

# Megan L. Smith

NSF POSTDOCTORAL FELLOW · INDIANA UNIVERSITY DEPARTMENT OF BIOLOGY

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## Education

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### The Ohio State University

Columbus, OH

PH.D., EVOLUTION, ECOLOGY AND ORGANISMAL BIOLOGY (EEOB)

2015 - 2020

- Advisor: Dr. Bryan Carstens
- Graduate Minor in Statistics

### University of Mississippi

Oxford, MS

B.S., BIOLOGY

2011 - 2015

- Honors Thesis Advisor: Dr. Richard Buchholz

### University of Mississippi

Oxford, MS

B.A., ENGLISH

2011 - 2015

## Professional Experience

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2020- Present	<b>NSF Postdoctoral Fellowship in Biology</b> , Dept. of Biology, Indiana University
2019-2020	<b>OSU Distinguished University Fellowship</b> , Dept. of EEOB, Ohio State University
2016-2019	<b>NSF Graduate Research Fellowship</b> , Dept. of EEOB, Ohio State University
2015-2016	<b>OSU Distinguished University Fellowship</b> , Dept. of EEOB, Ohio State University

## Publications

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\* *co-first authors*; + *mentored undergraduate*

### PUBLISHED

22. **Smith, Megan L.**, Connor Lang<sup>+</sup>, David Sneddon<sup>+</sup>, Jessica Wallace<sup>+</sup>, Anahí Espíndola, Jack Sullivan, and Bryan C. Carstens. 2022. Comparative phylogeography of microsnails from the Pacific Northwest. Accepted at *Northwest Science*.
21. Ruffley, Megan, **Megan L. Smith**, Anahí Espíndola, Daniel Turck, Niels Mithcell, Bryan Carstens, Jack Sullivan, and David C. Tank. 2022. Genomic evidence of an ancient inland temperate rainforest. Accepted at *Molecular Ecology*. Preprint available from aarhorea. DOI: 10.22541/au.163254059.95545414/v1
20. **Smith, Megan L.** and Matthew W. Hahn. 2022. The frequency and topology of pseudoorthologs. In Press at *Systematic Biology*. DOI: <https://doi.org/10.1093/sysbio/syab097>
19. Carstens, Bryan C., **Megan L. Smith**, Emanuel M. Fonseca, and Maria Tereza C. Thomé. 2022. Assessing model adequacy leads to more robust phylogeographic inference. In Press at *Trends in Ecology and Evolution*. DOI: 10.1016/j.tree.2021.12.007
18. Yan, Zhi\*, **Megan L. Smith**\*, Peng Du, Matthew W. Hahn, and Luay Nakhleh. 2022. Species tree inference on data with paralogs is accurate using methods intended to deal with incomplete lineage sorting. *Systematic Biology*. 71(2): 367-381.
17. Fountain-Jones, Nicholas M., **Megan L. Smith**, and Frédéric Austerlitz. 2021. Machine learning in molecular ecology. *Molecular Ecology Resources*, 21(8): 2589-2597.
16. **Smith, Megan L.** and Bryan C. Carstens. In Press. Species delimitation using molecular data. In *Species and Beyond*. Edited by John S. Wilkins, Frank E. Zachos, and Igor Ya Pavlinov. Taylor & Francis Group: Boca Raton, FL.

