

Matthew W. Austin, Ph.D. *Curriculum Vitae*

Curator of Biodiversity Data
Missouri Botanical Garden
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APPOINTMENTS

2023 - present	Curator of Biodiversity Data	Missouri Botanical Garden
2020 - 2023	Biodiversity Post-Doctoral Fellow	Living Earth Collaborative Washington University in St. Louis Missouri Botanical Garden

EDUCATION

2015 - 2020	Ph.D. Biology Certificate in University Teaching	University of Missouri - St. Louis
2015 - 2018	M.S. Biology	University of Missouri - St. Louis
2010 - 2014	B.S. Biological Sciences	University of Missouri - Columbia

PEER-REVIEWED PUBLICATIONS

* Co-first authors

+ Undergraduate co-author

^ High school student co-author

Austin, M.W. & N.E. Miller-Struttman. An inquiry-based activity for investigating the effect of climate change on phenology using the R programming language. In press at the *American Biology Teacher*.

Bartlett, K.B.⁺, **M.W. Austin**, J.B. Beck, A.E. Zanne & A.B. Smith. 2023. Beyond the usual climate? Factors determining flowering and fruiting phenology across a genus over 117 years. *American Journal of Botany* 100: e16188. DOI: doi.org/10.1002/ajb2.16188

- [Highlighted article](#) for July 2023 issue of the *American Journal of Botany*.

Austin, M.W. & A.S. Dunlap. 2023. Resource availability affects seasonal trajectories of population-level learning. *The American Naturalist* 201: 16-37. DOI: doi.org/10.1086/722235

Austin, M.W., P.O. Cole⁺, K.M. Olsen & A.B. Smith. 2022. Climate change is associated with increased allocation to potential outcrossing in a common mixed mating species. *American Journal of Botany* 109: 1085–1096. DOI: doi.org/10.1002/ajb2.16021

- Press coverage: [USA Today](#), [St. Louis Post-Dispatch](#), [St. Louis Fox 2](#)
- Highlighted article for July 2022 issue of the *American Journal of Botany*.
 - DOI: doi.org/10.1002/ajb2.16031

Austin, M.W., A.D. Tripodi, J.P. Strange & A.S. Dunlap. 2022. Bumble bees exhibit body size clines across an urban gradient despite low genetic differentiation. *Scientific Reports* 12: 4166. DOI: doi.org/10.1038/s41598-022-08093-4

Manning, T.H.*⁺, **M.W. Austin***, K. MuseMorris[^] & A.S. Dunlap. 2021. Equivalent learning, but unequal participation: male bumble bees learn comparably to females, but participate in cognitive assessments at lower rates. *Behavioural Processes* 193: 104528. DOI: doi.org/10.1016/j.beproc.2021.104528

Krakos, K.N. & **M.W. Austin**. 2020. Testing pollination syndromes in *Oenothera* (Onagraceae). *Journal of Pollination Ecology* 26: 52-66. DOI: [doi.org/10.26786/1920-7603\(2020\)609](https://doi.org/10.26786/1920-7603(2020)609)

- [Lay summary](#)

Austin, M.W. & A.S. Dunlap. 2019. Intraspecific variation in worker body size makes North American bumble bees (*Bombus* spp.) less susceptible to decline. *The American Naturalist* 194: 381-394. DOI: doi.org/10.1086/704280

- [Lay summary](#)

Austin, M.W., P. Horack⁺ & A.S. Dunlap. 2019. Choice in a floral marketplace: the role of complexity in bumblebee decision-making. *Behavioral Ecology* 30: 500-508. DOI: doi.org/10.1093/beheco/ary190

Dunlap, A.S., **M.W. Austin** & A.Q. Figueiredo. 2019. Components of change and the evolution of learning in theory and experiment. *Animal Behaviour* 147: 157-166. DOI: doi.org/10.1016/j.anbehav.2018.05.024

Manuscripts in Review

Austin, M.W., A.B. Smith, K.M. Olsen, P.C. Hoch, K.N. Krakos, S.P. Schmocker & N.E. Miller-Struttmann. Climate change increases flowering duration, driving phenological reassembly and elevated co-flowering richness. In review at the *Journal of Ecology*.

