

CURRICULUM VITAE

ANNA O'BRIEN

<https://amob.github.io>

Dept. of Molecular, Cellular, and Biomedical Sciences

University of New Hampshire

46 College Rd

Durham, NH, 03824

CURRENT APPOINTMENT

Assistant Professor at the University of New Hampshire, Department of Molecular, Cellular, and Biomedical Sciences.

DEGREES

- 2017 University of California Davis Population Biology PhD; Dissertation Research Title: “*The Confluence of Abiotic and Biotic Forces: Local Adaptation of Teosinte in the Context of Rhizosphere Biota and Environmental Gradients.*”
- 2010 University of Washington, Plant Biol. BS, College & Dept. Honors *summa cum laude*

AWARDS

- 2020 American Genetic Association Evolutionary, Ecological, or Conservation Genomics Research Award*
- 2015-2017 University of California Davis Plant Sciences Graduate Student Researcher Award †
- 2013-2015 The University of California Institute for Mexico and the United States Dissertation Research Grant*
- 2015-2016 Jastro Shields Research Award (*yearly, 2 total*) †
- 2012-2014 Center for Population Biology Affiliate Research Award (*yearly, 3 total*)*
- 2011-2015 National Science Foundation Graduate Research Fellowship †
- 2010 May-Garrett-Hayes Scholarship †
- 2010 Mary Gates Research Scholarship †
- 2009-2010 Frye-Hotson-Rigg Award: 2009-2010 *
- 2006-2010 National Merit Scholar Award †

* research funds; † fellowship or scholarship

PUBLICATIONS

IN PRINT OR IN PRESS

23. Lins, TF*, **AM O'Brien**, M Zargartalebi, D Sinton. Nanoplastic state and fate in aquatic environments: Multi-scale modeling. *Environmental Science Technology* 56 (**2022**): 4017-4028
22. Laurich, J*, **AM O'Brien**. Plants: Why do sunflowers have invisible colors?. *elife* 11 (**2022**): e76105.
21. **O'Brien, AM**, TF Lins*, Y Yang, ME Frederickson, D Sinton, CM Rochman. Microplastics shift impacts of climate change on a plant-microbe mutualism: Temperature, CO₂, and tire wear particles. *Environmental Research* 203 (**2022**): 111727.
20. **O'Brien, AM**, NA Ginnan, M Rebolleda-Gómez, MR Wagner. Microbial effects on plant phenology and fitness. *American Journal of Botany* 108(**2021**):1824-1837.

