



Zachary W. Culumber
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EDUCATION

PhD Biology, Department of Biology & Program in Applied Biodiversity Science (NSF-IGERT), Texas A&M University
2011 Advisor: Dr. Gil G. Rosenthal
BS Integrative Biology, High Distinction Honors, Department of Biology & Environmental Fellows Program, University of Illinois
2007 Minor: Environmental Studies
Research Mentor: Dr. Kimberly A. Hughes

APPOINTMENTS

2018- Assistant Professor, University of Alabama in Huntsville (UAH)
2017-2018 Postdoctoral Research Associate, Florida State University
2014-2016 Postdoctoral Research Associate, Kansas State University
2012-2014 CONACyT Postdoctoral Fellow, Univ. Autónoma del Estado de Hidalgo, México
2011-2012 Restoration Project Manager, Pizzo & Associates, Ltd., Chicago, IL, USA
2008-2011 National Science Foundation IGERT Trainee, Texas A&M University
2007-2010 Graduate Teaching Assistant, Texas A&M University
2004-2007 Undergraduate Research Assistant, University of Illinois

GRANTS & AWARDS

Awarded Total: \$231,915

2020.	UAH New Faculty Research Award	\$10,000
2017	NSF REU Supplement (ZWC conceived and wrote, parent IOS award to KAH)	\$6000
2016	American Livebearer Association, Langhammer Conservation Fund	\$999
2015	National Institutes of Health, K-INBRE	\$37440
2015	Mohamed bin Zayed Species Conservation Fund	\$12000
2014	National Science Foundation, FSML (ZWC conceived and wrote)	\$24500
2014	American Philosophical Society, Franklin Research Grants	\$6000
2014	International Society for Behavioral Ecology (travel award)	\$1500
2014	Society for the Study of Evolution (travel award)	\$1000
2013	Sistema Nacional de Investigadores, CONACyT	\$6000

2013	Animal Behavior Society	\$1034
2013	Society for Molecular Biology & Evolution (travel award)	\$1000
2012-2014	CONACyT Postdoctoral Fellowship	\$26919
2010	National Science Foundation Doctoral Dissertation Improvement Grant	\$14969
2008-2010	National Science Foundation IGERT Fellowship	\$80000
2008	Texas A&M, Ecology and Evolutionary Biology (travel award)	\$490
2008	Texas A&M, Department of Biology (travel award)	\$300
2007	University of Illinois Helen E. Hess Award, Best Undergraduate Thesis	\$400

PUBLICATIONS

31. Culumber, ZW. 2020. Behavioural response to simulated avian predation varies with latitude and predation intensity of natural populations. *Evolutionary Ecology*, 34, 1037-1046.
30. Culumber, ZW. 2020. Thermal stress increases activity and risk-taking behavior but not anxiety in a livebearing fish. *Environmental Biology of Fishes*, 1-5.
29. Culumber, ZW, Engel N, Travis J, & Hughes KA. 2020. Larger female brains do not reduce male sexual coercion. *Animal Behaviour*, 160, 15-24.
28. Culumber ZW, Anaya-Rojas JM, Booker WW, Hooks AP, Lange EC, Plier B., ... & Travis J. 2019. Widespread biases in ecological and evolutionary studies. *BioScience*, 69(8), 631-640.
27. Culumber ZW, Kraft B, Travis J, and KA Hughes. 2018. Gene-by-social environment interaction and the maintenance of genetic polymorphism in *Gambusia holbrooki*. *Evolution* 72(5):1146-1154.
26. Culumber ZW and M Tobler. 2018. Correlated evolution of thermal niches and functional physiology in tropical freshwater fishes. *Journal of Evolutionary Biology* 31(5):722-734.
25. ZW Culumber and M Tobler. 2017. Sex-specific evolution during the diversification of livebearing fishes. *Nature Ecology and Evolution* 1:1185-1191.
24. M Tobler and ZW Culumber. 2016. Perspective: Swimming in polluted waters. *Science* 354(6317):1232-1233.
23. Culumber ZW and M Tobler. 2016. Ecological divergence and conservatism: spatiotemporal patterns of niche evolution in a genus of livebearing fishes (Poeciliidae: *Xiphophorus*). *BMC Evolutionary Biology* 16:44.
22. Culumber ZW and M Tobler. 2016. Spatiotemporal environmental heterogeneity and the maintenance of the tailspot polymorphism in the variable platyfish (*Xiphophorus variatus*). *Evolution* 70(2):408-419.
21. Culumber ZW, G Hopper, N Barts CN Passow, S Morgan, A Brown, L Arias-Rodriguez and M Tobler. *In press*. Habitat use of two extremophile, highly endemic, and critically endangered fish species (*Gambusia eurystoma* and *Poecilia sulphuraria*; Poeciliidae). *Aquatic Conservation: Marine and Freshwater Ecosystems*. Online early.