GRANTS, AWARDS, & FELLOWSHIPS

2023 – 2026	“Research and reintroductions to address the problem of low fecundity in small populations of Mead’s milkweed” Missouri Department of Conservation (co-PI with Christine Edwards, Matthew Albrecht, Leah Berkman)	\$238,800
2020 – <i>present</i>	Biodiversity Post- Doctoral Fellowship (salary & research budget)	\$183,000
2019 – 2020	Graduate School Dissertation Fellowship	\$20,000
2019 – 2020	Trans World Airlines Scholarship	\$7,000
2019	Raven Fellowship	\$10,000
2019	Raju Mehra Award, UM - St. Louis College of Arts and Sciences	\$500
2018 – 2019	Trans World Airlines Scholarship	\$7,000
2018	Whitney R. Harris World Ecology Center Scholarship	\$4,000
2018	Biological Graduate Student Association Research Award	\$400
2017 – 2018	Trans World Airlines Scholarship	\$7,000
2017	Mickey Scudder Scholarship in Field Biology	\$1,000
2017	NSF Graduate Research Fellowship Program – Honorable Mention	
2016	Whitney R. Harris World Ecology Center Scholarship	\$3,443
2016	Biological Graduate Student Association Research Award	\$300
2013	Undergraduate Research Mentorship Program Scholarship	\$3,000

PRESENTATIONS

*Undergraduate co-author

- Mar. 2023 **Austin, M.W.** Exploring the past and envisioning the future: Novel applications of a digitized herbarium. Missouri Botanical Garden. (oral)
- Oct. 2022 **Austin, M.W.** Interactions and reproduction in a changing world: Exploring the consequences of flowering phenology shifts. Department of Biology, University of Missouri – St. Louis. (oral)
- Aug. 2022 **Austin, M.W.** Climate change drives greater investment in outcrossing by reducing climatic stress for a common mixed mating species. Ecological Society of America, Montreal, Québec, Canada. (oral)
- Feb. 2022 **Austin, M.W.** Timing is everything: Century-long changes to the flowering season in the greater St. Louis area. Clayton Garden Club, *virtual*. (oral)

- Aug. 2021 **Austin, M.W.**, N.E. Miller-Struttmann, K.N. Krakos, K.M. Olsen, A.B. Smith. Vital connections and altered ecology: flowering phenology shifts increase co-flowering overlap and heterospecific interaction potential. Ecological Society of America, *virtual*. (oral)
- Jul. 2021 **Austin, M.W.** Responses of flowering phenology to climate change: what we know and where to go from here. Missouri Botanical Garden Research Experiences for Undergraduates Program, *virtual*. (oral)
- Oct. 2020 **Austin, M.W.** Pollination systems in changing environments: plant-pollinator responses to environmental variability. Living Earth Collaborative, Washington University in St. Louis, *virtual*. (oral)
- Aug. 2020 **Austin, M.W.** & A.S. Dunlap. Bumble bees exhibit intraspecific body size spatial structuring despite low genetic differentiation. Ecological Society of America, *virtual*. (oral)
- Nov. 2019 **Austin, M.W.** & A.S. Dunlap. Intraspecific variation and behavior in bumble bees: population-level consequences. Entomological Society of America, St. Louis, MO, USA. (poster)
- Sep. 2019 **Austin, M.W.** & A.S. Dunlap. Implications of intraspecific variation for bumble bee (*Apidae: Bombus*) ecology and conservation. Saint Louis Ecology, Evolution and Conservation, St. Louis, MO, USA. (poster)
- Jul. 2019 **Austin, M.W.** Intraspecific variation and behavior in bumble bees: population-level consequences. Animal Behavior Society, Chicago, IL, USA. (oral)
- Sep. 2018 **Austin, M.W.** Variation and decline in North American bumble bees (*Bombus* spp.). Saint Louis Ecology, Evolution and Conservation, St. Louis, MO, USA. (oral)
- Nov. 2016 **Austin, M.W.** & A.S. Dunlap. Effects of resource complexity on foraging sampling and constancy in the bumblebee *Bombus impatiens*. Biological Graduate Research Symposium, UMSL, St. Louis, MO, USA. (oral)
- Jul. 2016 **Austin, M.W.**, P. Horack*, K.M. Janssen*, and A.S. Dunlap. Effects of resource complexity on foraging sampling and constancy in the bumble bee *Bombus impatiens*. Animal Behavior Society, Columbia, MO, USA. (poster)
- Jan. 2015 **Austin, M.W.** and S.C. Humfeld. Breeding phenology of female gray treefrogs: effects of male calling and environmental variables. Society for Integrative and Comparative Biology, West Palm Beach, FL, USA. (poster)