19. **O'Brien, AM**, TL Harrison*. Host match improves root microbiome growth. *Nature microbiology* 6 (2021): 1103-1104.
18. Guo, Y*, **AM O'Brien**, TF Lins*; RS Shahmohamadloo, XO Almirall, CM Rochman, D Sinton. Effects of hydrogen peroxide on cyanobacterium *Microcystis aeruginosa* in the presence of nanoplastics. *ACS ES&T Water* 1 (2021): 1596-1607
17. Chibwe, L, JL Parrott, K Shires, H Khan, S Clarence, C Lavalle, C Sullivan, **AM O'Brien**, AO De Silva, DCG Muir, CM Rochman. A deep dive into the complex chemical mixture and toxicity of tire wear particle leachate in fathead minnow. *Environmental Toxicology and Chemistry* 0 (2021): 1-10.
16. **O'Brien, AM**, CN Jack, ML Friesen, ME Frederickson. Whose trait is it anyways?: Coevolution of joint phenotypes and genetic architecture in mutualisms. *Proceedings of the Royal Society B: Biological Sciences* 288 (2020): 20202483
15. Batstone, RT*, **AM O'Brien**, TL Harrison*, ME Frederickson. Experimental evolution makes microbes more cooperative with their local host genotype. *Science*. 370 (2020): 476-478.
14. **O'Brien, AM**, J Laurich*, E Lash, ME Frederickson. Mutualistic outcomes across plant populations, microbes, and environments in the duckweed *Lemna minor*. *Microbial Ecology* (2020): 1-14.
13. Yang, Y, Y Guo*, **AM O'Brien**, TF Lins*, C Rochman, D Sinton. Biological responses to climate change and nanoplastics are altered in concert: full-factorial screening reveals interactive effects. *Environmental Science & Technology* 54 (2020): 2401-2410.
12. **O'Brien, AM**, ZH Yu*, D Luo*, J Laurich*, E Passepport, ME Frederickson. Resilience to multiple stressors in an aquatic plant and its microbiome. *American Journal of Botany* 107 (2019): 273-285.
11. **O'Brien, AM**, RJH Sawers, SY Strauss, J Ross-Ibarra. Adaptive phenotypic divergence in an annual grass differs across biotic contexts. *Evolution* 73 (2019): 2230-2246.
10. **O'Brien, AM**. Importance of plant- and microbe-driven metabolic pathways for plant defence. *Molecular Ecology* 28 (2019): 1582-1584. *Invited commentary*.
9. **O'Brien, AM**, RJH Sawers, J Ross-Ibarra, SY Strauss. Evolutionary responses to conditionality in species interactions across environmental gradients. *The American Naturalist* 192 (2018):715–730.
8. Persson, T, K Battenberg*, IV Demina, T Vigil-Stenman, B Vanden Heuval, P Pujic, MT Facciotti, EG Wilbanks, **A O'Brien**, P Fournier, and others. *Candidatus* Frankia Datiscae Dg1, the Actinobacterial Microsymbiont of *Datisca glomerata*, Expresses the Canonical nod Genes *nodABC* in Symbiosis with Its Host Plant. *PloS one* 10 (2014): e0127630–e0127630.
7. Lu-Irving P, N O'Leary, **A O'Brien**, RG Olmstead. Resolving the genera *Aloysia* and *Acantholippia* within tribe Lantaneae (Verbenaceae) using chloroplast and nuclear sequences. *Systematic Botany* 39 (2014): 644-655.
6. **O'Brien, AM**, AK Ettinger, J HilleRisLambers. Conifer growth and reproduction in urban forest fragments: Predictors of future responses to global change? *Urban Ecosystems* 15 (2012): 879-891.

PREPRINTS AND SUBMISSIONS

5. **O'Brien, AM**¹, ZH Yu*¹, C Pencer*, ME Frederickson, GH LeFevre, E Passport. Harnessing plant-microbiome interactions for bioremediation across a freshwater urbanization gradient.

In Review. 1. Authors contributed equally

4. De Frond HL*, **AM O'Brien**, CM Rochman. Representative subsampling methods for the chemical identification of microplastic particles in environmental samples *In Review*.
3. **O'Brien, AM**, RJH Sawers, J Gasca-Pineda, I Baxter, LE Eguiarte, J Ross-Ibarra, SY Strauss. Strengthened mutualistic adaptation between teosinte and its rhizosphere biota in cold climates. *In Review*. Available on bioRxiv: <https://doi.org/10.1101/2021.04.20.440703>
2. Lins, TF*, **AM O'Brien**, T Kose, CM Rochman, D Sinton. Temperature- and salinity-dependent toxicity of nanoplastics on zooplankton. *In Review*.
1. **O'Brien, AM**, J Laurich*, ME Frederickson. Having the 'right' microbiome matters for host trait expression and the strength of mutualism between duckweeds and microbes *In Review*. Available on bioRxiv: <https://doi.org/10.1101/2022.02.10.479958>

IN PREP

O'Brien, AM, T Kose, TF Lins, O Pogoutse, A Harkess, S Wright, D Sinton, ME Frederickson. Epigenetic and microbiome inheritance of salt tolerance in urban-adapted duckweed revealed by phenotype automation.

