

Miles Christopher Barnhart
Department of Biology
Missouri State University
Springfield, Missouri 65804-0095
E-mail: chrisbarnhart@missouristate.edu

EDUCATION

- 1984: Ph.D., Biology. University of California, Los Angeles.
- 1978: M.A., Biology. University of Kansas, Lawrence.
- 1976: B.Sc., Zoology cum laude. Iowa State University, Ames

POSITIONS HELD- RESEARCH AND TEACHING

- 2021-present: Distinguished Professor emeritus, Missouri State University.
- 2015-2021: Distinguished Professor, Missouri State University.
- 2001-2015: Professor, Missouri State University.
- 1996-2001: Associate Professor, Missouri State University.
- 1991-1996: Assistant Professor, Missouri State University.
- 1988-90: Lecturer, Department of Biology, University of San Diego, San Diego, CA.
- 1986-88: Postdoctoral Researcher and Lecturer, Biology, University of California, Irvine.
- 1984-86: Postdoctoral Research Fellow, Alberta Heritage Foundation for Medical Research, U. of Calgary.
- 1982: Research Assistant, Smithsonian Tropical Research Institute, Panama.
- 1979-82: Teaching Fellow, University of California, Los Angeles.
- 1977-78: Graduate Teaching Assistant, University of Kansas, Lawrence

AWARDS AND RECOGNITION

- 2023. Conservation Champion Award, Midwest Region. US. Fish and Wildlife Service.
- 2019. Award for Faculty Excellence in Research, College of Natural and Applied Science, MSU
- 2018. Award for Faculty Excellence in Service, College of Natural and Applied Science, MSU
- 2017. Outreach and Education External Partnership Award, Missouri Department of Conservation
- 2017. Gift of Time Nominee, City of Springfield/Springfield Council of Churches
- 2016. Award for Faculty Excellence in Research, College of Natural and Applied Science, MSU
- 2016. Faculty Excellence in Community Service Award, Missouri State University
- 2015. Special Recognition, Friends of the Gardens, Springfield MO.
- 2015. Board of Governors Faculty Excellence in Public Affairs Award, MSU Board of Governors
- 2014. Award for Faculty Excellence in Service, College of Natural and Applied Science, MSU.
- 2012. Award for Faculty Excellence in Research, College of Natural and Applied Science, MSU.
- 2012. Director's Award for Outstanding Faculty Research, Honors College, MSU.
- 2012. Missouri State University Faculty Spotlight.
- 2012, 2009. Bancorp South Academic Spotlight.
- 2011. Lifetime Achievement Award, Freshwater Mollusk Conservation Society.
- 2010. Collaborator of the Year Award, Missouri Department of Conservation.
- 2009. Conservation Champion Appreciation Award, US. Fish and Wildlife Service.
- 2009. Outstanding Thesis Advisor Award, Graduate College, Missouri State University.
- 2006, 2003, 2000: College Recognition Awards for Service, Missouri State University.
- 2005: Foundation Award for Research, Missouri State University
- 2004: Outstanding Faculty Mentor, Graduate College, Missouri State University.
- 2002: College Recognition Award for Research, Missouri State University

- 2001: College Recognition Award for Teaching, Missouri State University
- 2000-2004: University Fellow, Missouri State University.
- 2000: Silver Award, Radio News Feature, with Don Hendrix and Mike Smith, KSMU Radio. Council for the Advancement and Support of Education.
- 1999, 1997: University Recognition Awards for Research. Missouri State University.
- 1995: Summer Faculty Fellowship. Missouri State University.
- 1994: Excellence in Teaching Award. Missouri State University.
- 1984-1986: Postdoctoral Fellow, Alberta Heritage Foundation for Medical Research
- 1984: Robert Lasiewski Award for Excellence in Research, University of California, Los Angeles.
- 1978-1982: Chancellor's Intern Fellow, University of California, Los Angeles.
- 1976-1978: University of Kansas Graduate School Honors Fellowship, University of Kansas.
- 1976: Thomas H. MacBride Scholarship in Natural Sciences, University of Iowa.
- 1976: Phi Beta Kappa, Iowa State University.
- 1976: Sigma Xi Undergraduate Research Scholar, Iowa State University.
- 1974: N.S.F. Undergraduate Research Program Participant, Iowa State University.

