

CURRICULUM VITAE
September 2025

ZACHERY D. ZBINDEN

Assistant Professor
Molecular Ecology Research Group
University of Maryland Center for Environmental Science
Appalachian Laboratory
301 Braddock Road, Frostburg, MD 21532

✉ zach.zbinden@umces.edu | 🌐 umces.edu/zach-zbinden | 📄 zdzbinden.github.io

EDUCATION

2022	Ph.D., Biology–molecular ecology–University of Arkansas, Fayetteville, AR
2016	M.S., Biology–community ecology–University of Oklahoma, Norman, OK
2013	B.S., Ecology and Evolution, University of Pittsburgh, Pittsburgh, PA

EMPLOYMENT

2024–current	Assistant Professor, Appalachian Lab, Univ. Maryland Center for Environmental Science
2022–2024	Postdoctoral Research Associate, Dept. of Biological Sciences, Univ. of Arkansas
2016–2022	Graduate Assistant, Dept. of Biological Sciences, Univ. of Arkansas
2013–2016	Graduate Assistant, Dept. of Biology, Univ. of Oklahoma
2011–2013	Undergraduate Research Assistant, Pymatuning Lab of Ecology, Univ. of Pittsburgh

INTERESTS

Ecology	biogeography eDNA fish ecology molecular ecology spatial ecology
Evolution	comparative population genomics landscape genomics phylogeography
Conservation	conservation genomics ecological forecasting fisheries watershed approach
Data Analytics	AI bioinformatics multivariate statistics programming spatial analysis

PROFESSIONAL SOCIETIES

American Fisheries Society – American Society of Ichthyologists & Herpetologists – Ecological Society of America – Society for Conservation Biology – Society for the Study of Evolution – Sigma Xi

FUNDING

Awarded

- 2025-2026 The Chesapeake Bay Trust, \$50,000, *Optimizing eDNA protocols for stream restoration biodiversity assessments in Maryland: a comprehensive literature review and gap analysis*, PI: Daniel Allen, Col: Zach Zbinden
- 2025-2026 University System of Maryland Kirwan Center for Academic Innovation, \$1,500 *USM Generative AI Pedagogy Fellowship*
- 2025 The Nature Conservancy, \$35,000, *Assessing applications of artificial intelligence for the conservation of freshwater biodiversity*, PI: Katie May Laumann, Col: Zach Zbinden, Qian Zhang
- 2025-2031 Maryland Department of Natural Resources, \$122,521, *Statewide genomic characterization of Brook Trout populations for adaptive management in Maryland*. PI: Zach Zbinden
- 2025-2026 Maryland Department of Natural Resources, \$38,260, *Environmental DNA surveys for the endangered Blackbanded Sunfish (Enneacanthus chaetodon) in Maryland*. PI: Zach Zbinden, Col: Bob Hilderbrand
- 2025-2026 Maryland Department of Natural Resources, \$85,892, *Assessing eDNA efficacy in reproducing MBSS Sentinel Site collections for fish and benthic macroinvertebrates*. PI: Zach Zbinden, Col: Bob Hilderbrand
- 2024-2026 TALIN–The Appalachian Lab Investors Network, \$100,000, *Harnessing natural genetic adaptations for climate resilience in Appalachian fish*. PI: Zach Zbinden
- 2023-2026 Arkansas Game & Fish Commission, \$92,775, *Habitat associations and population genetic structure of the endemic Beaded Darter Etheostoma clinton in the upper Ouachita River system*. PI: Marlis Douglas, Col: Zach Zbinden, Mike Douglas

Awarded, Completed

- 2022-2024 Arkansas Game & Fish Commission, \$99,635, *Developing genetic approaches for sustainable long-term monitoring and modeling CWD spread in White-tailed Deer*. PI: Marlis Douglas, Col: Zach Zbinden, Mike Douglas, Tyler Chafin
- 2020-2022 University of Arkansas and Arkansas Game & Fish Commission, \$48,000 *Harry and Jo Leggett Chancellor's Fellowship*
- 2016-2020 University of Arkansas Graduate School, \$88,000 *Distinguished Doctoral Fellowship*
- 2012-2013 Howard Hughes Medical Institute and the University of Pittsburgh, \$5,000 *HHMI Undergraduate Research Fellowship*

Submitted, Not Funded

- 2026-2027 TALIN–The Appalachian Lab Investors Network, \$97,809, *Screening indoor environments for biological invaders*. PI: Zach Zbinden
- 2026-2030 National Science Foundation, \$921,009, Collaborative research: Toward resilient Brook Trout populations: A genomic and physiological blueprint for adaptive management, PI: Zach Zbinden, Col: Matt Fitzpatrick

