Molly C. Womack

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Education and Research Positions

2020–present **Assistant Professor**, Utah State University
2020 **Secretary's Distinguished Fellow**, National Museum of Natural History, Washington DC
2019 **Peter Buck Postdoctoral Fellow**, National Museum of Natural History, Washington DC
2017–2018 **NSF Postdoctoral Fellow**, University of California, Berkeley and National Museum of Natural History, Washington DC
2016 **PhD in Zoology**, Colorado State University
2010 **BS in Biology**, University of Florida

Grants and Fellowships

2023 Company of Biologists Scientific Meeting Grant (Award EA893) $2,456
NSF 21-506 Division of Integrative Organismal Systems: Integrative Ecological Physiology $992,541
(Award 2247610; Womack PI) $498,279 to Womack @ USU
Title: *Collaborative Research: Evolving thicker skin: Understanding how adaptations to a universal trade-off dictate the climate vulnerability and ecology of an imperiled vertebrate clade*
NSF 22-513 Organismal Response to Climate Change $800,862
(Award 2307832; Womack co-PI) $399,855 to Womack @ USU
Title: *Collaborative Research: ORCC: Saltwater Rising: Understanding how sea level rise affects coastal amphibians*
2022 NSF 22-500 Building Research Capacity of New Faculty in Biology $471,862
(Award 2218191; Womack co-PI) $93,379 to Womack @ USU
Title: *BRC-BIO: Phenotypic convergence and trait loss in high-elevation Andean frogs*
2021 NSF 18-513 Major Research Instrumentation Program $402,500
(Award 2117667; Womack co-PI)
Title: *MRI: Acquisition of MicroCT for Research and Training in Biology*
Utah Endangered Species Mitigation Fund (Womack PI) $7,100
2020 Utah Agricultural Experimental Station Project (UTA01574) $25,000
2018 Secretary's Distinguished Fellowship, National Museum of Natural History $54,400
Peter Buck Postdoctoral Fellowship, National Museum of Natural History $109,200
2016 NSF Postdoctoral Research Fellowship in Biology $138,000
NSF Doctoral Dissertation Improvement Grant $19,500
Research Coordination Network Laboratory Exchange Grant $2,600
2015 Society for the Study of Amphibians and Reptiles Student Travel Grant $500
EDEN (Evo-Devo-Eco Network) Research Exchange $3,000
2014 Heiligenberg Travel Grant $700
2012 Colorado State University Travel Grant $600
2011 Sigma Xi Grants in Aid of Research (GIAR) $1,000
Colorado State University Travel Grant $633
2010 Sigma Xi Grants in Aid of Research (GIAR) $700
Colorado State University Graduate Fellowship $2,000

Awards and Honors

2021 The Herpetologists' League Raymond D. Semlitsch Research Award $5,000
2016 Graduate Student Excellence in Undergraduate Teaching and Mentoring Award at Colorado State University
1st place Dwight Davis student presentation in the Division of Vertebrate Morphology at the Society for Integrative and Comparative Biology Meeting

Peer-Reviewed Publications (since joining USU faculty)

[MC] = used museum collections, [U]= undergraduate/postbac mentee, [G]= graduate student mentee, *= equal contributors