Jul. 2013 **Austin, M.W.** and S.C. Humfeld. Arrival of female gray treefrogs in breeding choruses: effects of male calling and environmental variables. Undergraduate Research and Creative Achievements Forum, MU, Columbia, MO, USA. (poster)

CO-AUTHORED PRESENTATIONS

*Undergraduate co-author

- Aug. 2022 Donson, C.* & **M.W. Austin**. Investigating flowering phenology and response to climate change in different *Viola odorata* populations. REU Symposium, Missouri Botanical Garden. (oral)
- Aug. 2022 Donson, C.* & **M.W. Austin**. Investigating flowering phenology and response to climate change in different *Viola odorata* populations. REU Symposium, Missouri Botanical Garden. (poster)
- Aug. 2021 Cole, P.O.* & **M.W. Austin**. Effects of climate change on the phenology of cleistogamous and chasmogamous flowers. REU Symposium, Missouri Botanical Garden. (oral)
- Aug. 2021 Cole, P.O.* & **M.W. Austin**. Effects of climate change on the phenology of cleistogamous and chasmogamous flowers. REU Symposium, Missouri Botanical Garden. (poster)
- Sep. 2021 Conroy, S.* & **M.W. Austin**. Pollinator sharing and heterospecific pollen transfer among native Missouri flora. Undergraduate Research Symposium, Washington University in St. Louis. (poster)
- Jul. 2019 Manning, T.H.*, **M.W. Austin** & A. S. Dunlap. Variation in learning ability across colony developmental stage in *Bombus impatiens* bumble bees. Animal Behavior Society, Chicago, IL. (poster)
- Jul. 2019 Dunlap, A.S., **M.W. Austin** & I. Rojas-Ferrer. Producer-scrouter dynamics in foraging bumble bees. Animal Behavior Society, Chicago, IL. (oral)
- Sep. 2017 Dunlap, A.S., **M.W. Austin** & P. Horack*. The role of complexity in bumblebee partner choice in floral communities. St. Louis Ecology, Evolution, and Conservation. (oral)
- Apr. 2016 Janssen, K.M*, P. Horack* & **M.W. Austin**. Bees in a floral market place: floral complexity and sampling in *Bombus impatiens*. Undergraduate Research Symposium, University of Missouri – St. Louis. (poster)
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MENTORING

¹ undergraduate student supervisor

² undergraduate thesis committee member

³ high school student supervisor

2023	Léa Vilna-Santos ¹	Missouri Botanical Garden <i>Project: Effects of climate change on phenology and stomatal density</i>
2023	Axel Cortes ³	Missouri Botanical Garden <i>Project: Effects of climate change on phenology and stomatal density</i>
2022	Catherine Donson ^{1,2}	Scripps College REU Missouri Botanical Garden <i>Honors Thesis: Investigating flowering phenology and response to climate change in different Viola odorata populations</i>
2021 – 2023	Kelsey Bartlett ¹	George Washington University <i>Project: Beyond the usual climate? Factors determining fruiting and flowering phenology across a genus over 117 years</i>
2022	Evan Xiao ¹	Washington University in St. Louis <i>Project: Comparing genomic diversity between historic and contemporary populations of Sanguinaria canadensis</i>
2021	Piper Cole ¹	New College of Florida REU Missouri Botanical Garden <i>Project: Effects of climate change on the phenology of cleistogamous and chasmogamous flowers</i>
2021	Sophie Conroy ¹	Washington University in St. Louis <i>Project: Pollinator sharing and heterospecific pollen transfer among native Missouri flora</i>
2018 – 2020	Tian Manning ¹	University of Missouri – St. Louis <i>Project: Variation in learning ability across colony developmental stage in Bombus impatiens bumble bees</i>
2019	Kamau MuseMorris ³	University of Missouri – St. Louis <i>Project: Variation in learning ability across colony developmental stage in Bombus impatiens bumble bees</i>
2019	Olivia Ransin ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2019	Dannice Alexander ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2019	Melia Reeves-Long ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>