PUBLICATIONS

Scholar Profile

Refereed journal articles

Student authors are underlined

- 2025 **Zbinden**, Chafin, Tiemann, Edds, Martin, Hofmeier, Douglas & Douglas. Historic and contemporary selection define conservation units for a short-range endemic within an anthropogenically-altered riverscape. *Global Ecology and Conservation*, 62: e03783. [PDF](#)
- Martin, **Zbinden**, Middaugh, Douglas, Douglas & Chafin. GeoGenIE: A deep learning approach to predict geographic provenance of biodiversity samples from genomic SNPs. In Review.
- Zhang, **Zbinden**, Das, Boeing, Afanasyev, Guo, Zhu, Zhang & Xu. Quantile regression increases accuracy to predict an ecological cornerstone. In Review.
- Atkinson, Franzen, Hopper, Lopez, **Zbinden** & Vaughn. Environmental gradients drive convergence in life history strategies among disparate but linked taxonomic groups. In Review.
- 2024 Neal, **Zbinden**, Douglas & Douglas. Reducing DNA extraction costs through factorial design for the DNAdvance kit. *BMC Research Notes*. 17: 397. [PDF](#)
- 2023 **Zbinden**, Douglas, Chafin & Douglas. Riverscape community genomics: A comparative analytical approach to identify common drivers of genetic structure. *Molecular Ecology*, 32(24): 6743–6765. Associated [perspective article](#). [Cover article](#). [PDF](#)
- **Zbinden**, Douglas, Chafin & Douglas. A community genomics approach to natural hybridization. *Proceedings of the Royal Society B: Biological Sciences*, 290: 20230768. [PDF](#)
 - Regmi, Douglas, Wangchuk, **Zbinden**, Edds, Tshering & Douglas. The Himalayan uplift and evolution of aquatic biodiversity across Asia: Snowtrout (Cyprininae: *Schizothorax*) as a test case. *PLoS ONE*, 18(10): e0289736. [PDF](#)
- 2022 **Zbinden**, Geheber, Lehrter & Matthews. Multifaceted assessment of stream fish alpha and beta diversity using spatial models. *Hydrobiologia*, 849(8): 1795–1820. [PDF](#)

- **Zbinden**. A needle in the haystack? Applying species co-occurrence frameworks with fish assemblage data to identify species associations and sharpen ecological hypotheses. *Journal of Fish Biology*, 100(2): 339–351. [PDF](#)
- 2021 **Zbinden**, Geheber, Matthews & Marsh-Matthews. Fish communities, species of greatest conservation need, and potential protected areas in southeastern Oklahoma, 2014-2016. *Proceedings of the Oklahoma Academy of Science*, 101: 14–32. [PDF](#)
- Chafin, **Zbinden**, Douglas, Martin, Middaugh, Gray, Ballard & Douglas. Spatial population genetics in heavily managed species: separating patterns of historical translocation from contemporary gene flow in white-tailed deer. *Evolutionary Applications*, 14(6): 1673–1689. [PDF](#)
- 2020 **Zbinden**. Temporal dynamics of stream fish assemblages and the role of spatial scale in quantifying change. *Ecology and Evolution*, 10(2): 952–961. [PDF](#)
- Chafin, Douglas, Martin, **Zbinden**, Middaugh, Ballard, Gray & Douglas. Age structuring and spatial heterogeneity in prion protein gene (*PRNP*) polymorphism in Arkansas white-tailed deer. *Prion*, 14(1): 238–248. [PDF](#)
- 2017 **Zbinden** & Matthews. Beta diversity of stream fish assemblages: partitioning variation between environmental and spatial factors. *Freshwater Biology*, 62(8): 1460–1471. [Cover article](#). [PDF](#)

Non-refereed publications

- 2024 Douglas, Martin, **Zbinden**, Chafin, Campbell, & Douglas. Developing genetic approaches for sustainable long-term monitoring and modeling CWD spread in white-tailed deer. *Final Report* (30 June 2024). Arkansas Game and Fish Commission, Little Rock, AR.
- 2023 Douglas, **Zbinden**, Chafin, Martin, Tiemann, Edds & Douglas. Genetic diversity of the Neosho Madtom (*Noturus placidus*). *Final Report* (15 Nov. 2023). Kansas Department of Wildlife and Parks, Pratt, KS.
- 2022 Douglas, **Zbinden**, Chafin, Martin & Douglas. Screening SNP variation to model deer dispersal in Arkansas. *Final Report* (1 Jul. 2022). Arkansas Game and Fish Commission, Little Rock, AR.
- Zbinden, Douglas, Chafin & Douglas. Ozark fish community genomics: ddRAD seq. NCBI sequence read archive. BioProject: PRJNA809538.
- Zbinden, Douglas, Chafin & Douglas. Trait-based predictors of genomic diversity within freshwater fish communities of the Ozarks. bioRxiv, 2022.10.26.513843.
- 2021 **Zbinden**. With great diversity comes great responsibility: what we can do to better archive the rich biodiversity of Arkansas. *University of Arkansas Museum Campus Contributions*.