20. Culumber ZW. 2016. Variation in the evolutionary integration of melanism with behavioral and physiological traits in *Xiphophorus variatus*. *Evolutionary Ecology* 30(1):9-20.
19. Culumber ZW. 2015. Poeciliid fry responses to conspecific, heterospecific, and predator visual cues. *Behaviour* 152:1463-1479.
18. Culumber ZW, M Schumer, S Monks, and M Tobler. 2015. Environmental heterogeneity generates opposite gene-by-environment interactions for two fitness-related traits within a population. *Evolution* 69(2):541-550.
17. Johnson JB, ZW Culumber, R Easterling and GG Rosenthal. 2015. Boldness and predator evasion in naturally hybridizing swordtails (Teleostei: *Xiphophorus*). *Current Zoology* 61(4):596-603.
16. Culumber ZW and S Monks. 2014. Does fin coloration signal social status in a dominance hierarchy of the livebearing fish *Xiphophorus variatus*? *Behavioural Processes* 107:158-162.
15. Culumber ZW, CE Bautista-Hernández, S Monks, L Arias-Rodríguez and M Tobler. 2014. Variation in melanism and female preference in proximate but ecologically distinct habitats. *Ethology* 120 (11):1090-1100.
14. Culumber ZW, OM Ochoa and GG Rosenthal. 2014. Assortative mating and the maintenance of population structure in a natural hybrid zone. *American Naturalist* 184(2):225-232.
* [Featured by Science](#)
13. Culumber ZW. 2014. Pigmentation in *Xiphophorus*: an emerging system in ecological and evolutionary genetics. *Zebrafish* 11(1):57-70.
12. Culumber ZW and S Monks. 2014. Resilience to extreme temperature events: acclimation capacity and body condition of a polymorphic fish in response to thermal stress. *Biological Journal of the Linnean Society* 111(3):504-510.
11. Culumber ZW, CE Bautista-Hernández and S Monks. 2014. Physiological stress and the maintenance of adaptive genetic variation in a livebearing fish. *Evolutionary Ecology* 28 (1):117-129.
10. Culumber ZW, R Miranda and S Monks. 2013. First report of *Xiphophorus hellerii* in the arid Metztitlán Canyon Biosphere Reserve in Mexico. *Environmental Biology of Fishes* 97 (2):157-161.
9. Culumber ZW and GG Rosenthal. 2013. Mating preferences do not maintain the conspicuous tailspot polymorphism in the platyfish, *Xiphophorus variatus*. *Behavioral Ecology* 24 (6):1286-1291.
8. Culumber ZW and GG Rosenthal. 2013. Population-level mating patterns and fluctuating asymmetry in swordtail hybrids. *Naturwissenschaften* 100 (8):801-804.
7. Culumber ZW, DB Shepard, SW Coleman, GG Rosenthal and M Tobler. 2012. Physiological adaptation along environmental gradients and replicated hybrid zone structure in swordtails (Teleostei: *Xiphophorus*). *Journal of Evolutionary Biology* 25 (9): 1800-1814.

6. Verzijden MN, ZW Culumber and GG Rosenthal. 2012. Opposite effects of learning cause asymmetric mate preferences in hybridizing species. *Behavioral Ecology* 23 (5): 1133-1139.
5. Plath M, R Riesch, ZW Culumber, B Streit and M Tobler. 2011. Giant water bug (*Belostoma sp.*) predation on a cave fish (*Poecilia mexicana*): effects of female body size and gestational state. *Evolutionary Ecology Research* 13:133-144.
4. Culumber ZW, HS Fisher, M Tobler, M Mateos, MD Sorenson, PH Barber and GG Rosenthal. 2011. Replicated hybrid zones of *Xiphophorus* swordtails along an elevational gradient. *Molecular Ecology* 20 (2):342-356.
3. Tobler M, ZW Culumber, M Plath, KO Winemiller and GG Rosenthal. 2011. An indigenous religious ritual selects for resistance to a toxicant in a fish (*Poecilia mexicana*, Poeciliidae). *Biology Letters* 7 (2): 229-232.
2. Coleman SW, ZW Culumber, A Meaders, J Henson and GG Rosenthal. 2009. Inducible molecular defenses, ultraviolet radiation, and melanomagenesis in natural *Xiphophorus* hybrids - a field-based investigation of lab-based cancer models. *Environmental Biology of Fishes* 86 (2): 279-84.
1. Purdy Drew KR, LK Sanders, ZW Culumber, O Zribi and GCL Wong. 2008 Cationic amphiphiles increase activity of aminoglycoside antibiotic tobramycin in the presence of airway polyelectrolytes. *Journal of the American Chemical Society* 131 (2):486-93.