15. Warwick, Alexa R., Lisa N. Barrow, **Megan L. Smith**, D. Bruce Means, Alan R. Lemmon, and Emily Moriarty Lemmon. 2021. Signatures of north-eastern expansion and multiple refugia: genomic phylogeography of the Pine Barrens tree frog, *Hyla andersonii* (Anura: Hylidae). *Biological Journal of the Linnean Society*, 133(1): 120-134.
14. **Smith, Megan L.** and Matthew W. Hahn. 2021. New approaches for inferring phylogenies in the presence of paralogs. *Trends in Genetics*, 37(2): 174-187.
13. Marden, Emily, Richard J. Abbott, Frédéric Austerlitz, Daniel Ortiz-Barrientos, Regina S. Baucom, Pim Bongaerts, Aurélie Bonin, Camille Bonneaud, Luke Browne, C. Alex Buerkle, Ana L. Caicedo, David W. Coltman, Mitchell B. Cruzan, Angus Davison, J. Andrew DeWoody, Alex J. Dumbrell, Brent C. Emerson, Nicholas M. Fountain-Jones, Rosemary Gillespie, Tatiana Giraud, Michael M. Hansen, Kathryn A. Hodgins, Myriam Heuertz, Shotaro Hirase, Rebecca Hooper, Paul Hohenlohe, Nolan C. Kane, Joanna L. Kelley, Andrew P. Kinziger, Valerie J. McKenzie, Corrie S. Moreau, Alison G. Nazareno, Tara A. Pelletier, Josephine M. Pemberton, Yanhua Qu, Sébastien Renaut, Cynthia Riginos, Naiara Rodríguez-Ezpeleta, Sean M. Rogers, Jacob A. Russell, Sean D. Schoville, Suhua Shi, **Megan Smith**, Victoria L. Sork, Graham N. Stone, Pierre Taberlet, Elin Videvall, Lisette Waits, Emily Warschefskey, Robert K. Wayne, Annabel Whibley, Janna Willoughby, Jeremy B. Yoder, Lucie Zinger, Benjamin Sibbett, Shawn Narum, and Loren H. Rieseberg. 2021. Sharing and reporting benefits from biodiversity research. *Molecular Ecology*, 30(5): 1103-1107.
12. Lado, Paula, **Megan L. Smith**, Bryan Carstens, and Hans Klompen. 2020. Population genetic structure and demographic history of the lone star tick. *Molecular Ecology*, 29(15): 2810-2823.
11. Colston, Timothy J., Brice P. Noonan, **Megan L. Smith**, R. Alexander Pyron. 2020. On the availability of recently described *Ptychadena* (Anura: Ptychadenidae) nomina from Ethiopia. *Zootaxa*, 4786(2): 289-294.
10. Watters, George T., **Megan L. Smith**, and D.J. Sneddon\*. 2020. The subfamily Abbottellinae (Annulariidae): origins, associations, and a review of the Hispaniolan taxa. *The Nautilus*, 134(1): 1-34.
9. Weiringa, Jamin G., Matthew R. Boot, Marcos V. Dantas-Queiroz, Drew Duckett, Emanuel M. Fonseca, Heather Glon, Natalie Hamilton, Sungsik Kong, Flavia M. Lanna, Kali Z. Mattingly, Danielle J. Parsons, **Megan L. Smith**, Benjamin W. Stone, Coleen Thompson, Lei Zuo, and Bryan C. Carstens. 2020. Does habitat stability structure intraspecific genetic diversity? It's complicated. *Frontiers of Biogeography*, 12(2): e45377.
8. **Smith, Megan L.** and Bryan C. Carstens. 2020. Process-based species delimitation leads to identification of more biologically relevant species. *Evolution*, 74(2): 216-229.
7. Rankin, Andrew M., Thomas Wilke, Michael Lucid, William Leonard, Anahí Espíndola, **Megan L. Smith**, Megan Ruffley, Dave Tank, Bryan C. Carstens, and Jack Sullivan. 2019. Complex interplay of ancient vicariance and recent secondary contact in northwestern North American temperate rainforests. *Biological Journal of the Linnean Society*, 127(4): 876-889.
6. Sullivan, J.\*, **Megan L. Smith**\*, Anahí Espíndola, Megan Ruffley, Andrew Rankin, David C. Tank, and Bryan C. Carstens. 2019. Integrating life history traits into predictive phylogeography. *Molecular Ecology*, 28(8): 2062-2073.
5. **Smith, Megan L.**, Megan Ruffley, Andrew M. Rankin, Anahí Espíndola, David C. Tank, Jack Sullivan, and Bryan C. Carstens. 2018. Testing for the presence of cryptic diversity in tail-dropper slugs (*Prophysaon*) using molecular data. *Biological Journal of the Linnean Society*, 124(3): 518-532.
4. Ruffley, Megan R., **Megan L. Smith**, Anahí Espíndola, Bryan C. Carstens, David C. Tank, and Jack Sullivan. 2018. Combining allele frequency and tree-based approaches improves phylogeographic inference from natural history collections. *Molecular Ecology*, 27(4): 1012-1024.
3. **Smith, Megan L.**, Megan Ruffley, Anahí Espíndola, David C. Tank, Jack Sullivan, and Bryan C. Carstens. 2017. Demographic model selection using Random Forests and the Site Frequency Spectrum. *Molecular Ecology*, 26(17): 4562-4573.
2. **Smith, Megan L.**, Brice P. Noonan, and Timothy J. Colston. 2017. The role of climatic and geological events in generating diversity in Ethiopian grass frogs (Genus *Ptychadena*). *Royal Society Open Science*, 4(8): 170021.
1. Espíndola, Anahí, Megan Ruffley, **Megan L. Smith**, Bryan C. Carstens, David C. Tank, and Jack Sullivan. 2016. Identifying cryptic diversity with predictive phylogeography. *Proceedings of the Royal Society B*, 283(1841): 20161529.

