and Herpetologists; Minneapolis, MN

2010: Fitness consequences of the righting response in hatchling turtles, Midwest Ecology and Evolution Conference; Ames, IA.

Poster presentations

2018: The effect of density and timing of hatching on early life phenotypes and survival of anole lizards, Society for Integrative and Comparative Biology; San Francisco, CA

2017: Seasonal shifts in *Anolis sagrei* reproduction invoke challenges for scientific reproducibility, Joint Meeting of Ichthyologists and Herpetologists; Austin, TX

2016: Patterns of hatchling mortality during hibernation of the painted turtle (*Chrysemys picta*). Joint Meeting of Ichthyologists and Herpetologists; New Orleans, LA

2014: The influence of nest-site choice and nest temperature on hatchling painted turtle survival during hibernation. Society for Integrative and Comparative Biology; Austin, TX

2011: Experimental analysis of the influence of nest-site choice on offspring survival, phenotypic development, and sex ratio in (*Chrysemys picta*), American Society of Ichthyologists and Herpetologists; Minneapolis, MN

2007: Tree growth patterns and soil nutrient variation in a maple-basswood forest restoration after sixteen years, Ecological Society of America; San Jose, CA.

OUTREACH

2018-19: Minnesota State Fair pollinator outreach at Butterfly House

2018-2019: Ecology Science Fair Volunteer

- Ran two sections of “Brainy Butterflies” program for elementary students

2017: Best of Fair Judge for the Junior and Senior division of the Greater East Alabama Regional Science and Engineering Fair

2016-17: Faculty mentor for NSF STEM-IQ program at Auburn University

- Contributed to summer workshop geared towards improving teachers’ ability to lead independent science fair projects

- Mentored teachers and students in rural Alabama to improve the quantity and quality of science fair projects

2016: STEM Discovery Day

- Live animal presentation to middle school students from Lowndes County, AL

2016: Auburn Museum of Natural History Open House volunteer

- Educated the public on museum goals and local reptile diversity

2016: Best of Fair Judge for the Senior division of the Greater East Alabama Regional Science and Engineering Fair

2015-17: Coordinator for “Meet-the-Expert” series for Youngzine Children’s magazine

- Founded and coordinated a monthly magazine series highlighting scientists to children

2014-17: Advisory Team Member for Youngzine Children’s magazine

- Science advisor aiding in developing “Field-to-Classroom” biology feature for Youngzine

2009-13: Mentor for Turtle Camp Research and Education in Ecology Program

- Two-week intensive field biology camp for underrepresented high-school students
- Aided students in developing team research projects and presenting posters to the public

2011: Agriculture Education Leadership Camp

- Presentation to high school agriculture students about career opportunities and research in the biological sciences

2011: ISU Horticulture Farm Field Day

- Presentation to agriculture industry members about impacts of agriculture on turtle biology

2011: SYMBI Science Days

- Research demonstration to Des Moines middle school students on ecology and evolutionary biology

2009-11: ISU Science Bound

- Research presentation on ecology research to underrepresented Des Moines high school science students (x3)

SERVICE

Reviewer: *American Midland Naturalist*, *American Naturalist*, *Australian Journal of Zoology* (x2) *Behavioral Ecology*, *Biological Invasions*, *Biology Letters*, *Biological Journal of the Linnean Society* (x2), *Canadian Journal of Zoology*, *Copeia*, *Current Zoology*, *Ecology and Evolution* (x2), *Herpetologica*, *Journal of Animal Ecology*, *Journal of Experimental Biology*, *Journal of Experimental Zoology Part A* (x2), *Journal of Herpetology* (x3), *Oecologia* (x3), *National Science Foundation* (ad hoc), *Nature Ecology and Evolution*

2017: Chair of Herpetologist League Graduate Research Award Committee

2016: Herpetologist League Graduate Research Award Judge

2016: Judge for Greater East Alabama Regional Science and Engineering Fair at Auburn University
2011-12: SYMBI GK-12 Graduate Fellow Leadership Team Representative
2010-11: President for Department of EEOB Graduate Student Organization
2010: Co-organizer of Midwest Ecology and Evolution Conference at Iowa State University
2009-10: EEOB Department Senator for Iowa State Graduate and Professional School Senate

AWARDS

2013: Raymond B. Huey Award Finalist, Society for Integrative and Comparative Biology
2011: Peer Teaching Award, Iowa State University
2010: National Science Foundation Graduate Research Fellowship Program, Honorable Mention

TECHNICAL EXPERIENCE

2008: Wildlife Research Specialist, University of Minnesota

- Monitored spotted owl habitat use and demographics under differing forest management regimes in Tahoe and Eldorado National Forests

2007-08: Research Intern, Cedar Creek Ecosystem Science Reserve, University of Minnesota

- Conducted research on a prairie biofuel and groundwater quality experiment.

2006: Undergraduate Research Assistant, Biology Department, St. Olaf College

- Conducted independent research on forest restoration project and evaluated restoration strategies.

2005: Tree Inspector, City of Minnetonka

- Surveyed suburban forest for diseased elm and oak trees, educated public on forest pathology

REFERENCES

Dr. Fred Janzen
Department of Ecology, Evolution and Organismal Biology
Iowa State University
Tel: (515) 294-4230
Email: fjanzen@iastate.edu

Dr. Daniel Warner
Department of Biological Sciences
Auburn University
Tel: (334) 844-4999
Email: dan.warner@auburn.edu

Dr. Emilie Snell-Rood
Department of Ecology, Evolution and Behavior
University of Minnesota
Tel: (612) 624-7238
Email: emilies@umn.edu