TEACHING EXPERIENCE

INSTRUCTOR

2021-	Human Evolution and Culture (BYS 491)
2019-2020	Molecular Methods in Ecology and Evolution
2019-present	Animal Behavior (BYS491)
2019-present	Ecophysiology (BYS491)
2018-present	Evolution (BYS464)

TEACHER TRAINING

2015	Science Communication Fellow, Sunset Zoo & Portal to the Public, Manhattan, KS (Participant)
2014	Life Discovery Conference: Realizing vision and change, preparing for next generation biology, San Jose, CA. (Participant)
2014	Experiencing Evolution: Professional Development Workshop for Undergraduate Educators, SSE Annual Meeting, Raleigh, NC. (Participant)
2014	Life Discovery Conference: Promoting University Attendance by Underrepresented Groups with Multi-year Mentoring: the CiM-Bio Model, San Jose, CA. (Roundtable Leader)

TEACHING ASSISTANT

2010	Ecology (BIOL357), Texas A&M University (Instructor: Dr. David Baumgardner)
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- 2008 Ecology (BIOL357), Texas A&M University (Instructor: Dr. Robert Powell)
 2007 Ecology (BIOL357), Texas A&M University (Instructor: Dr. Robert Powell)

GUEST LECTURES

- 2018 Intro to Biological Research (BYS292)
 2017 Population Ecology (PCB5425), Individual Variation and Population Ecology
 2016 NSF Research Experience for Undergraduates, Kansas State University
 2008 Ecology (BIOL357), Biomes of the World
 2007 Ecology (BIOL357), The Evolution of Sex

STUDENT MENTORSHIP*Undergraduate*

- 2019- Katelyn Giltner (UAH)
 2019- Noah Daniels (UAH)
 2020- Mason Holt (UAH)
 2020- Trinity Tennant (UAH)
 2020- Audrey Kirby (UAH)
 2020- Hannah Lee (UAH)
 2020- Grace Oswald (UAH)
 2019 Josephine Smith (UAH)
 2018 Tessa Costley (UAH)
 2017-2018 Gabriella Dean (Florida State)
 2017 Nancy Engel (Cornell), NSF REU summer student at Florida State
 2016-2017 Rachel McNemee (Kansas State)
 2015 Shannon Drexler (U of Wisconsin-Platteville), NSF REU summer student at Kansas State
 2014 Mattie Bieberly (Kansas State) [*poster presentation & \\$2000 University award](#)
 2010 Ryan Easterling (Texas A&M)
 2010 Suzanne Simpson (Texas A&M)
 2009-11 Courtney Passow (Texas A&M)
 2009-10 Olivia Ochoa (Texas A&M) [*author on Culumber et al. 2014 Am. Nat.](#)
 2009 Sarah Classen (Texas A&M)
 2008 Rachel McCreary (Texas A&M)
 2007-08 Jenna Christopher (Texas A&M)

High School

- 2015 Sam Morgan (Manhattan USD 383) [*author on Culumber et al. Aquat. Conserv.](#)
 2013 Osvaldo Hernández-Cisneros (CBTIS 5, Zacualtipan, Mexico)

GRADUATE STUDENT COMMITTEES

2015-2017 Jesús Antonio Rocamontes Morales (MSc), Instituto de Ecología (INECOL), Xalapa, México. Primary Advisor: Dra. Carla Gutiérrez.

GRADUATE STUDENTS

2019-present Jennifer Dougherty. Primary Thesis Advisor.