- 2020 Douglas, Chafin, **Zbinden**, Martin & Douglas. White-tailed deer in Arkansas: genetic connectivity and chronic wasting disease susceptibility. [Final Report](#) (10 Feb. 2020). Arkansas Game and Fish Commission, Little Rock, AR.
- 2016 Matthews, Marsh-Matthews & **Zbinden**. Survey of Clear Boggy, Muddy Boggy, Kiamichi and Little River drainages in Oklahoma to determine current distribution and status of fish species of greatest conservation need and potential change in fish communities. [Final Report](#) (30 Jun. 2016). Oklahoma Department of Wildlife Conservation, Oklahoma City, OK.

POPULAR MEDIA

- 2025 Maryland Brook Trout genomics survey. [UMCES YouTube](#).
- 2024 How fish create 'countries' in river systems. [Outdoor Life](#).
- 2024 Scientists reveal secret world of fish 'countries' that divide Arkansas. [News Week](#).
- 2024 Novel comparative approach enables mapping of fish 'countries.' [Univ. of Arkansas News](#).
- 2023 Comparative landscape genomics has arrived with a splash. [Molecular Ecology](#).
- 2021 UA partners with Arkansas Game and Fish to study Smallmouth Bass. [Univ. of Arkansas News](#).
- 2021 New hope for Tar Creek. [Sooner Magazine](#).
- 2020 Biological sciences doctoral candidate awarded Leggett Fellowship. [Univ. of Arkansas News](#).
- 2020 Researcher receives award for work on Ozark fish communities. [Univ. of Arkansas News](#).
- 2018 Researchers use genetic information to track chronic wasting disease. [Univ. of Arkansas News](#).

SELECTED SEMINARS AND CONFERENCE PRESENTATIONS

Invited as presenting author

- 2025 The molecular ecology research group at the Appalachian Laboratory: Supporting conservation and management with genomic tools. *University of Maryland Center for Environmental Science, Horn Point Laboratory, Cambridge, MD.*
- The molecular ecology working group at the Appalachian Laboratory: Guiding conservation and management with genomic tools. *University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, Solomons, MD.*
- 2024 Integrating ecology, evolution, and conservation through spatial genomics. *University of Maryland Center for Environmental Science, Institute of Marine & Environmental Technology, Baltimore, MD.*
- Using nature's own tools to expedite climate adaptation. *The Appalachian Lab Investors Network, University of Maryland Center for Environmental Science, Frostburg, MD.*

From genes to ecosystems: A genomic approach to ecology and conservation. *University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg, MD.*

- 2023 Integrating ecology, evolution, and conservation using genomics. *University of Nebraska, School of Natural Resources, Lincoln, NE.*

Contributed as presenting author

- 2025 Using nature's own tools to expedite climate adaptation. *Southern Division American Fisheries Society, Asheville, NC.*
- 2024 Diversity of Smallmouth Bass in Arkansas. *Arkansas Chapter of the American Fisheries Society, Texarkana, AR.*
- 2023 A community genomics approach to natural hybridization. *Joint Meeting of Ichthyologists and Herpetologists, Norfolk, VA.*
- 2022 Riverscape community genomics: Intraspecific genetic structure driven by common processes. *American Fisheries Society, Spokane, WA.*
- 2021 Hybridization between fish species in nature: a multispecies population genomic examination. *American Fisheries Society, Baltimore, MD.*
- 2020 A comparative population genetic approach for testing traits associated with variation in population connectivity across species in the White River Basin. *Southern Division American Fisheries Society, Little Rock, AR.*
- 2019 Community genomics of stream fish: multispecies, comparative population genetics spanning the White River Basin. *American Fisheries Society, Reno, NV.*
- Spatiotemporal dynamics of stream fish assemblages over four decades. *American Fisheries Society, Reno, NV.*
- 2018 DNA barcoding the Himalayan torrent ichthyofauna of Bhutan. *International Mahseer Conference, Paro, Bhutan.*
- Micro- and macroevolutionary consequences of dispersal differential among species. *EEB Seminar, University of Arkansas, Dept. of Biological Sciences, Fayetteville, AR.*
- 2017 Beta diversity of stream fish assemblages: partitioning variation between environmental and spatial factors. *Joint Meeting of Ichthyologists and Herpetologists, Austin, TX.*
- 2016 A comparison of fish community structure between Clear Boggy and Muddy Boggy Creeks. *Oklahoma Natural Resource Conference, Oklahoma City, OK.*
- 2015 A contemporary fish survey of the Muddy Boggy Drainage, southeast Oklahoma, USA. *Joint Meeting of Ichthyologists and Herpetologists, Reno, NV.*