PUBLICATIONS - CAREER SUMMARY

- 79 peer-reviewed journal articles and books
- 47 technical reports to funding agencies
- 33 articles in popular press, instructional manuals, newsletters and abstracts

PUBLICATIONS – LAST 10 YEARS

- Ning Wang, James L. Kunz, Rebecca A. Dorman, Danielle Cleveland, Jeffery A. Steevens, Sandy Raimondo, Tom Augspurger, Chris Barnhart. 2023. Evaluation of Chronic Effects of Potassium Chloride and Nickel on Survival, Growth, and Reproduction of a Unionid Mussel (*Lampsilis siliquoidea*). *Environmental Toxicology and Chemistry*
- Steevens, Jeffrey, James Kunz, Ning Wang, Chris Barnhart, and Serena Ciparis. 2023. Survival and growth of juvenile mussels in an outdoor pond after 28-day laboratory exposure to aqueous zinc. *Freshwater Mollusk Biology and Conservation* 00:000–000, 203
- Wang N, Barnhart MC, and others. 2022. ASTM Standard Guide for Conducting Laboratory Toxicity Tests with Freshwater Mussels. *American Society for Testing and Materials* E2455-22.
- Wang N, Kunz JL, Barnhart MC, and 25 others. 2021. Method Development for a Short-Term 7-d Toxicity Test with Unionid Mussels. *Environmental Toxicology and Chemistry*. 40:3392-3409.
- Oesch, R.D., L.E. Watrous, and M.C. Barnhart. 2019. Missouri Land Snails and Slugs. Conservation Commission of the State of Missouri. 217p. <https://www.researchgate.net/publication/337113725>
- Kunz, J.L., M.C. Barnhart, R Glidewell, Ning Wang, C.G. Ingersoll. 2019. Pulsed flow-through auto-feeding beaker systems for the laboratory culture of juvenile freshwater mussels. *Aquaculture* 520: 734959 (7p) ISSN 0044-8486 DOI: 10.1016 <https://www.researchgate.net/publication/338566577>
- Seagroves, L. Ashley, M. Chris Barnhart, Thom Hardy, and Astrid N. Schwalb. 2019. Reproductive ecology of the threatened and endemic freshwater mussel *Lampsilis bracteata*. *Aquatic Conservation: Marine and Freshwater Ecosystems* 2019: 1–11. <https://doi.org/10.1002/aqc.3154>
- Ferreira-Rodríguez, Noe, M. Christopher Barnhart, et al. 2019. Research priorities for freshwater mussel conservation assessment. *Biological Conservation* 231, March 2019, Pages 77-8
- Barnhart, M.C. 2018. Forward. In: Patterson, M., et al. *Freshwater Mussel Propagation for Restoration*. Elsevier Press, 272 p.

- Lavictoire, Louise, A.D. Ramsey, E.A. Moorkens, G. Souch, and M.C. Barnhart. 2018. Ontogeny of juvenile freshwater pearl mussels, *Margaritifera margaritifera* (Bivalvia: Margaritiferidae) PLOS 1: <https://doi.org/10.1371/journal.pone.0193637>
- Ning Wang, James Kunz, Chris Ivey, Chris Ingersoll, Chris Barnhart, Elizabeth Glidewell. 2017. Toxicity of Chromium (VI) to two mussels and an amphipod in Water-Only Exposures with or without a co-stressor of elevated temperature, zinc, or nitrate. *Archives of Environmental Contamination and Toxicology*. DOI: 10.1007/s00244-017-0377-x
- Cavallaro, Michael C., M. Christopher Barnhart, and W. Wyatt Hoback. 2017. Causes of rapid carrion beetle (Coleoptera: Silphidae) death in flooded pitfall traps and tests of soil flooding, immersion tolerance, and swimming behavior. *Environmental Entomology* *Environmental Entomology*, 46(2), 2017, 362–368. doi: 10.1093/ee/nvw165
- Wang, N., Ivey, C. D., Ingersoll, C. G., Brumbaugh, W. G., Alvarez, D., Hammer, E. J., Bauer, C. R., Augspurger, T., Raimondo, S. and Barnhart, M. C. 2016. Acute sensitivity of a broad range of freshwater mussels to chemicals with different modes of toxic action. *Environ Toxicol Chem*. doi:10.1002/etc.3642
- Douda, K., Martin, M., Glidewell, E., Barnhart, C. 2016. Stress-induced variation in host susceptibility to parasitic freshwater mussel larvae. *Hydrobiologia* 1-9, DOI: 10.1007/s10750-016-2895-3.
- Leonard, Jeremy A., W. Gregory Cope, Tom Augspurger, Edward J. Hammer, M. Christopher Barnhart, and Robert B. Bringolf. 2016. Extending the toxicity-testing paradigm for freshwater mussels: Assessing chronic reproductive effects of the synthetic estrogen 17 α -ethinylestradiol on the unionid mussel *Elliptio complanata*. *Comp. Biochem. Physiol. Part C Toxicology & Pharmacology*. Sep 2016.
- Boogaard, M.A., T.J. Newton, T.D. Hubert, C.A. Kaye, M.P. Henson, and M.C. Barnhart. 2015. Evaluation of the acute toxicity of 3-trifluoromethyl-4-nitrophenol (TFM) to multiple life stages of *Epioblasma triquetra* and its host fish (*Percina caprodes*). *Environmental Toxicology and Chemistry* 34(7):1634-41.
- Leonard, J.A., W.G. Cope, M.C. Barnhart, R.B. Bringolf. 2014. Metabolomic, behavioral, and reproductive effects of the aromatase inhibitor fadrozole hydrochloride on the unionid mussel *Lampsilis fasciola*. *General and Comparative Endocrinology*, 206: 213–226
- Leonard, J.A., W.G. Cope, M.C. Barnhart, and R.B. Bringolf. 2014. Metabolomic, behavioral, and reproductive effects of the synthetic estrogen 17 α -ethinylestradiol on the Unionid mussel *Lampsilis fasciola*. *Aquatic Toxicology* 150:103–116.
- Miller, E.J., J.J. Tomasic and M.C. Barnhart. 2014. A comparison of freshwater mussels (Unionidae) from a Late-Archaic archeological excavation with recently sampled Verdigris River, Kansas populations. *American Midland Naturalist* 171:16–26.
- Fritts, A.K., M.C. Barnhart, M. Bradley, N. Liu, E. Hammer, W.G. Cope, W. Gregory, and R. Bringolf. 2014. Assessment of toxicity test endpoints for freshwater mussel larvae (glochidia). *Environmental Toxicology and Chemistry* 33 (1), 199-207.