PRESENTATIONS

INVITED TALKS

- 2019 Kennesaw State University, Ecology and Evolution Seminar 2017 Evolution Spotlight Session. Portland, OR.
 2016 K-INBRE Symposium. Kansas City, MO
 2015 Instituto de Ecología, Xalapa, México
 2015 2^{da} Jornada de Ciencia y Desarrollo Sustentable. Calnali, Hidalgo (Mexico)
 2015 Ecology and Evolutionary Biology Seminar, Kansas State University

CONTRIBUTED TALKS (6) & POSTERS (6)

- 2017 Ecology and Evolution Seminar, Florida State University
 2017 Society for Integrative and Comparative Biology. New Orleans, LA
 2016a Society for Integrative and Comparative Biology. Portland, OR
 2016b Society for Integrative and Comparative Biology. Portland, OR
 2015 Ecological Genomics Symposium. Manhattan, KS
 2014 Evolution Annual Meeting. Raleigh, NC
 2014 XIV Congreso Nacional de Ictiología, Morelia, Michoacan, Mexico
 2014 International Society for Behavioral Ecology. New York, NY
 2013 Society for Molecular Biology and Evolution. Chicago, IL
 2012 CECYTEH (high school), Calnali, Hidalgo, Mexico
 2008 Applied Biodiversity Science Seminar, Texas A&M University
 2008 International Society for Behavioral Ecology. Ithaca, NY
 2008 NSF IGERT Project Meeting. Washington DC

PROFESSIONAL SERVICE

JOURNAL REFEREE

<i>Proceedings of the Royal Society B</i>	<i>Copeia</i>
<i>Molecular Ecology</i>	<i>Biological Journal of the Linnean Society</i>
<i>Functional Ecology</i>	<i>Biological Invasions</i>
<i>Evolutionary Ecology</i>	<i>Biology Letters</i>
<i>Behavioral Ecology</i>	<i>Canadian Journal of Zoology</i>
<i>Ecology</i>	<i>Journal of Fish Biology</i>
<i>Ecology & Evolution</i>	<i>Neotropical Ichthyology</i>
<i>Evolution</i>	<i>Southwestern Naturalist</i>
<i>Behavior</i>	<i>Asian Fisheries Science</i>
<i>Behavioral Ecology & Sociobiology</i>	<i>Freshwater Science</i>
<i>Comparative Biology & Physiology</i>	

GRANT REFEREE

- 2018 NSF, Division of Integrative Organismal Systems, Animal Behavior
 2016 NSF, Division of Environmental Biology, Long Term Research in Environmental Biology
 2015 CONACyT, Becas en el Extranjero - Reviewed proposals in Spanish for Mexico's national science council for students seeking funding to obtain a PhD abroad

PUBLIC OUTREACH & EDUCATION

- 2017 Article for *Livebearers Journal* , "Impacts of environmental change on wild populations of livebearers"
- 2012-2016 Coordinator & Advisory Board Member, CICHAZ Field Station
- 2016 Featured Scientist at 'Science on Tap', jointly hosted by Sunset Zoo & K-State College of Arts & Sciences, Manhattan, KS
- 2016 STEM Night, Lee Elementary School, Manhattan, KS
- 2016 Science Outreach, Sunset Zoo, Science Saturday, Manhattan, KS
- 2013-2015 Mentor, CICHAZ Mentoring in Biology (CiM-Bio) program, Mexico
- 2015 Fish Morphology Activity, Grades 3-5, Marlatt Elementary School, Manhattan, KS
- 2015 Science Outreach, Sunset Zoo, Military Appreciation Day, Manhattan, KS
- 2015 Judge, Research Experience for Undergraduate Joint Poster Session, Kansas State University
- 2014 Judge, Ruth M. Patrick Student Poster Award for the *American Society of Naturalists* (Evolution Annual Meeting). Raleigh, NC.
- 2012 Article for *FishChum*, "Observation of a novel, pigmented sword in *X. malinche* in its natural habitat"
- 2011 Article for *FishChum*, "Natural variation in wild-caught swordtails"
- 2009 Member of Organizing Committee, Ecological Integration Symposium (EIS), Texas A&M University
- 2008 Video media, *C.S.I. Calnali*, Short movie featuring K-12 students in Mexico using molecular biology to solve crime in swordtail hybrid zones (YouTube)
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MEDIA & PRESS COVERAGE

- New York Times** "Rapid evolution saved this fish from population, study says." Our perspective of a piece published in *Science* was featured in a *New York Times* article, 2017. [link](#)
- Science** "Where did these hybrid fish come from?" Our work in *The American Naturalist* was featured as a ScienceShot by *AAAS Science*, 2014. [link](#)
- Tropical Fish Hobbyist** "Variation in wild swordtails" Invited article about my research on variation in livebearing fishes, 2013. [link](#)
- TAMUtimes** "Move over CSI, Aggie video takes center stage" Featured article about my C.S.I. outreach video. 2009. [link](#)