TEACHING AND MENTORING

University of Maryland Center for Environmental Science

2025 Ecological Genomics – Professor (graduate; co-taught with Clara Fuchsman)
2026 Fish Ecology – Professor (graduate; co-taught with Ryan Woodland)

University of Arkansas

2020 Conservation Genetics – Computer Lab Instructor (senior/graduate)
2019-2021 Ichthyology – Lab Instructor (senior/graduate)
2017-2018 Global Change Biology – Recitation Leader (senior)
2016-2020 Principles of Biology – Lab Instructor (freshman, non-majors)

University of Oklahoma

2016 Zoology – Lab Instructor (freshman, non-majors)
2015 Ichthyology – Lab Instructor (senior/graduate)
2015 Quantitative Biology – Teaching Assistant (junior/senior)
2014 Evolution, Ecology, and Diversity – Lab Instructor (freshman/sophomore)
2013-2014 Molecules, Cells, and Physiology – Lab Instructor (freshman/sophomore)

Graduate Mentees

* Completed Thesis | ^PPublished

2025– Kyle Rufo, Appalachian Lab, Univ. of Maryland Center for Environmental Science (PhD)

Undergraduate Mentees

* Completed Thesis | ^PPublished

2023-2024 Carson Neal, Undergraduate Biological Sciences, Univ. of Arkansas * ^P
2023-2024 Lane Laroche, Honors Biological Sciences, Univ. of Arkansas *
2019-2021 Kevin Hollar, Honors Biological Sciences, Univ. of Arkansas *
2018-2020 Mackenzie Reed, Honors Biological Sciences, Univ. of Arkansas *
2017-2019 McKenna George, Honors Biological Sciences, Univ. of Arkansas *
2014-2016 Richard Lehrter, Undergraduate Biological Sciences, Univ. of Oklahoma * ^P

AWARDS AND HONORS

2022 James E. Wright Graduate Award, American Fisheries Society
2020 Jimmie Pigg Student Achievement Award, Southern Division of American Fisheries Society
2017 G.T. Johnson Memorial Scholarship Outstanding 1st Year Student, Univ. of Arkansas
2016 Teaching Excellence Award, Univ. of Oklahoma
2015 L.G. Hill Graduate Excellence Award, Univ. of Oklahoma
2014 L.G. Hill Graduate Excellence Award, Univ. of Oklahoma

SERVICE

2025	Participant of the 'Living Resources Feasibility Charette,' Chesapeake Bay Program
2024-	Member of the Graduate Faculty Council, UMCES
2024-	Chair of the Appalachian Lab Graduate Education Committee, UMCES
2024-	Member of the Appalachian Lab Onboarding Committee, UMCES
2024	Co-facilitator, 'eDNA/omics' working group, MEES Colloquium, UMCES
2024	Lightning Talk Judge, MEES Colloquium, UMCES
2022	Project Judge, Undergraduate Research Competition, Univ. of Arkansas
2021	Member of the Planning Committee, Univ. of Arkansas, Dept. Biological Sciences
2020	Member of the Museum Advisory Council, Univ. of Arkansas
2020	Chair of the Fundraising Committee, Museum Advisory Council, Univ. of Arkansas
2020	Member of the Graduate Studies Committee, Univ. of Arkansas, Biological Sciences
2018	Rapporteur, International Mahseer Conference

Manuscript referee

Aquatic Sciences (1x'22)

Biological Conservation (1x'21)

Conservation Biology (1x'23)

Diversity & Distributions (1x'22)

Ecology & Evolution (1x'23)

Freshwater Biology (1x'23)

Journal of Biogeography (1x'22)

Molecular Ecology (1x'24)

OIKOS (1x'25)

PLoS ONE (1x'18; 2x'19; 2x'20)

Scientific Reports (1x'25)

Southwestern Naturalist (1x'16)

USGS external (1x'24; 1x'25)