

# ZACHERY D. ZBINDEN

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Arkansas Conservation and Molecular Ecology Laboratory  
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## EDUCATION

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- 2022      **Ph.D. in Biology, University of Arkansas, Fayetteville, AR**  
Dissertation – *Riverscape community genomics of Ozark fishes: A comparative framework to infer ecological and evolutionary determinants of genetic diversity.*  
Advisors: Marlis R. Douglas & Michael E. Douglas
- 2016      **M.S. in Biology, University of Oklahoma, Norman, OK**  
Thesis – *Beta diversity of stream fish communities: partitioning variation between abiotic and spatial factors.* Advisor: William J. Matthews
- 2013      **B.S. in Ecology and Evolution, University of Pittsburgh, Pittsburgh, PA**

## APPOINTMENTS

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- 2022–      Postdoctoral Research Associate, Dept. of Biological Sciences, Univ. of Arkansas
- 2020–2022      Chancellor's Fellow, Dept. of Biological Sciences, Univ. of Arkansas
- 2016–2020      Distinguished Doctoral Fellow, 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

## RESEARCH AND TEACHING INTERESTS

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Ecology	biogeography   community ecology   spatial ecology
Evolution	landscape genetics   phylogeography   population genetics
Conservation	fisheries   conservation genomics   ecological forecasting
Zoology	ichthyology   taxonomy   phylogenetics
Quantitative bio	spatial analysis   programming   bioinformatics   multivariate statistics

## GRANTS AND FELLOWSHIPS

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- 2023 Arkansas Game and Fish Commission, \$93,879  
*Habitat associations and population genetic structure of the endemic Beaded Darter *Etheostoma clinton* in the upper Ouachita River system.* **Co-PI**
- 2020 Univ. of Arkansas & AR Game and Fish Commission, Leggett Chancellor's Fellowship, \$48,000
- 2016 Univ. of Arkansas Graduate School, Distinguished Doctoral Fellowship, \$88,000
- 2012 Howard Hughes Medical Institute, Undergraduate Research Fellowship, \$5,000

### *Pending grant applications*

- 2023 National Science Foundation, Division of Environmental Biology, \$696,812  
*Integrating genomic data to predict climate change resilience in freshwater communities.* **Co-PI**

## PUBLICATIONS

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### [Scholar Profile](#)

#### *Refereed journal articles*

- 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](#)

#### *Technical reports and non-refereed publications*

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.

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.

#### *Pending work (available upon request)*

- **Zbinden**, Douglas, Chafin & Douglas. Phenotypic traits are predictors of genomic variability in freshwater fish communities. *In revision*. [Preprint](#)
- Shepherd, Matthews, Geheber, **Zbinden**, Tobler, Marsh-Matthews & Nairn. Re-establishment of fish communities following implementation of ecologically engineered passive treatment systems to remediate mine drainage. *In revision*.
- **Zbinden**, Douglas, Chafin, Tiemann, Edds, Martin, Hofmeier & Douglas. Conservation genomics of the small range endemic Neosho Madtom (*Noturus placidus*). *In prep*.

- Zhang, Xu & **Zbinden**. Upper boundaries of fish diversity in river basins and the species saturation index. *In prep*

## SEMINARS AND CONFERENCE PRESENTATIONS

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### *As presenting author*

- 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, 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.

## RESEARCH EXPERIENCE

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- 2022- **Postdoctoral Research Associate | University of Arkansas | Drs. Mike & Marlis Douglas**  
Managing five conservation genomic projects aimed at guiding management via landscape genomic surveys and quantitative analysis (White-tailed Deer, Neosho Madtom, Smallmouth Bass, Beaded Darter, Collared Lizard)  
*Skills: project management, workflows, coding, mentorship, communicating with stakeholders, grant writing*
- 2017-2022 **Research Assistant | University of Arkansas | Drs. Mike & Marlis Douglas**  
Collaborator on genomic studies of fish and wildlife (White-tailed Deer, Brown Tree Snake, Black Bear, Himalayan fishes)  
*Skills: communicating with stakeholders, bioinformatics, population genomic analysis*
- 2016-2022 **Project Leader | University of Arkansas | Drs. Mike & Marlis Douglas**  
Conceived, designed, and executed a dissertation project on comparative riverscape genomics. Collected fish assemblages at 75 sites across the Ozarks and genotyped >3,500 individuals from 35 fish species using reduced representation genomics  
*Skills: field expedition planning and management, fish collection, genomic library prep, bioinformatics, coding, population genomic analysis, project management, mentorship*
- 2016 **Research Assistant | University of Oklahoma | Dr. Richard Broughton**  
Led field expeditions to collect fish populations for genetic analysis in OK and TX  
*Skills: field expedition planning, fish seining, habitat assessment*
- 2016 **Research Assistant | Oklahoma Biological Survey | Dr. Caryn Vaughn**  
Fish and mussel assemblage collecting and stream environmental surveys in OK  
*Skills: fish identification, electroshocking, stream surveying techniques, data loggers*
- 2013-2016 **Research Assistant | University of Oklahoma | Dr. William J. Matthews**  
Fish collecting and environmental surveys at 160 locations across OK. Identification and museum archival of >35,000 specimens.  
*Skills: field expedition planning and management, fish seining, habitat assessment and stream surveys, fish identification, museum specimen archival*
- 2013 **Research Assistant | Sam Noble Museum of Natural History | Dr. Edie Marsh-Matthews**  
Fish specimen archival and database organization  
*Skills: museum database management, collections management*
- 2012-2013 **Lab Technician | University of Pittsburgh | Dr. Vernon Twombly**  
Lab maintenance, media preparation, DNA extraction and quantification  
*Skills: laboratory protocols and molecular methods*
- 2011-2013 **Research Assistant | Pymatuning Lab of Ecology | Dr. Rick Relyea**  
Field sampling of aquatic invertebrates and amphibians, animal care and husbandry, toxicology and mesocosm experiments  
*Skills: experimental design, field techniques, invertebrate identification*

