# Nathan C. Emery

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## *Education*

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|---|---|
| 2009-2016 | **Ph.D. in Ecology, Evolution and Marine Biology**<br>University of California Santa Barbara<br>Advisor: Dr. Carla D'Antonio |
| 2003-2007 | **B.Sc. Biology, Graduation with Distinction**<br>Duke University |

## *Appointments*

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|---|---|
| 2021-present | **Academic Specialist,** Great Lakes Bioenergy Research Center, Michigan State University |
| 2019-2021 | **Postdoctoral Research Associate**, Plant Biology Department and Great Lakes Bioenergy Research Center, Michigan State University (with Dr. David Lowry) |
| 2016-2019 | **Postdoctoral Research Associate**, Plant Biology Department, Michigan State University. NSF-Funded project: "Longitudinal study of teaching practices in early-career biology faculty." (with Dr. Diane Ebert-May) |
| 2008 | **Eastern Oregon Field Ecologist**, The Nature Conservancy of Oregon |
| 2007 | **Ecology Research Technician**, Isla Juan Fernandez, Chile (via the University of Chicago) |

## *Teaching Experience*

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| 2022 | **Co-Instructor of Record**, Ecology, Michigan State University<br>• Co-teaching a 180-student online course |
| 2021 | **Guest Lecturer**, Conservation Stewards Program, Michigan State University |
| 2021 | **Guest Lecturer**, Environmental Conservation/Climate Change, St. Edward's University |
| 2021 | **Co-Instructor of Record**, Introductory Biology 240, San Francisco State University<br>• Co-taught a 200-student online course focused on protists, plants and fungi |
| 2018 | **Instructor of Record**, Introductory Biology 162, Michigan State University<br>• Taught a 200-student introductory biology course<br>• Led to publication of tree phenology lesson (Emery et al. 2019, *CourseSource*) |
| 2017 | **Co-Instructor of Record**, Introductory Biology 162, Michigan State University<br>• Co-taught a 200-student introductory biology course<br>• Co-designed and implemented a course-long project consisting of students collecting, visualizing, and analyzing tree phenology patterns. |
| 2014-2016 | **Instructor of Record**, General Plant Ecology, UC Santa Barbara<br>• Designed and taught a course for 50-85 upper-division ecology students<br>• Developed a course-long research proposal writing assignment.<br>• Led to publication of research proposal lesson (Emery 2016, *EcoEDigital Library*) |
| 2015 | **Instructor of Record**, Ecology and Management of California Wildlands, UC Santa Barbara<br>• Taught a 24-student field course with weekly trips to California's ecosystems |
| 2015 | **Academic Coordinator**, Introductory Biology Lab Course, UC Santa Barbara<br>• Trained and supervised eight teaching assistants to teach lab activities |

- Developed lab quizzes, coordinate grading and maintain course website

2012-2013 **Curriculum development for Teaching Assistants**, UC Santa Barbara

- Co-developed a curriculum for the "Teaching Techniques for Teaching Assistants" course for the Biology departments with the course instructor

2010-2016 **Teaching Assistant**, UC Santa Barbara

- Led multiple Introductory Biology Lab Series 1, 2 and 3 (25 students each)
- Led the lab component of Foundations of Ecosystem Restoration (2012-2014)
- Led discussion sections for Ecology and Management of California Wildlands
- Led discussion sections for Introduction to Ecology

## *Peer-Reviewed Publications (Google Scholar Page)*

* indicates undergraduate author

21. **Emery, N.**, Crispo, E., Supp, S., Kerkhoff, A., Aiello-Lammens, M., Bledsoe, E., O'Donnell, K., and A. McCall. 2021. Data Science in Undergraduate Life Science Education: A Need for Instructor Skills Training. *BioScience* biab107

20. Berry, Z. C., Ávila-Lovera, E., De Guzman, M. E., and K. O'Keefe, and **N. Emery.** 2021. Beneath the bark: woody stem water and carbon fluxes and the implications for stem-atmosphere exchange and plant function. *Frontiers in Forests and Global Change* 4.