24. Womack, M.C., and Hoke, K.L. In press. Convergent anuran middle ear loss lacks a universal, adaptive explanation. *Brain, Behavior and Evolution*.
23. Albecker, M.A., Strobel, SM., **Womack, M.C.** 2023. Developmental plasticity in anurans: Meta-analysis reveals effects of larval environments on metamorphosis timing and body size. *Integrative and Comparative Biology*, icad059.
22. Capshaw, G., Brown, A.D., Peña, J.L., Carr, C.E., Christensen-Dalsgaard, J., Tollin, D.J., **Womack, M.C.** and McCullagh, E.A. 2023. The continued importance of comparative auditory research to modern scientific discovery. *Hearing Research*, 108766.
21. [MC] Mitra, A.T., **Womack, M.C.**, Gower, D.J, Streicher, J.W., Clark B., Bell, R.C., Schott, R.K., Fujita, M.K., and Thomas, K.N. 2022. Ocular lens morphology is influenced by ecology and metamorphosis in frogs and toads. *Proceedings of the Royal Society B,* 289(1987), 20220767.
20. **Womack, M.C.*,** Steigerwald, E.*, Blackburn, D., Cannatella, D.C., Catenazzi, A., Che J., Koo, M.K., McGuire, J.A., Ron, S., Spencer, C., Vredenburg, V.T., and Tarvin, R.D. 2022. State of Amphibia 2020: Five years of amphibian research, diversity and resources. *Ichthyology & Herpetology, 110*(4), 638-661.
19. [MC] Adler, K.A [U]., De Nault, D.L. [U], Cardoza, C.M. [U], and **Womack, M.C.** 2022. Evolutionary rates and shape variation along the anuran vertebral column with attention to phylogeny, body size, and ecology. *Evolution,* 76(11), 2724-2738.
18. Phillips, J.R. [G], Hewes, A.E., **Womack, M.C.**, and Schwenk, K. 2022. The Mechanics of Air-Breathing in African Clawed Frog Tadpoles, *Xenopus laevis* (Anura: Pipidae). *Journal of Experimental Biology*, 225(10), jeb243102.
17. Hoke, K.L., Christensen-Dalsgaard, J., and **Womack, M.C**. 2022. Auditory system divergence does not explain species differences in call preference. *Brain, Behavior and Evolution*, 1-16.
16. Sadier A., Sears, K.E., and **Womack, M.C**. 2022. Unraveling the heritage of lost traits. *Journal of Experimental Zoology Part B: Molecular and Developmental Evolution*, 338(1-2), 107-118.
15. Stynoski, J.L., **Womack, M.C.,** Trama, F., Coloma, L.A., Hoke. K.L. 2021. Whispers from vestigial nubbins: Arrested development provokes trait loss in toads. *Evolution and Development,* 23(1), 5-18.
14. **Womack, M.C.,** and Bell. R.C. 2020. Two-hundred million years of anuran body-size evolution in relation to geography, ecology and life history. *Journal of Evolutionary Biology*, 33(10), 1417-1432.
13. [MC] Buttimer S.M. [U], Stepanova, N. [U], and **Womack M.C.** 2020. Evolution of the unique anuran pelvic and hindlimb skeleton in relation to microhabitat, locomotor mode, and jump performance. *Integrative and Comparative Biology*, 60(5), 1330-1345.
12. [MC] Stepanova, N. [U] and **Womack, M.C**. 2020. Anuran limbs reflect microhabitat and distal, later-developing bones are more evolutionarily labile. *Evolution,* 74(9), 2005-2019.

Peer-Reviewed Publications (before joining USU faculty)

11. Hernández-Gómez, O., Byrne A.Q, Gunderson A.R., Jenkinson T.S., Noss C.F., Rothstein A.P., **Womack M.C.,** and Rosenblum E.B. 2020. Invasive vegetation affects amphibian skin microbiota and body condition. *PeerJ*, 8, e8549.
10. Lambert, M.R.†, **Womack, M.C.†**, Byrne, A.Q., Hernández-Gómez, O., Noss, C.F., Rothstein, A.P., ... & Nanjappa, P. 2020. Comment on "Amphibian fungal panzootic causes catastrophic and ongoing loss of biodiversity". *Science*, 367(6484).
9. [MC] **Womack, M.C.,** Metz, M.J., and Hoke, K.L. 2019. Larger genomes linked to slower development and loss of late-developing traits. *American Naturalist,* 194(6), 854-864.

8. Bell, R.C., **Womack, M.C.**, Esposito, L.A., Kaya, A., Elie T. 2019. *Hyperolius adspersus* (Sprinkled Long Reed Frog). Predation Natural History Note. *Herpetological Review*, 50(4), 759-760.
7. **Womack, M.C.,** Christensen-Dalsgaard, J., Coloma, L.A., and Hoke, K.L. 2018. Sensitive high-frequency hearing in earless and partially eared harlequin frogs (*Atelopus*). *Journal of Experimental Biology*, 221(10), jeb169664.
6. **Womack, M.C.,** Stynoski, J.L., Voyles [U], M.K., Coloma, L.A., and Hoke, K. L. 2018. Prolonged middle ear development in *Rhinella horribilis*. *Journal of morphology*, 279(10), 1518-1523.
5. [MC] **Womack, M.C.,** Fiero, T. [U], and Hoke, K.L. 2018. Trait independence as a primer for trait loss. *Evolution*, 72(3), 679-687.
4. **Womack, M.C.,** Christensen-Dalsgaard, J., Coloma L.A., Chapparo, J.C., and Hoke, K.L. 2017. Earless toads sense low frequencies but miss the high notes. *Proceedings of the Royal Society B*, 284(1864), 20171670.
3. **Womack, M.C.,** Christensen-Dalsgaard, and Hoke, K.L**.** 2016. Better late than never: effective air-borne hearing of toads delayed due to late maturation of the tympanic middle ear structures. *Journal of Experimental Biology*, 219(20), 3246-3252.
2. [MC] Pereyra, M.O.*, **Womack, M.C.***, Barrionuevo, J.S., Blotto, B.L., Baldo, D., Targino, M., ... and Grant, T. 2016. The complex evolutionary history of the tympanic middle ear in frogs and toads (Anura). *Scientific Reports*, 6, 34130.
1. Babonis, L.S. **Womack, M.C.,** and David, H.E. 2012. Morphology and putative function of the colon and cloaca of marine and freshwater snakes. *Journal of Morphology*, 273(1), 88-102.