#### IN REVIEW OR REVISION

3. **Smith, Megan L.**, Dan Vanderpool, and Matthew W. Hahn. In revision. Using all gene families vastly expands data available for phylogenomic inference in primates. Preprint available from bioRxiv: DOI: 10.1101/2021.09.22.461252.
2. Fonseca, Emanuel M., Drew J. Duckett, Filipe G. Almeida, **Megan L. Smith**, Maria Tereza C. Thomé, and Bryan C. Carstens. In review. Assessing model adequacy for Bayesian Skyline Plots using posterior predictive simulations.

1. **Smith, Megan L.**, Jessica Wallace<sup>+</sup>, David C. Tank, Jack Sullivan, and Bryan C. Carstens. In revision. The role of multiple Pleistocene refugia in driving speciation in the Pacific Northwest.

## Awards, Fellowships, & Grants

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2020	<b>Postdoctoral Research Fellowship in Biology</b> , NSF	\$ 207,000
2018	<b>Alumni Grants for Graduate Research</b> , The Ohio State University	\$ 4,760
2018	<b>Osburn Graduate Student Scholarship for Research</b> , The Ohio State University	\$ 2,500
2018	<b>Presentation Award, 2nd Place</b> , Ohio Super Computer Users Group Meeting	
2018	<b>Best talk in the phylogenetics section</b> , Three Rivers Ecology and Evolution Meeting	
2017	<b>Rosemary Grant Award</b> , Society for the Study of Evolution	\$ 2,500
2016	<b>Graduate Student Research Award</b> , Society for Systematic Biologists	\$ 1,400
2016	<b>James H. McLean Student Grant in Collections-Based Research</b> , Western Society of Malacologists	\$ 1,000
2015	<b>Graduate Research Fellowship</b> , NSF	\$ 102,000
2015	<b>Distinguished University Fellowship</b> , The Ohio State University	\$ 55,104

## Presentations

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\* *presenting author*; + *mentored undergraduate*