19. **Emery, N.**, Maher, J. M., and D. Ebert-May. 2021. Environmental influences and individual characteristics that affect learner-centered teaching practices. *PLOS One*

18. McNicol, G., Yu, Z., Berry, Z. C., **Emery, N.**, Soper, F., and W. Yang. 2021. Stable isotope ecology: Tracing plant-environment interactions from organismal to planetary scales. *Emerging Topics in Life Sciences*

17. Lott, S.* and **N. Emery.** 2021. The effect of leaf morphological traits and wet deposition on hydrophobicity. *RURALS: Review of Undergraduate Research in Agricultural and Life Sciences*

16. **Emery, N.**, Bledsoe, E., Hasley. A., and C. D. Eaton. 2020. Cultivating inclusive educational and research environments in ecology and evolution. *Ecology & Evolution*

15. **Emery, N.**, Maher, J. M., and D. Ebert-May. 2020. Early-career faculty practice learner-centered teaching up to 9 years after postdoctoral professional development. *Science Advances* 6, eaba2091

14. Alund, M. †, **Emery, N.**†… and E. Gering. 2020. Academic ecosystems must evolve to support a sustainable postdoc workforce. *Nature Ecology & Evolution* 4, 777–781. (†Co-first author)

13. Doerr, A., **Emery, N.**, Ficken, C., Scherer, A., Fullman, T. and M. Reichenborn. 2020. Human dimensions: Professional development for the everyday early career ecologist. *Bulletin of the Ecological Society of America* 00(00):e01695

12. **Emery, N.**, Roth, K., and A. Pivovaroff. 2019. Flowering phenology indicates plant flammability in a dominant shrub species. *Ecological Indicators*, 109, 105745

11. **Emery, N.**, Maher, J. M., and D. Ebert-May. 2019. Professional Development in STEM Higher Education: Studying the Educational Ecosystem. *Innovative Higher Education* 44(6), 469-479.

10. **Emery, N.**, Trujillo, C., Jarosz, A., and T. Long. 2019. Quantifying and Visualizing Campus Tree Phenology. *CourseSource*.

9. **Emery, N.**, Hund, A., Burks, R., Duffy, M., Scoffoni, C., and A. Swei. 2019. Students as ecologists: Strategies for successful mentorship of undergraduate researchers. *Ecology and Evolution*, 9: 4316–4326

8. Pivovaroff, A. L., **Emery, N.**, Sharifi, M. R., Witter, M., Keeley, J. E., & P. W. Rundel. 2019. The Effect of Ecophysiological Traits on Live Fuel Moisture Content. *Fire*, 2(2), 28.

7. VanWallendael, A., Soltani, A., **Emery, N. C.**, Peixoto, M. M., Olsen, J., & D. B. Lowry. 2019. A Molecular View of Plant Local Adaptation: Incorporating Stress-Response Networks. *Annual Review of Plant Biology*, 70.

6. Berry, Z. C., **Emery, N. C.**, Gotsch, S. G., & G. R. Goldsmith. 2019. Foliar water uptake: processes, pathways, and integration into plant water budgets. *Plant, Cell & Environment*, 42(2), 410-423.

5. **Emery, N.**, C. M. D'Antonio, and C. J. Still. 2018. Fog and live fuel moisture in coastal California shrublands. *Ecosphere*, 9(4)

4. **Emery, N.** 2016. Foliar uptake in coastal California shrub species. *Oecologia*. 182(3), 731-742.

3. **Emery, N.** 2016. Writing an Ecology Research Proposal. *EcoEDigital Library*. Ecological Society of America.

2. **Emery, N.** and J. Lesage*. 2015. Late summer fog use in the drought deciduous shrub, Artemisia californica (Asteraceae). *Madroño*. 62: 150-157.

1. Chen, X., **Emery, N.**, Garcia, E. S., Hanan, E. J., Hodges, H. E., Martin, T., ... & C. Tague. 2013. Perspectives on disconnects between scientific information and management decisions on post-fire recovery in western US. *Environmental management*, 1-12.

## *Other Publications*

Ebert-May, D. and **N. Emery**. 2017. Teaching like a scientist: assessing your assessments. *Frontiers in Ecology and the Environment*, 15(5), 227-227.