PRESENTATIONS - CAREER SUMMARY

- 267 presentations at professional meetings, authored or coauthored.
- 63 invited presentations, 11 keynote or plenary.

PROFESSIONAL PRESENTATIONS – LAST 10 YEARS

- Barnhart, M. C. and N. Wang. 2023. Freshwater Mussel Biology and Laboratory Toxicity Testing Webinar. Society for Environmental Toxicology and Chemistry 44th Annual Meeting, Lexington KY (via Zoom) August 24, 2023.
- Barnhart, M.C. and Ning Wang. 2022. Overview of freshwater mussel biology. Remtech Europe (via Zoom) September 20, 2022.

- Buback, Steve, Dan Marschalek and Chris Barnhart. 2022. Saving the Regal Fritillary. Missouri Prairie Foundation Webinar: <https://www.youtube.com/watch?v=4e8TsgIP72c> June 22, 2022
- Barnhart, M. C. 2022. Touched by Butterflies: Ecological Education in the Roston Native Butterfly House. Missouri Prairie Foundation, Grow Native! Webinar. August 31, 2022.
- Barnhart, M. C. Buried Treasure: Marvelous Mollusks of the Ozarks. James River Basin Partnership membership event, March 17, 2022.

2021 Biennial Symposium of the Freshwater Mollusk Conservation Society, San Antonio, Texas April 14–18.

- DEVELOPING A REPRODUCTIVE TOXICITY TEST METHOD FOR FRESHWATER MUSSELS. Allison Sieja¹, Christopher Barnhart², James Kunz¹, Danielle Cleveland¹, Bernard Sietman³, Doug Hardesty¹, Eric Brunson¹, Jeffery Steevens¹ & Ning Wang¹. ¹US Geological Survey Columbia Environmental Research Center, Columbia, MO; ²Missouri State University, Springfield, MO; ³Minnesota Department of Natural Resources Center for Aquatic Mollusk Programs, Lake City, MN.
- ENVIRONMENTAL DNA TOOLS FOR THE CONSERVATION OF FRESHWATER MUSSELS. Katy E. Klymus, Dannise V. Ruiz-Ramos, Nathan L. Thompson, Zachary Taylor, Katie Ortiz, Jess W. Jones, M. Christopher Barnhart, Catherine A. Richter.
- DESIGN OF MALE SPECIFIC qPCR ASSAYS FOR THE DETECTION OF FRESH WATER MUSSEL SPAWNING EVENTS. Dannise V. Ruiz-Ramos¹, Katy E. Klymus¹, Nathan L. Thompson¹, Megan Voshage¹, Jess W. Jones², M. Christopher Barnhart³, Catherine A. Richter¹. ¹USGS Columbia Environmental Research Center, Columbia, MO. ²Virginia Polytechnic Institute and State University – Department of Fish and Wildlife Conservation, Blacksburg, VA. ³Missouri State University, Springfield, MO.
- Wang N, Kunz JL, Cleveland D, Steevens JA, Raimondo S, Augspurger T, Barnhart MC. Evaluation of Chronic Sensitivity of a Freshwater Mussel Using Partial Life-Cycle Toxicity Tests and Long-Term Toxicity Tests. Presented at Virtual Symposium of the Freshwater Mollusk Conservation Society, April 12-14, 2021.
- Barnhart, M. C. 2020. Mussel Biology and Reproduction. Webinar for Missouri Department of Conservation Stream Team. August 27, 2020
- Wang, N., J.L. Kunz, J.A. Steevens, S. Raimondo, T. Augspurger, and M.C. Barnhart. 2020. Evaluation of Chronic Sensitivity of a Freshwater Mussel Using Partial Life-Cycle Toxicity Tests and Long-Term Toxicity Tests. SETAC North America 41th annual meeting, Fort Worth, TX; November 15-19, 2020
- D Hofstra, C Barnhart, R Brown, et al. 2020. Designing mussel rafts for freshwater bioremediation. New Zealand Freshwater Sciences Conference 2020. Invercargill, New Zealand December 1-4, 2020