O'Brien, AM, A Harkess, ME Frederickson, S Wright. Diversity of cytosine methylation in *Lemna minor*. *Expected submission based on funding to Heredity*.

O'Brien, AM, C Knox*, ME Frederickson. Environmental factors affecting microbiome composition an aquatic plant.

**Graduate or undergraduate student with whom I collaborated closely as a mentor or peer*

TEACHING & MENTORING

APPOINTMENTS

2020	Course Instructor	Seminar in Ecol. & Evol. Biol. EEB495H1S, Univ. of Toronto
2017	Reader	Intro Biology BIS 2B, University of California Davis
2016	Teaching Assistant	Intro Biology BIS 2B, University of California Davis
2013	Teaching Assistant	Angiosperm Systematics PLB 108, UC Davis
2013	Teaching Assistant	Intro Biology BIS 2B, University of California Davis

UNDERGRADUATE MENTEES

Dian-ya Luo: 2018 - 2021*	Clara Pencer: 2018 - 2019*
Marcio Amancio de Carvalho: 2019 - 2021	Julie Wang: 2018
Sydney Ackermann: 2019 - 2020	Farida Samad-zada: 2017 - 2018
Sabina Pang: 2019 - 2021*	Amoi Campbell: 2017*
Adeena Zahid: 2019	Kevin Boardman: 2016 - 2017*
Colleen Metcalf: 2019	Olivia Jackson: 2016
Hannah Solway: 2019	Abenamar Gordillo-Hidalgo: 2014*
Theodora Udounwa: 2019	Carlos Fabián de la Cruz: 2014*
Vicki Zhang: 2018 - 2019	
Christopher Knox: 2018 - 2019*	
Avery Schwarz: 2018 - 2019*	

**independent project students*

SYNERGISTIC ACTIVITIES

Within the last year (approximately) I have reviewed articles or grants for: Trends in Microbiology, The American Naturalist, Journal of Hazardous Materials, Annals of Botany, eLife, Evolution Letters, Nature Microbiology, Environmental Science and Pollution Research, Nature Communications,

Ecology, Molecular Ecology

- 2021 Jul-Dec, Chair of EEB Allyship Network, University of Toronto, *membership through March 2022*
- 2021 April, interviewed by Toronto Nature Now with Ryerson University
- 2020 November, quoted source for an article on tire wear particles for the Christian Science Monitor <https://www.csmonitor.com/Environment/2020/1109/A-pollution-solution-where-the-rubber-meets-the-road>
- 2020 October, blog for North American Youth Parliament for Water (with co-authors). <https://www.alliance4water.org/blog-posts/drops-of-change-fighting-against-freshwater-pollution-in-a-changing-climate>
- 2020 Presenter for Broadening Representation & Equity With Science (BREWS), series at U Toronto, Dept. of Ecology and Evolutionary Biology, "Investigating the Diversity of EEB Invited Speakers."
- 2020 Member, Koeffler Science Reserve Outreach Committee
- 2018-2020 Judge at the EEB Undergraduate Research Fair (*yearly, 3 total*)
- 2019 Presenter at "Classifying the new?", Art Sci Salon public event, 21 November 2019
- 2019 Disasters Workshop presenter, U Toronto Dept. of Ecology and Evolutionary Biology
- 2018 Science Rendezvous U Toronto St. George Dept. of Ecology and Evolutionary Biology planning committee
- 2017- BREWS member U Toronto (*ongoing*)
- 2017 Mentorship for Howard University - UC Davis undergraduate exchange program: Evolution and Ecology Graduate Admission Pathways
- 2016 Founding member of Population Biology Student Diversity Committee
- 2013-2017 Planning committee for UC Davis Center for Population Biology Graduate Group Picnic Day Event (*4 of 5 years*)
- 2015 Planning committee for UC Davis Center for Population Biology Graduate Student Run Mini-Conference, 2015: Questions and Methods in Ecological Genomics
- 2014 Genotype By Sequencing data-processing workshop in TASSEL for students at LANGEBIO, CINVESTAV, Irapuato, Gto, Mexico