## *Publications in progress (available upon request)*

Ma, S., **Emery, N.**, and C. M. D'Antonio. Short-Interval Fires and Vegetation Change in Southern California. *In Review, BioRxiv*: https://doi.org/10.1101/2021.05.08.443193

## *Grants and Fellowships*

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| 2021 | **NSF RCN-UBE** – *Co-PI* – "The Biological and Environmental Data Education Network: Preparing instructors to integrate data science into undergraduate biology and environmental science curricula" ($500,000) |
| 2019 | **Environmental Data Science Inclusion Network & Quantitative Undergraduate Biology Education and Synthesis Open Education Fellow** ($2,200) |
| 2016 | **Coastal Fund Grant,** UCSB Associated Students ($584) |
| 2014-2015 | **Ecology, Evolution and Marine Biology Block Grant**, UCSB ($10,000) |
| 2014 | **Isotope Inter-University Training for Continental-scale Ecology Fellowship** ($4,043) |
| 2013-2014 | **Ecology, Evolution and Marine Biology Block Grant**, UCSB ($1,500) |
| 2013 | **Instruction Improvement Grant**, Office of Instructional Development, UCSB ($2,000) |
| 2013 | **Ellen Schamberg Burley Graduate Scholarship**, UCSB ($700) |
| 2013 | **NSF Doctoral Dissertation Improvement Grant**, NSF ($16,766) |
| 2013 | **Mildred Mathias Research Grant**, UC Natural Reserve System ($1,900) |

*Submitted but not funded*

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| 2020 | **MSU - Partnerships for Innovative Research in Africa** – *Co-PI* - "Systems thinking for improving plant science education outcomes in undergraduate courses" ($50,000) |
| 2016, 2017 | **NSF-IOS Proposal** – *Senior Personnel* – "Inward Bound: Determining the drivers, ecological variation, and importance to physiological functioning of foliar water uptake and improving predictions of plant responses to climate change through process-based modelling" |

## *Education leader/organizer*

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| 2021 | **Biological and Environmental Data Education Network**, NSF Research Coordination Network – Undergraduate Biology Education<br>• Co-PI on 5 year grant to train undergraduate instructors in evidence-based teaching practices and how to best incorporate data science skills into life science courses |
| 2021 | **Four-Dimensional Ecology Education Framework (4DEE): Assessment Working Group**, Ecological Society of America |
| 2017 - 2021 | **Backward Design and Inclusive Pedagogy Workshop,** ESA Annual Meetings<br>• Designed and led a professional development workshop for ESA attendees |
| 2020 | **Backward Design and Inclusive Pedagogy Workshop**, Michigan State University<br>• Designed and led a professional development workshop for MSU postdocs |
| 2019-2020 | **Open Education Fellow,** Environmental Data Science Inclusion Network (EDSIN) and Quantitative Undergraduate Biology Education and Synthesis (QUBES)<br>• A leadership program for life science, math biology, statistics, and ecoinformatics educators interested in inclusive data science education<br>• Led to collaborative publication (Emery et al. 2020, *Ecology & Evolution*) |
| 2019-2020 | **Biological and Environmental Data Education Network,** NSF Incubator<br>• Our goal is to use data science education to make the life and environmental sciences more accessible, transparent, reproducible, and relevant. |
| 2018 | **Students as Ecologists: Collaborating with Undergraduates from Scientific Question to Publication,** Ecological Society of America Annual Meeting<br>• Organizer/Moderator for INSPIRE Session. Led to collaborative publication (Emery et al. 2019 *Ecology & Evolution*) |
| 2017 - 2020 | **Biology Curriculum committee,** Michigan State University |

- Participating in committees dedicated to curricula alignment

2017 **Backward Design Workshop,** UC Santa Barbara
- Designed and led a professional development workshop for graduate students, postdocs and early-career faculty in the STEM disciplines

2012, 2013 **TA Orientation Workshop Leader and Panelist**, UC Santa Barbara

## *Mentorship*

2021 **NSF REU**, Kellogg Biological Station, Michigan State University
- Guided Milagros Hernandez Jimenez through an independent research project
- Milagros is presenting her work at the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science conference and preparing her research for publication