2020. US DOI National Conservation Training Center Webinar series.

- Barnhart, Chris. The New Freshwater Mussel Silo: Design, Construction and Conservation Application. <https://fws.rev.vbrick.com/#/videos/585c5cdc-b307-4a79-bab2-10e808571280>
- Barnhart, Chris. Touched by Butterflies: Opportunities for Ecological Education. <https://fws.rev.vbrick.com/#/videos/c995a7fc-a6ed-4149-8af2-3a9d00a7d179>

2019. Biennial Symposium of the Freshwater Mollusk Conservation Society, San Antonio, Texas April 14-18.

- Wang, Ning, Chris Barnhart, Jordan Murray, and 12 others. 2019 Method Development for Short-Term Effluent Test with a Freshwater Mussel (*Lampsilis siliquoidea*).

2019. Invited Seminar, Columbia Environmental Research Center, Columbia, MO 4-5-19

- Barnhart, Chris. Sacrificial clams: freshwater mussels in the context of toxicology.

2019. EPA Safe and Sustainable Water Resources Research Program webinar: M and M's: Developing Methods to Detect Toxicity in Water using Mayflies and Mussels. 3-27-19

- Wang, Ning, James L. Kunz, Jeffery A. Steevens, Edward J. Hammer, Candice R. Bauer, and M. Chris Barnhart. Method development for short-term effluent test using a freshwater mussel, *Lampsilis siliquoidea*.

2019. Interior Highlands Mollusk Conservation Committee, Neosho MO March 13-14

- Sapp, Regina and Chris Barnhart. Effects of chronic hypoxia on survival and growth of juvenile freshwater mussels.
- Sieja, Allison and Chris Barnhart. Competition between invasive Asian clams and native freshwater mussels.
- Stegmann, Eric and Chris Barnhart. Habitat selection and host detection in the Salamander mussel, *Simpsonaias ambigua*.
- Barnhart, Chris and Louise Lavictoire. Allometry of filtration rate and gill development in juvenile freshwater mussels.

2019. SETAC Europe Annual Meeting, Helsinki, Finland, May 26-31.

- Norberg-King, Teresa, Ning Wang, James L. Kunz, Jeffery A. Steevens, Edward J. Hammer, Candice R. Bauer, and M. Chris Barnhart. Development of Short-Term Toxicity Test Methods to Estimate Chronic Toxicity using the Freshwater Mussel (Fatmucket, *Lampsilis siliquoidea*).

2019. Invited seminar, NIWA, Hamilton, New Zealand. 1-15-19

- Barnhart, Chris. Freshwater Mollusks for Toxicology.

2018. Freshwater Mollusk Conservation Society Workshop: Freshwater Mollusk Health and Disease Assessment, La Crosse, Wisconsin, March 13-15, 2018

- Kern, Morgan, Louise Lavictoire, Megan Bradley, Nathan Eckert, and Chris Barnhart. Pests, predators, parasites, and related problems in the culture of freshwater mussels.

2018. FMCS International Freshwater Mollusk Meeting, September 16-20, 2018, Verbania, Italy.

- Ning Wang, James L. Kunz, Jeffery A. Steevens, M. Chris Barnhart. Method development for short-term effluent tests with a freshwater mussel (Fatmucket, *Lampsilis siliquoidea*).

2017. Ocean University, Qingdao, PRC.

- Barnhart, M. C. Invited Lecture, Ocean University, Qingdao, PRC. "Conservation Significance of freshwater mussels in the USA. Invited Lecture, Ocean University, Qingdao, PRC.
- Barnhart, M. C. Biogeographic connections between China and Eastern North America. Invited Lecture, Ocean University, Qingdao, PRC.