Invited Seminars (* = upcoming)

2024 *Northern Arizona University – Department of Biological Sciences
*Indiana University – Biology Department
2023 Louisiana State University – Museum of Natural Science
Harvard University – Department of Organismic and Evolutionary Biology
Cornell University – Ecology and Evolutionary Biology
University of Texas at Austin – Department of Integrative Biology
2022 University of Kentucky – Biology Department
2021 Iowa State University – Department of Ecology, Evolution, and Organismal Biology
American Museum of Natural History
"Morphology Group": a multi-institution Zoom seminar hosted by University of Michigan EEB
2020 University of Oklahoma – Biology Department
California Academy of Sciences, San Francisco
2019 University of California, Los Angeles – Department of Ecology and Evolutionary Biology
2018 Utah State University, Logan – Biology Department
Smithsonian NMNH, Washington D.C. – Department of Vertebrate Zoology
University of California, Davis – Center for Population Biology
Duke University, North Carolina – Biology Department
2017 University of Maryland – Behavior, Ecology, Evolution and Systematics Program
University of California, Berkeley – Museum of Vertebrate Zoology
San Francisco State University – Biology Department
2013 University of the Pacific, Stockton – Biology Department

Invited Presentations (lead presenter)

2023 Society for Integrative and Comparative Biology Meeting. Austin, TX. Symposium: *Pathways to adulthood: environmental, developmental, and evolutionary influences on the ontogeny of form and function*

Society for Integrative and Comparative Biology Meeting. Austin, TX. Special Session: *What amphibians have taught us about organism-focused evolutionary biology*

2022 34th Karger Workshop in Evolutionary Neuroscience. San Diego, CA. Association for Research in Otolaryngology. Virtual MidWinter Meeting. ***symposium keynote***

2020 Society for Integrative and Comparative Biology Meeting. Austin, TX. Symposium: *Melding Modeling and Morphology: integrating approaches to understand the evolution of form and function*

2019 International Congress of Vertebrate Morphology. Prague, Czech Republic. ***symposium keynote***

2016 International Congress of Neuroethology. Montevideo, Uruguay.

Contributed Conference Presentations (lead presenter)

2022 Joint Meeting of Ichthyologists and Herpetologists. Spokane, WA. (talk)
Society for Integrative and Comparative Biology Meeting. Phoenix, Arizona. (talk)

2019 Evolution. Providence, RI. (poster)

2018 Evolution. Montpellier, France. (talk)

2017 NSF Collections-Based PRFB Symposium. Cambridge, MA. (poster)
Evolution. Portland, Oregon. (talk)
Society for Integrative and Comparative Biology Meeting. New Orleans, Louisiana. (talk)
highlighted in SICB news article

2016 Society for Integrative and Comparative Biology Meeting. Portland, Oregon. (talk)
winner of the Davis Award

2015 Society for the Study of Amphibians and Reptiles Meeting. Lawrence, Kansas. (talk)

2014 Congress of Neuroethology. Sapporo, Japan. (talk)

2012 Evolution. Ottawa, Canada. (poster)

2010 University of Florida Undergraduate Symposium. Gainesville, FL. (poster)

2009 University of Florida Marine Biology Meeting. St. Augustine, FL. (poster)

Teaching Experience

Instructor on Record:	*Sensory Biology: The evolution of (un)common senses* (2023)
	Evolution (2022)
	Organismal Biology and Physiology (2021–2024)
	Evolutionary Developmental Biology Seminar (2020)
Teaching Assistant:	*Biological Basis of Animal Behavior* ***lab developer** (2015)
	Developmental Biology (2011, 2012)
	Ecology (2011)
	Evolution (2013)
	Herpetology (2014, 2016)
	Introductory Biology (2010, 2016)
	Invertebrate Zoology (2012)
Guest Lecturer:	*Introduction to Graduate School* (2020–2022
	Biology Professions (2021–2022)
	Computational Biology (2021)
	Herpetology (2014, 2016)
	Biological Basis of Animal Behavior (2015)
	Introductory Biology (2013)
	Ecology (2011)

Mentorship

Postdoc: Dr. Sarah McKay Strobel (2022–present)
Dr. Genevieve Mount (2021–2023)
Dr. Molly Albecker (2021–2022)

Graduate: Julia Soares Parreiras, PhD (2023–present)
Jackson Phillips, PhD (2020–present)
Veronica Urgiles Penafiel, PhD **(**2020–2021)