2019	Michaela Browne ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2019	Sahil Vaid ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2019	Amrith Gurung ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2019	Jenna Riordan ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2019	Sharvitti Broussard ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2018 – 2019	Emina Spahic ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2018	Kunal Singh ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2018	Melisa Muminovic ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2018	Sierra McAlister ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2018	Lilli Goldman ¹	University of Missouri – St. Louis <i>Project: Producer-scrounger dynamics in foraging bumble bees</i>
2018	Sarah Lueder ¹	University of Missouri – St. Louis <i>Project: Microsatellite genotyping of St. Louis bumble bees</i>
2017	Tori Hines ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2017	Brooke McGlasson ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2017	Kendra Phan ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2017	Tyler Wagner ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>

2017	Emily Cuttle ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2017	Maria Nguyen ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2017	Lauren Szyhowski ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2016	Tanmayee Pydimukka ³	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2015 – 2016	Kathryn Janssen ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>
2015 – 2016	Patricia Horack ¹	University of Missouri – St. Louis <i>Project: Bees in a floral market place: floral complexity and sampling in Bombus impatiens</i>

UNIVERSITY TEACHING

Instructor of Record

Summer 2020 Biology of Climate Change University of Missouri – St. Louis

Graduate Teaching Assignments

Fall 2018 From Molecules to Organisms (*recitation*) University of Missouri – St. Louis
Spring 2018 From Molecules to Organisms (*recitation*) University of Missouri – St. Louis
Fall 2017 From Molecules to Organisms (*recitation*) University of Missouri – St. Louis
Spring 2017 Organisms and the Environment (*lab*) University of Missouri – St. Louis
Fall 2016 Organisms and the Environment (*lab*) University of Missouri – St. Louis
Spring 2016 Organisms and the Environment (*lab*) University of Missouri – St. Louis
Fall 2015 Organisms and the Environment (*lab*) University of Missouri – St. Louis

Invited Guest Lectures

Spring 2020 *Descent with Modification* Organisms and the Environment (UMSL)
Fall 2019 *What is Cognition?* Evolution of Cognition (UMSL)

Spring 2019	<i>Communication: Signal Design</i>	Animal Behavior (UMSL)
Spring 2018	<i>Sampling and Group Foraging</i>	Animal Behavior (UMSL)
Spring 2017	<i>The Biosphere</i>	Organisms and the Environment (UMSL)
Spring 2017	<i>Animal Behavior</i>	Organisms and the Environment (UMSL)

Invited Laboratory Contributor

Fall 2022	<i>Climate Change and Phenology</i>	Ecology (Webster University)
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SERVICE & OUTREACH

2022 – 2023	<u>Living Earth Collaborative Seminar Series</u> , Washington University in St. Louis <i>Role: Organizer & Host</i>
2022	Living Earth Collaborative Graduate Student Research Grant Program, Washington University in St. Louis <i>Role: Co-organizer</i>
2022	Living Earth Collaborative Post-doctoral Fellowship Selection Committee, Washington University in St. Louis <i>Role: Post-Doc Representative</i>
2021 – 2022	<u>Living Earth Collaborative Seminar Series</u> , Washington University in St. Louis <i>Role: Organizer & Host</i>
2021	<u>Panel on Environmental Racism and Biodiversity Conservation in St. Louis</u> , Living Earth Collaborative, Washington University in St. Louis <i>Role: Co-organizer</i>
2019	Pollinator Brochure for St. Louis County Parks <i>Role: Content Contributor</i>
2018 – 2019	Biology Faculty Meetings, University of Missouri – St. Louis <i>Role: Graduate Student Representative</i>
2017 – 2018	Student Government Association, University of Missouri – St. Louis <i>Role: Graduate Student Representative</i>
2017	Community Garden Pollinator Outreach, St. Louis, MO <i>Role: Exhibiter</i>