2017. 10th Biennial Symposium of the Freshwater Mollusk Conservation Society. Cleveland, OH

- Kern, Morgan A. Beth Glidewell and Chris Barnhart, Simplifying methods for in vitro metamorphosis of glochidia.
- Loyd, Kendell, Beth Glidewell, Chris Barnhart, Bernard Sietman, and Mike Davis. Synchronization of reproduction by temperature in deertoe mussel (*Truncilla truncata*).
- Martin, Kathryn C., Beth Glidewell, and Chris Barnhart. Upper thermal limits of freshwater mussels (Bivalvia, Unionoida) in ramped temperature exposures.
- Maynard, Bryce, Chris Barnhart, and Marc Owen. A year-long mark-recapture study of the threatened Rabbitsfoot Mussel (*Quadrula cylindrica cylindrica*).
- Moore, Adrian P., Robert B. Bringolf, and M. Christopher Barnhart. Use of partial lifecycle tests to determine effects of nitrate and an estrogen on fatmucket (*Lampsilis siliquoidea*).

2016. 4th Interior Highlands Mollusk Conservation meeting. Tahlequah, OK

- Maynard, Bryce and Chris Barnhart. Linking shell morphology to the reproductive behavior of the threatened Rabbitsfoot mussel (*Quadrula cylindrica cylindrica*).

- Maynard, Amy, Laszlo Kovacs and Chris Barnhart. Sex-associated mitochondrial genes: tools for understanding Unionid reproduction and development.
- Kern, Morgan and Chris Barnhart. Simplifying methods for in vitro metamorphosis of glochidia.
- Loyd, Kendell and Chris Barnhart. Testing the possible role of chemoreception in spawning of Deertoe Mussel (*Truncilla truncata*).
- Martin, Kathryn and Chris Barnhart. Critical thermal limits of freshwater mussels in ramped temperature exposures.
- Glidewell, Beth, Amy Maynard, James Kunz, Ning Wang and Chris Barnhart. Culturing early juvenile mussels in pulsed flow-through beaker systems.
- Barnhart, Chris. Sacrificial clams: the conservation significance of freshwater mussels.

2016. *California Society of Ecological Restoration Annual Meeting. Kings Beach CA*

- Jonathan Young, Niveen Ismail, Chris Barnhart. 2016. Urban Restoration of a Native Freshwater Mussel: Collaboration, Conservation, and Ecological Engineering.

2015. *2nd International Seminar: Rearing of Unionoid Mussels. Clervaux, Luxembourg, November 24-27.*

- Barnhart, Chris. 100 years of mussel propagation: What have we learned, and where are we going? Invited
- Barnhart, Chris. Pulsed flow systems for early juvenile culture. Invited.

2015. *9th Biennial Symposium of the Freshwater Mollusk Conservation Society. St. Louis.*

- Martin, Kathryn, Chris Barnhart, and Nathan Eckert. Upper thermal limits of juvenile *Megaloniais nervosa* in ramped temperature exposures.
- Kunz, James L., Chris G. Ingersoll, Ning Wang, and M. Chris Barnhart. Refining test conditions for conducting water-only toxicity tests with juvenile freshwater mussels.
- Maynard, Amy, Chris Barnhart, and Laszlo Kovacs. Sperm MT-DNA of *Venustaconcha pleasii*.
- Glidewell, Beth, Chris Barnhart. Propagation of western pearlshell, *Margaritifera falcata*.
- Ingersoll, Chris G., M. Chris Barnhart, John M Besser, Chris D Ivey, Nile E Kemble, James L Kunz, and Ning Wang. Development of methods for conducting laboratory sediment toxicity tests with juvenile freshwater mussels.
- Wang, Ning, Chris G. Ingersoll, Chris D. Ivey, James L. Kunz, Rebecca A. Dorman, John M. Besser, William G. Brumbaugh, Ed Hammer, Candice Bauer, Tom Augspurger, and M. Chris Barnhart. Acute and chronic sensitivity of freshwater mollusks to select chemicals.
- Barnhart, Chris and Monte McGregor. One hundred years of mussel propagation: What have we learned, and where are we going?
- Douda, Karel, Michael Martin, Elizabeth Glidewell, and Chris Barnhart. The effects of glochidia infection intensity and stress levels on the metamorphic success of *Lampsilis siliquoidea*.
- Fobian, Todd, Chris Barnhart, and Bryce Maynard. Comparison of reproduction and host fish among populations of rabbitsfoot, *Quadrula cylindrica cylindrica*.
- Barnhart, Chris. Mussel Propagation: from Capture to Culture. Invited.

2015. *Mid-Continent Warm Water Fish Culture Workshop, Hilton Branson Convention Center, Branson, MO February 2nd – 4th.*

- Barnhart, Chris. Progress in the captive culture of native freshwater mussels. Invited.