Undergraduates & Postbacs: 30 total mentored students, including:
15 poster presentations, 2 undergraduate theses, 3 undergraduate-first authored publications, and 4 undergraduate co-authored publications

High School Students: 5 total mentored students
1 conference presentation (2021 SICB)

Committee Member: Ren Weinstock (Kapheim Lab), Megan Kempas (Savitzky Lab), Helen Plylar (Savitzky Lab), Hannah Wilson (Savitzky Lab), Caroline Long (Freeman Lab), Renata Blocher (Polejaeva Lab)

Professional Service

Reviewer for Journals (Manuscripts): *Journal of Anatomy, Bioacoustics, Biological Journal of the Linnean Society, Biology Letters, BMC Evolutionary Biology, Current Biology, Climate Change Ecology, Egyptian Journal of Aquatic Research, eLife, Evolution, Function Ecology, Herpetological Monographs, Integrative and Comparative Biology, Nature Communications, PeerJ, PNAS, Proceedings of the Royal Society B, Scientific Reports, TREE, Journal of Zoology*

Reviewer for Grants and Fellowships: SSE Rosemary Grant Award Evaluations (2022); National Science Foundation (2019); American Society of Ichthyologists and Herpetologist's Cashner Student Award (2019); Society of Systematic Biologists Graduate Student Research Awards (2018)

Steering Committee member for AmphibiaWeb.org (2019–current)

Program Officer-Elect for the Division of Phylogenetics and Comparative Biology in the Society for Integrative and Comparative Biology

Board of Governor for American Society of Ichthyology and Herpetology (2020–current)

Committee member of American Society of Ichthyology and Herpetology's Diversity, Equity, Inclusion and Belonging Committee (2019–2021)

Committee member of Herpetology League Diversity Committee (2019–2021)

Society Affiliations: Society for the Study of Evolution, Society for the Study of Amphibians and Reptiles, Society for Integrative and Comparative Biology, American Society of Ichthyologists and Herpetologists, American Society of Naturalists

Departmental Service

Member of Graduate Programs Committee, Utah State University (2022–present)

Founder of Postdoc Career Development Workshop, Utah State University (2021–present)

Member of Vivarium Advisory Committee, Utah State University (2021–present)

Member of Biology Safety Committee, Utah State University (2020–present)

Event Creator and Host for Non-Academic Career Panel at Utah State University (2021)

Member of Biology Executive Committee, Utah State University (2021–2022)

Member of Diversity, Equity, and Inclusion Committee, Utah State University (2020–2022; Chair 2021)

Graduate Student Representative, Colorado State University (2015–2016)

Community Outreach

2020–2023	Mentor for the Native American Summer Mentorship Program, Logan, UT
2023	"Science Unwrapped" Public Presenter at Utah State University
2022	Interactive Presenter at California Academy of Sciences' public "NightLife" event
	Mentor for Society for Integrative and Comparative Biology's (SICB) Division of Ecology and Evolution "Beers and Brains" social
2021	Mentor for Careers in Science (CiS) Intern Program at California Academy of Sciences
	Panelist at SICB Event, "Job hunting tips and tricks: A panel discussion on finding a faculty position in Ecology and Evolutionary Biology"
	Outgroup mentor at Society for Integrative and Comparative Biology annual meeting
2017–2021	Newsbox contributor to Amphibiaweb.org
2020	Panelist in ASIH Virtual Event, "Navigating herpetology and ichthyology as a member of a minoritized/marginalized group."
2018–2020	Frog Expert Q&A – Achieve Academy, Oakland, CA
2019	Yes! Mentor at National Museum of Natural History, Washington, DC
	Congressional Night at National Museum of Natural History, Washington, DC
	Panelist in SACNAS Event "Demistifying the postdoc" University of California, Berkeley
	Science Fair Judge – Madera Elementary, Berkeley, CA
2018	Science Fair Judge – K-5 Sequoia, Berkeley, CA
	Q?rius' Expert is In – National Museum of Natural History, Washington, DC
2017–2018	Save the Frogs Day! University of California, Berkeley
2017	Teen Night Out! – National Museum of Natural History, Washington, DC
2016	Meet the Animals Day! – Earless frogs at the Museum of Discover, Fort Collins, CO
2015–2016	Research demonstrations for Bella Romero 8th graders, Greeley, CO
2015	Research presentation for 7th grade class, Thornton, CO
2013	Save The Frogs Day! – Museum of Discovery, Fort Collins, CO
	Judge for Undergraduate Poster Symposium, Colorado State University
2012–2014	USA Science and Engineering Festival Expo Washington, DC – Evolution Here and Now
2012–2013	Green Day – Bacon Elementary, Fort Collins, CO
2011	Research presentation – Cheyenne Mountain High School, Colorado Springs, CO