### SEMINARS AND INVITED TALKS

- Fall 2021. *Expanding the genes used in phylogenomics beyond single-copy orthologs*. Brown Bag Seminar: Indiana University Dept. of Biology, Bloomington, IN.
- Fall 2021. *Expanding the genes used in phylogenomics beyond single-copy orthologs*. Brown Bag Seminar: The Ohio State University Dept. of EEOB, Columbus, OH.
- Fall 2021. *The role of demographic models in species delimitation*. Invited Talk: Virtual Species Delimitation Workshop, The Smithsonian National Museum of Natural History.
- Summer 2021. *The effects of selection on inferences of introgression with Machine Learning*. Invited Symposium Talk: Virtual Evolution Meeting.
- Spring 2021. *Expanding the genes used in phylogenomics beyond single-copy orthologs*. Brown Bag Seminar: University of New Mexico Dept. of Biology, Albuquerque, NM.
- Spring 2021. *Paralogs in phylogenomics*. Chalk Talk: University of Montana, Missoula, MT.
- Fall 2019. *Studying speciation and species limits*. Invited Talk: University of Michigan Life Sciences Institute, Ann Arbor, MI.
- Fall 2019. *Studying speciation in terrestrial gastropods: integrating genomic, ecological, and morphological data*. Brown Bag Seminar: University of Michigan Dept. of Ecology and Evolutionary Biology, Ann Arbor, MI.

### CONTRIBUTED PRESENTATIONS

18. **Smith, Megan L.**\* and Matthew W. Hahn. 2021. The frequency and topology of pseudoorthologs. Poster: Probabilistic Modeling in Genomics.
17. **Smith, Megan L.**\*, David C. Tank, Anahí Espíndola, Jack Sullivan, and Bryan C. Carstens. 2020. The role of multiple Pleistocene refugia in driving speciation in the Cascades range. Talk: Society for Systematic Biologists Stand-Alone Meeting, Gainesville, FL.
16. **Smith, Megan L.**\* and Bryan C. Carstens. 2019. Considering the process of speciation while investigating species limits suggests reinforcement as a driver of speciation in taildropper slugs. Talk: World Congress of Malacology, Asilomar, CA.
15. **Smith, Megan L.**\* and Bryan C. Carstens. 2019. Process-based species delimitation leads to identification of more biologically relevant species. Talk: Ernst Mayr symposium, Evolution meeting, Providence, RI.
14. David Sneddon\*\*, **Megan L. Smith**, and Bryan C. Carstens. 2019. Does microhabitat influence cryptic diversity? An investigation using microsnails *Punctum randolphi* from the Pacific Northwest rainforests? Poster: Evolution meeting, Providence, RI.

13. Jessica Wallace<sup>+</sup>, **Megan L. Smith**, and Bryan C. Carstens. 2019. Using next-gen sequencing to infer the evolutionary history of *Prophysaon andersoni*. Poster: Ohio State Denman Undergraduate Research Forum, Columbus, OH.
12. Connor Lang<sup>+</sup>, **Megan L. Smith**, and Bryan C. Carstens. 2019. Exploring biodiversity of microsnails within the Pacific Northwest. Poster: Ohio State Denman Undergraduate Research Forum, Columbus, OH.
11. David Sneddon<sup>+</sup>, **Megan L. Smith**, and George T. Watters. 2019. An assessment of the diversity of a subfamily of snails (Abbottellinae) and their relatedness within Annulariidae. Poster: Ohio State Denman Undergraduate Research Forum, Columbus, OH.
10. **Smith, Megan L.\*** and Bryan C. Carstens. 2018. Studying speciation in taildropper slugs using Machine Learning. Talk: Dept. of EEOB, The Ohio State University, Columbus, OH.
9. **Smith, Megan L.\*** and Bryan C. Carstens. 2018. Disentangling the process of speciation using machine learning. Talk: Ohio Super Computer Users Group Meeting, Columbus, OH.
8. **Smith, Megan L.\*** and Bryan C. Carstens. 2018. Disentangling the process of speciation using machine learning. Talk: Three Rivers Evolution and Ecology Meeting, Pittsburgh, PA.
7. **Smith, Megan L.\*** and Bryan C. Carstens. 2018. Species delimitation using Random Forests and the Site Frequency Spectrum. Talk: Society for Systematic Biologists Stand-Alone Meeting, Columbus, OH.
6. **Smith, Megan L.\*** and Bryan C. Carstens. 2017. Species delimitation with gene flow. Talk: Graduate Student Recruitment Event, The Ohio State University, Columbus, OH.
5. **Smith, Megan L.\***, Megan Ruffley, Anahí Espíndola, David C. Tank, Jack Sullivan, and Bryan C. Carstens. 2015. Species limits and relationships within tail-dropper slugs (genus *Prophysaon*) from the Pacific Northwest. Talk: Evolution meeting, Portland, OR.
4. Espíndola, Anahí, Megan Ruffley, **Megan L. Smith\***, David C. Tank, Bryan C. Carstens, Jack Sullivan. 2017. Identifying cryptic diversity with predictive phylogeography. Talk: Graduate Student Recruitment Event, The Ohio State University, Columbus, OH.
3. **Smith, Megan L.\***, Megan Ruffley, Anahí Espíndola, David C. Tank, Jack Sullivan, and Bryan C. Carstens. 2016. Testing models of colonization in the robust lancetooth snail (*Haplotrema vancouverense*) from the Pacific Northwest using Approximate Bayesian Computation and the Site Frequency Spectrum. Talk: Evolution meeting, Austin, TX.
2. **Smith, Megan L.\***, Brice P. Noonan, and Timothy J. Colston. 2015. Cryptic diversity in Ethiopian *Ptychadena* revealed through molecular data. Talk: Society for the Study of Amphibians and Reptiles Annual Meeting, Lawrence, KS
1. **Smith, Megan L.\***, Brice P. Noonan, and Timothy J. Colston. 2015. Cryptic diversity in Ethiopian *Ptychadena* revealed through molecular data. Poster: Evolution meeting, Raleigh, NC.