2014. *State University of New York, Buffalo. Invited seminar.*

- Barnhart, Chris. Sacrificial Clams- the Conservation Significance of Freshwater Mussels.

2014. *Freshwater Mollusk Conservation Society Workshop. Portland, Maine.*

- Maynard, Bryce, J. Persinger, Z. Ford, S. McMurray, and M.C. Barnhart. Quantitative Habitat Assessment of Mussel Communities in the Lower Pomme de Terre and Sac Rivers.

- Wilhelm, Caitlin and M.C. Barnhart. Comparison of filter feeding and deposit feeding in the invasive Asian clam, *Corbicula fluminea*, and the fatmucket, *Lampsilis siliquoidea*.
- Maynard, Amy, M.C. Barnhart and L. Kovacs. Sperm and sex determination in Unionidae.

2014. *Kansas Natural Resources Conference*.

- Barnhart, M.C. Sacrificial clams: the conservation significance of native freshwater mussels. *Plenary*

RECENT NEWS AND POPULAR PRESS INVOLVING OUR RESEARCH.

- Springfield Daily Citizen: <https://sgfcitizen.org/springfield-mo-life/springfield-outdoors-recreation/msu-regal-fritillary-butterfly-prairie/>
- Springfield News-Leader: <https://www.news-leader.com/story/sports/outdoors/2022/04/17/butterflies-missouri-regal-fritillary-butterfly-mdc-monarch/7184552001/>
- KSMU public radio: <https://www.ksmu.org/news/2022-04-19/20-000-caterpillars-are-let-loose-on-the-prairie-boosting-numbers-of-threatened-butterfly>
- MDC Facebook Live segment: <https://www.facebook.com/moconservation/videos/regal-fritillaries-mdc-staff-are-releasing-regal-fritillaries-caterpillars-on-la/687388462380632>
- MDC Facebook Live segment: <https://www.facebook.com/moconservation/videos/releasing-caterpillars-mdc-staff-are-releasing-caterpillars-today-on-lapetite-ge/1425267924658876>
- Joplin Globe: https://www.joplinglobe.com/news/local_news/mdc-msu-hope-to-counter-decline-of-regal-fritillary-butterflies/article_b298852e-e76c-11ec-914b-eb031de68652.html
- Missouri Prairie Foundation Webinar: Saving the Regal Fritillary: <https://moprairie.org/event/mpf-webinar-saving-the-regal-fritillary-butterfly-current-research-reintroduction-efforts-in-missouri/>
- Missouri Conservationist magazine: Regal fritillary: Tending to the Queen of the Prairie. <https://mdc.mo.gov/magazines/missouri-conservationist/2022-09/regal-fritillary>
- Mulcrone, Rene. 2020. Something's fishy about mussels. Huron River Watershed Council. <https://www.hrwc.org/somethings-fishy-about-mussels/>
- Levy, Sharon 2019. The hidden strengths of freshwater mussels. Knowable Magazine. <https://knowablemagazine.org/article/living-world/2019/hidden-strengths-freshwater-mussels>.

GRANTS AND CONTRACTS- CAREER SUMMARY

- 100 research grants and contracts
- \$2.9 million total

GRANTS AND CONTRACTS- RECENT

- 2023-26. Toxicity of Ammonia to Federally Threatened and Endangered Freshwater Mussels with a Co-stressor of Elevated Temperature or Metal Mixture. SERDP Project Number: RC24-4338. Funded. USGS CERC.
- 2022-25. Water quality conditions protective of freshwater mussel reproduction. USGS CERC.
- 2020-22. Regal Fritillary Rearing Protocols and Larval Microhabitat Needs. Missouri Department of Conservation.
- 2019-21. Developing methods for laboratory culture of diverse species of freshwater mussels, evaluating effects of growth during early life stages on freshwater mussel life history, and using eDNA as a marker for freshwater mussel species detection. US Geological Survey Columbia Environmental Research Center
- 2018-21. Mussel Habitat Survey, Fort Leonard Wood, MO. U.S. Army Corps of Engineers.
- 2018-21. Freshwater Remediation Using Native Mussels. New Zealand National Institute of Water and Atmospheric Research
- 2015-22. Mountain Lake California *Anodonta* Propagation. Presidio Trust, San Francisco Ca

COURSES TAUGHT

- Biogeography (undergraduate and graduate)
- Parasitology (advanced undergraduate/graduate)
- Invertebrate Zoology (advanced undergraduate/graduate)
- General Biology (introductory course for university undergraduate biology majors)
- Survey of Biology (general education course for undergraduates)
- Aquatic Entomology (graduate)
- Senior Seminar (advanced undergraduate)
- Comparative Animal Physiology (advanced undergraduate/graduate)
- General Physiology (advanced undergraduate/graduate level)
- Respiration Physiology (graduate level).
- Streams Seminar (graduate level)
- Biology of Freshwater Mollusks (graduate level).
- Biology of Freshwater Crustacea (graduate level)
- Biological Invasions (graduate level).
- Species Concepts (graduate level).