## TEACHING AND MENTORING EXPERIENCE

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### *University of Arkansas*

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

### *University of Oklahoma*

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

### *Undergraduate and graduate mentees*

\* Completed Thesis / Dissertation | <sup>P</sup>Published

2023– Emerson Lejong, Graduate Biological Sciences, Univ. of Arkansas  
2023– Carson Neal, Undergraduate Biological Sciences, Univ. of Arkansas  
2023– Carter White, Graduate Biological Sciences, Univ. of Arkansas  
2023– Lane Laroche, Honors Biological Sciences, Univ. of Arkansas  
2022– Timothy Goodhart, Graduate Biological Sciences, Univ. of Arkansas  
2023-2023 Hyatt Fox, Undergraduate 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 \*<sup>P</sup>

## AWARDS AND HONORS

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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 1<sup>st</sup> 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

## ADDITIONAL TRAINING

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- 2022 Faculty Peer Mentoring Program, Univ. of Arkansas
- 2022 Equity 101: Building Understanding/ Engaging in Action, IDEALS Institute, Univ. of Arkansas
- 2022 Writing a Land Acknowledgement, Multicultural Center, Univ. of Arkansas
- 2022 Gender Bias: Building Understanding/ Creating Allies, IDEALS Institute, Univ. of Arkansas
- 2022 Safe Zone Allies Training, Multicultural Center, Univ. of Arkansas
- 2022 OUCH! That Stereotype Hurts Training, Division of DEI, Univ. of Arkansas
- 2022 Facing Bias: Exposing Blind Spots/ Engaging in Action, IDEALS Institute, Univ. of Arkansas
- 2022 Diversity & Inclusion, Employee Development Program, Univ. of Arkansas
- 2022 Principles of Diversity, Equity, & Inclusion, IDEALS Institute, Univ. of Arkansas
- 2017 Jetstream Cloud Computing, High-Performance Computing Center, Univ. of Arkansas

## SERVICE

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- 2022 Project Judge, Undergraduate Research Competition, Univ. of Arkansas
- 2021 Planning Committee, Univ. of Arkansas, Dept. Biological Sciences
- 2020 Museum Advisory Council, Univ. of Arkansas
- 2020 Fundraising Committee Chair, Museum Advisory Council, Univ. of Arkansas
- 2020 Graduate Studies Committee, Univ. of Arkansas, Dept. Biological Sciences
- 2018 Rapporteur, International Mahseer Conference

### *Manuscript referee*

*Aquatic Sciences – Biological Conservation – Conservation Biology – Diversity & Distributions – Ecology & Evolution – Freshwater Biology – Journal of Biogeography – Molecular Ecology – PLoS ONE – The Southwestern Naturalist*

## PROFESSIONAL SOCIETIES

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American Fisheries Society – American Society of Ichthyologists & Herpetologists – American Society of Naturalists – Society for Conservation Biology – Society for the Study of Evolution

## REFERENCES

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### *Ordered by contact priority*

Dr. Marlis R. Douglas	Ph.D. co-advisor and postdoc supervisor Professor & Endowed Chair, University of Arkansas mrd1@uark.edu   479-575-4176
Dr. William J. Matthews	M.S. advisor and RA supervisor Professor Emeritus, University of Oklahoma wmatthews@ou.edu   405-227-4377
Dr. Jeremy M. Beaulieu	Ph.D. committee member Associate Professor, University of Arkansas jmbeauli@uark.edu   479-575-2618
Dr. Michael E. Douglas	Ph.D. co-advisor Professor & Endowed Chair, University of Arkansas med1@uark.edu   479-575-6343
Dr. Adam M. Siepielski	Ph.D. committee member Associate Professor, University of Arkansas amsiepie@uark.edu   479-575-6357
Dr. Caryn C. Vaughn	M.S. committee member and RA supervisor Professor, University of Oklahoma cvaughn@ou.edu
Dr. Edie Marsh-Matthews	M.S. committee member and RA supervisor Professor Emeritus, University of Oklahoma emarsh@ou.edu
Dr. Richard E. Broughton	RA supervisor Professor, University of Oklahoma rbroughton@ou.edu
Dr. Vernon J. Twombly	RA supervisor Instructor, University of Pittsburgh vernjtwombly@gmail.com
Dr. Rick A. Relyea	RA supervisor Professor & Endowed Chair Rensselaer Polytechnic Institute relyer@rpi.edu