- 2016 – 2017 Biology Graduate Student Association, University of Missouri – St. Louis
Role: Treasurer
- 2016 Animal Behavior Society Outreach Event, Columbia, MO
Role: Exhibiter
- 2016 Harris World Ecology Center, University of Missouri – St. Louis
Role: Graduate Student Representative
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OTHER PROFESSIONAL ACTIVITIES

Workshops

- Aug. 2022 Explore and work with biodiversity data from NEON and LTER, Ecological Society of America, Montreal, Québec, Canada
- Aug. 2022 Introduction to Geospatial Data Analysis in R and Application to Remote Sensing Based Tree Inventories from Neon Sites, Ecological Society of America, Montreal, Québec, Canada
- Jan. 2022 Preparing and Delivering a Teaching Demo, Center for Teaching and Learning, Washington University in St. Louis, St. Louis, MO, USA
- Jun. 2020 Online Course Design Basics Workshop, University of Missouri – St. Louis, St. Louis, MO, USA
- Jan. 2020 Identification and Ecology of Midwestern Bees, Billiken Bee Lab, St. Louis University, St. Louis, MO, USA
- Sep. 2019 Mentoring Undergraduate Research: Inclusive Practices for all Disciplines and Students, Focus on Teaching and Technology Conference, St. Louis, MO, USA
- Jul. 2019 Cultural Competency Workshop, Animal Behavior Society, Chicago, IL, USA
- Jul. 2019 Animal Behavior Lab Activities: Engaging Students in the Science of Animal Behavior, Animal Behavior Society, Chicago, IL, USA
- Nov. 2018 St. Louis Science Communication Workshop, University of Missouri – St. Louis, St. Louis, MO, USA
- Aug. 2018 Teaching Assistant Academy, University of Missouri – St. Louis, St. Louis, MO, USA
- Oct. 2017 R Statistics Workshop, University of Missouri – St. Louis, St. Louis, MO, USA

Aug. 2016 Building Personal Bridges: Connecting Your Science to Your Communities,
Animal Behavior Society, Columbia, MO, USA

Manuscript Reviewer

New Phytologist, The American Naturalist, Functional Ecology, Biodiversity and Conservation,
Animal Behaviour, Behavioral Ecology, Insectes Sociaux, Animal Behavior and Cognition,
Journal of Experimental Biology, Western North American Naturalist

Professional Affiliations

Ecological Society of America (ESA), Animal Behavior Society (ABS), Entomological Society
of America (ESA), Society for Integrative and Comparative Biology (SICB)

REPRESENTATIVE PRESS COVERAGE

- Mar. 2023 USA Today: [If April showers bring May flowers, why are blooms appearing so early? Climate change.](#)
- Feb. 2023 St. Louis Fox 2: [Small flowers focus of big climate research at Missouri Botanical Garden](#)
- Feb. 2023 Climate Change Program, Washington University in St. Louis: [Not Blooming Like They Used to: Plant Species and the Climate](#)
- Jul. 2022 St. Louis Post-Dispatch: [Climate change improves violet blooms, but there's a hitch](#)
- Jun. 2022 Discover + Share, Missouri Botanical Garden: [Climate Change and Common Violets](#)
- Sep. 2021 Scientific American: [In Missouri, a Human 'Bee' Works to Better Understand Climate Change's Effects](#)
- Jun. 2021 HEC Media: [Flowers Bloom Early Confusing Bees – Effects of Climate Change on Flowers, Bees & Possibly You](#)
- May 2021 St. Louis Public Radio: [Climate Change Is Resetting The Clock For Missouri Wildflowers. Will It Affect Their Survival?](#)
- Mar. 2021 The Source, Washington University in St. Louis: [Yes, spring flowers are blooming earlier. It might confuse bees.](#)
- Fall 2017 University of Missouri – St. Louis Magazine: Profile Article
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