INTERNATIONAL RESEARCH COLLABORATION

- Sue Clearwater, New Zealand National Institute for Water and Atmospheric Research
- Bob Brown, Landcare, New Zealand
- Louise Lavictoire, Freshwater Biological Association UK
- Karel Douda, University of Prague CR
- Jingjing Miao, Ocean University PRC
- Na Liu, Taiyuan University PRC

MASTERS THESES SUPERVISED

- Sieja, Allison. 2021. *Corbicula fluminea* Effects on Survival, Growth, and Drift of Juvenile *Lampsilis siliquoidea* in Laboratory Exposures.
- Stegmann, Eric. 2020. Habitat Selection and Host Detection in the Salamander Mussel, Habitat Selection and Host Detection in the Salamander Mussel, *Simpsonaias ambigua*.
- Johnson, David A. 2018. Effects of parafluvial flows on interstitial ammonia and freshwater mussels in the Buffalo National River.
- Martin, Michael. 2018. The freshwater drum as a host of native mussels, Unionidae.
- Kern, Morgan. 2017. Refining *in vitro* culture methods for Unionid mussels.
- Loyd, Kendell. 2017. Synchronization of reproduction by temperature in deertoe mussel (*Truncilla truncata*).
- Martin, Kathryn. 2016. Upper thermal limits of freshwater mussels (Bivalvia, Unionoida) in ramped temperature exposures.
- Maynard, Amy. 2015. Sperm mitochondria genetics and sexual reproduction in Unionid mussels.
- Pletta, Madeline. 2013. Particle capture by freshwater bivalves: implications for feeding ecology and biopesticide delivery.
- Bosman, Ben. 2012. Host relations and reproductive biology of the Ebonyshell, *Fusconaia ebena*.
- Bradley, Megan. 2011. Byssus production in freshwater mussels (Bivalvia: Unionoidea).
- Brondel, Rebecca 2010. Size-dependent predation of a native crayfish (*Orconectes neglectus*) on a native bivalve (*Lampsilis siliquoidea*).

- Duzan, Matt 2010. Effects of flow and substrate on burying behavior and drift of early juvenile freshwater mussels.
- Crownhart, Andrea 2009. Factors affecting metamorphosis success of the parasitic larvae of freshwater mussels, Unionidae.
- Pillow, Mike 2009. Acute toxicity of ammonia and copper to mussel (Bivalvia: Unionidae) glochidia inside and outside of conglomerates.
- Duzan, Jennifer 2008. Factors affecting feeding and growth of juvenile freshwater mussels (Unionidae).
- Beussink, Zachary 2007. Effects of sediment exposure on host suitability for the parasitic glochidia larvae of Unionid mussels.
- Fobian, Todd 2007. Host utilization and reproductive timing among populations of *Quadrula cylindrica*.
- Bowers, Jolene. 2006. Innate cross-immunity of host fish to the parasitic larvae of Unionoid mussels.
- Kaiser, Brianna 2005. The effects of glochidiosis on fish respiration.
- Dodd, Ben 2005. Immune responses of host fish to the parasitic glochidia larvae of Unionid mussels.
- Eckert, Nathan 2003. Reproductive biology and host requirements among isolated populations of *Cyprogenia aberti* (Conrad 1850).
- Bigham, Shannon 2002. Host specificity of freshwater mussels: a critical factor in conservation.
- Delp, Angela 2002. Rhabdocoel flatworms as predators of juvenile freshwater mussels.
- Shiver, Melissa 2001. Reproductive biology of the Neosho mucket, *Lampsilis rafinesqueana*.
- Baird, Michael. 2000. Life history and population structure of the spectacle mussel, *Cumberlandia monodonta* (Bivalvia, Margaritiferidae).
- Riusech, Frank. 1999. Genetic and life history characteristics of the freshwater bivalves, *Venustaconcha ellipsiformis* and *Venustaconcha pleasii*, in the Ozark Plateaus region.
- Hansen, Darby. 1998. Hypoxia and ventilation of the marsupium in the amphipod, *Gammarus pseudolimnaeus* Bousfield.
- Mills, Nathan. 1998. Effects of hypoxia on embryonic development and hatching in two *Ambystoma* and two *Rana* species.
- Roberts, Andrew. 1997. Reproductive biology of the flat floater mussel, *Anodonta suborbiculata* Say, 1831 (Bivalvia: Unionidae).
- Hoback, Wyatt. 1995. Hypoxia-limited survival, respiration, and mate-guarding behavior in the amphipod, *Gammarus pseudolimnaeus* Bousfield.