## Teaching Experience

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2022	<b>Species Delimitation</b> , Guest Lecturer	Ohio State University
2021	<b>Species Delimitation Workshop</b> , Instructor	Smithsonian
2019	<b>Freshman Bioinformatics Seminar</b> , Teaching Assistant	Columbus, OH
2018	<b>Predictive Phylogeography Workshop</b> , Instructor	Columbus, OH
2017	<b>Research Experience for Undergraduates</b> , Teaching Assistant	Columbus, OH

## Mentoring

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2021-2021	<b>Abigail Comer</b> , Undergraduate, Indiana University
2017-2019	<b>David Sneddon</b> , Undergraduate, The Ohio State University
2017-2019	<b>Connor Lang</b> , Undergraduate, The Ohio State University
2017-2019	<b>Jessica Wallace</b> , Undergraduate, The Ohio State University
2017-2019	<b>Annie Chessler</b> , Undergraduate, The Ohio State University
2017-2018	<b>Katheryn Field</b> , Undergraduate, The Ohio State University
2016-2017	<b>Dylan Projansky</b> , Undergraduate, The Ohio State University
2015-2016	<b>Ivy Larkin</b> , High School Student, Upper Arlington High School

## Outreach & Professional Development

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### SERVICE AND OUTREACH

- 2020-2021 **Molecular Ecology Resources**, Guest Editor, Special Issue on Machine Learning
- 2020-2021 **Postdoctoral Association at Indiana University**, Leadership Team Member
- 2018-2021 **Molecular Ecology**, Junior Editorial Board Member
- 2018-2019 **Graduate Evolution and Ecology Students**, President
- 2017-2018 **Graduate Studies Committee**, Graduate Student Representative
- 2017-2018 **Undergraduate Evolution and Ecology Club**, Graduate Student Mentor
- 2018 **Society for Systematic Biologists**, Meeting Planning Committee

### PEER REVIEW

Systematic Biology  
Molecular Ecology  
Molecular Ecology Resources  
Molecular Biology and Evolution  
Peer J  
BMC Evolutionary Biology  
Software X  
Journal of Heredity  
Nature Scientific Reports  
Systematic Entomology  
Molecular Phylogenetics and Evolution  
Evolution  
Journal of Ecology  
TAXON  
The American Naturalist

### PROFESSIONAL MEMBERSHIPS

Society for the Study of Evolution  
Society for Systematic Biologists  
American Malacological Society  
Western Society of Malacologists