PRESENTATIONS

- O'Brien AM. "Consequences of species interactions for responses to stress." **Invited Seminar, Plant Seminar series, Department of Biology**, 2021 Dec 2; University of Pennsylvania.
- O'Brien AM. "Ecological and evolutionary consequences of species interactions under stress." **Invited Seminar, Department of Molecular, Cellular and Biomedical Sciences**, 2021 Jun 3; University of New Hampshire.
- O'Brien AM. "Vision and Goals for Tree Fruit Soil Microbiome and Soil-Borne Disease Research." **Invited Seminar, Wenatchee USDA ARS**, 2021 Apr 8; Wenatchee USDA ARS.
- O'Brien AM. "Ecological and evolutionary consequences of species interactions under stress." **Invited Seminar, Department of Biological Sciences**, 2021 Mar 9; University of Southern California.
- O'Brien AM. "Plant-microbiome interactions under stress". **Invited Seminar, Departamento de Ingeniería Bioquímica**; 2020 Oct 22; Instituto Tecnológico de Estudios Superiores de Irapuato, Irapuato, Gto, México.
- O'Brien AM. "Plant-microbiome interactions under stress: ecological and evolutionary conse-

quences”. **Invited Seminar, Plant Resilience Institute**; 2020 Sep 29; Michigan State University.

O'Brien AM. “Urban runoff and the evolutionary ecology of aquatic plant-microbiome interactions”. **Talk: Credit Valley Conservation Research Colloquium**; 2019 Nov 29; Mississauga, ON.

O'Brien AM, J Laurich, ME Frederickson. “Host-Microbiome interactions under stress: ecology and evolutionary history”. **Talk: Evolution 2019**; 2019 Jun 21-25; Providence, Rhode Island. Recorded, available: <https://www.youtube.com/watch?v=IbpcHXtwtMk>

O'Brien AM, J Laurich, ME Frederickson. “Host-Microbiome interactions under stress”. **Talk: Atwood Colloquium**; 2019, Apr 12-13; Toronto, ON.

O'Brien AM, J Laurich, ME Frederickson. “Urban Contamination and Adaptation between Duckweed and Microbes”. **Talk: Canadian Society for Evolution and Ecology**; 2018, Jul 19-21; University of Guelph, Guelph, ON.

O'Brien AM, J Laurich, ME Frederickson “Urban Contamination and Adaptation between Duckweed and Microbes”. **Talk: Green Life Symposium 2018**, Sep 27-28, University of Michigan, Ann Arbor, Michigan.

O'Brien, AM. “Co-influence of Biotic and Abiotic Environments on Plant Local Adaptation.” **Invited Seminar at University of Toronto**; 2018, Oct 30; Toronto, ON.

O'Brien, AM, J Ross-Ibarra, RJH Sawers, SY Strauss “Evolutionary responses to conditionality in species interactions across environmental gradients.” **Talk: ESA Annual Meeting 2017**; 2017, August 6; Portland, OR.

O'Brien, AM, RJH Sawers, SY Strauss, J Ross-Ibarra. “Adaptative divergence in a biotic context: role of plant-rhizosphere interactions and climate in phenotypic divergence of teosinte.” **Talk: Evolution 2016**; 2016, June 21; Austin, TX.

O'Brien AM. “Environmental gradients shape adaptation in interactions between teosinte and soil biota,” **Invited Seminar CINVESTAV**; 2016, March 08; Irapuato, Gto, Mexico.

SKILLS

Bioinformatics (R, unix and bash), **statistical analyses** (bayesian and environmental niche modeling), **genetic analyses** (GBS, GWAS, 16S rDNA), **methods** (PCR, DNA extractions, arbuscular mycorrhizal assays), **Spanish**