SERVICE

Professional Service:

- U.S. Department of the Interior, NCTC Training Course: “Conservation Biology of Freshwater Mussels”. Taught annually 2012-2019.
- Missouri Department of Conservation, freshwater mollusk professional training workshops, taught annually 2005-2015.
- Society for Ecological Toxicology and Chemistry (SETAC), Freshwater Mollusk Toxicology Workshops, taught 5 times at National Meeting.
- Chair, Propagation and Restoration Committee, Freshwater Mollusk Conservation Society (FMCS). 1999-2003, organized National Workshop for FMCS at US DOI National Conservation Training Center, Shepherdstown WV in 2003.
- Journals and organizations for which I have reviewed manuscripts and grant proposals: American Aquaculture, American Malacological Bulletin, American Midland Naturalist, American Zoologist, Aquaculture, Archiv für Hydrobiologie, Biological Bulletin Woods Hole, Biological Conservation, BioMedCentral Research Notes, Comparative Biochemistry and Physiology, Ecology, Environmental Toxicology and Chemistry, Freshwater Science, Hydrobiologia, Invertebrate Biology, Journal of Applied Ecology, Journal of Comparative Physiology,

Journal of Experimental Biology, Journal of Morphology, Journal of the American Water Resources Association, Limnologica, Marine Behavior & Physiology, Missouri Department of Conservation, National Fish and Wildlife Foundation, National Science Foundation, Oecologia, Physiological Zoology, Southeastern Naturalist, Southwestern Naturalist, Transactions of the American Fisheries Society, U. S. Fish and Wildlife Service, U.S. Geological Survey, Veliger.

Community Service

- Curator, Roston Native Butterfly House, Greene County Botanical Center. 2009-present. Responsible for infrastructure, docent training, breeding program, and educational outreach.
- Board Member, Friends of the Garden, 2008-present.
- Conservation Committee, Joplin Audubon Nature Center. 2002-2007. Planning interpretive displays for Wildcat Glades Nature Center.
- Ozark Science and Engineering Fair judge & section chair, 10 years. Sponsored two Division winners and two Grand Prize winners (both competed at the Intel International fair).
- Presentations on science and natural history to local schools, conservation groups, and service organizations annually. Some examples:
 - ✓ “Butterflies Lives” and “Keeping Caterpillars” Annual Programs for Butterfly House docents at Springfield Botanical Center.
 - ✓ “Touched by Butterflies: Opportunities for Ecological Education”. Lecture for Missouri Department of Conservation Southwest Regional Volunteer Conference, MSU Darr Center.
 - ✓ “Sacrificial Clams-The Significance of Freshwater Mussels.” Meramec Hills Master Naturalists, Rolla, Springfield Free Thinkers, at Library Station.
 - ✓ “Special Delivery–The Beauty of Plant-Pollinator Partnerships” Springfield Conservation Nature Center, Ozark Native Plants Society, Ozark Master Gardeners Workshop.
 - ✓ “Wonders Down Under”. Missouri Master Naturalists Statewide Convention.
 - ✓ “Emerald Ash Borer: Kiss Your Ash Goodbye”. Missouri Native Plants Society.
 - ✓ “World of Weeds: Invasive Species and the Homogenization of Nature”. Springfield Public Library.
 - ✓ Flying Flowers: Raising the Native Silk Moths”. Springfield Conservation Nature Center “Insect-o-Rama” program. We provide rearing kits to teachers and others.
 - ✓ Photo displays at Springfield Conservation Nature Center and Springfield Botanical Center: “Nature Quotes Illustrated”, “Touched by Butterflies”, “Moth Madness”.

University/College Service

- CNAS Tenure and Promotion Committee 2016-present. Chair, present
- Intellectual Property Committee 2015-present.
- Faculty Grants Committee 2004-05, Chair 2005-2006, 2008-2013, Member 2015-2017.
- University Futures Task Force 2005-06
- Chair, Enhancing Research and Creativity Subgroup, University Long Range Plan
- University Whistle Blower Committee 2006
- Academic Advisory Development Committee 2006
- Research Task Force 2004-05
- Faculty Leave Committee 2001-03, 2004-05, Chair 2002-03
- Presidential Scholar Interviewer 2003
- Convocations Committee 2001-02
- University Awards Committee Chair 1999-2000
- College Council 1999-2000.