2021 **Mentor Judge,** Society for Advancement of Chicanos/Hispanics and Native Americans in Science Annual Conference
- Mentoring several student presenters to improve their research presentations and help them navigate the online conference

2020-2021 **R Stats Working Group**, Michigan State University
- Leading a group of post-docs, students, and technicians through learning the basics of R, data management, and statistical analysis

2020 **Writing Group Leader**, Michigan State University
- Organized and led a writing/editing group with lab technicians and an REU student as they worked on manuscripts for publication

2018-2019 **Research Mentor**, Plant Biology 498, Michigan State University
- Guided Steven Lott through an independent research project complete with poster, oral presentation, and writing of a manuscript for publication (Lott and Emery 2021*, RURALS*)

2011-2016 **Research Mentor**, UC Santa Barbara
- Mentored Josie Lesage, Aria Bauman, and Monica Lee through their respective senior thesis projects that resulted in written papers and presentations at on-campus research symposia. One has been published (Emery and Lesage 2015*, Madroño*)
- Involved over 15 other students in my research program

2013 **Summer Institute for Math and Science Mentor**, UC Santa Barbara
- Mentored four incoming freshmen on an independent research project to demonstrate the scientific method

2012 **Jack Kent Cooke Bridges Mentor**, UC Santa Barbara
- Mentored four community college students for a one-week intensive program to learn about research methods and the scientific process which resulted in a presentation.

2012 **Summer Research Mentorship Program**, UC Santa Barbara
- Mentored a high school student: Together we developed a research study, conducted fieldwork, analyzed data. Student gave a final presentation to faculty and peers.

## *Awards*

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| 2021 | **Outstanding Postdoctoral Award ($500)**, Plant Biology Department, MSU |
| 2019 | **Education Section Paper Award**, Ecological Society of America |
| 2016 | **Vernon Cheadle Award,** Cheadle Center for Biodiversity and Ecological Restoration |
| 2015 | **Doctoral Student Travel Grant,** UC Santa Barbara |
| 2013 | **Graduate Student Association Excellence in Teaching Award**, UC Santa Barbara |
| 2012 | **California Native Plant Society Education Award,** CNPS |
| 2011, 2013 | **Worster Award** for Graduate and Undergraduate Research Pairing, UC Santa Barbara |

## *Scientific Presentations*

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| 2021 | Posters: **There and Back Again: Intraspecific plant physiological responses to multiple droughts and recovery in a perennial C4 grass**<br>American Society of Plant Biology Annual Conference, Ecological Society of America: 106th Annual Meeting |
| 2021 | Invited Talk: **Cultivating inclusive instructional and research environments in ecology and evolutionary science** – University of Minnesota |
| 2020 | Presentation & breakout session: **Integrating R programming skills into existing data-centric learning activities**<br>ESA Life Discovery Conference 2020 |
| 2020 | Lightening talk: **Switchgrass from the sky**<br>Great Lake Bioenergy Research Center Virtual Sustainability Symposium |
| 2020 | Talk: **Modeling the factors that influence learner-centered teaching over time**<br>Ecological Society of America: 105th Annual Meeting |
| 2019 | Invited Talk: **Self-Efficacy and persistence of teaching professional development**<br>Bowling Green State University |
| 2019 | Talk: **Persistence of professional development in early-career biology faculty**<br>Ecological Society of America: 104th Annual Meeting |
| 2019 | Talk: **Persistence of professional development outcomes and self-efficacy in early-career faculty**<br>Society for the Advancement of Biology Education Research meeting |
| 2018 | Poster: **When flowers fade, fire risk grows: Phenology predicts flammability in semi-arid shrublands**<br>Poster: **Professional development: Evidence for predicting teaching practices in early-career biology faculty**<br>Ecological Society of America: 103rd Annual Meeting |
| 2018 | Poster: **Evidence for Predicting Teaching Practices in Early-Career Biology Faculty**<br>Teaching & Learning Spring Conference, Michigan State University |
| 2017 | Talk: **Coastal fog and plant flammability in California shrublands**<br>Talk: **Factors that predict teaching practices of early-career biology faculty**<br>Ecological Society of America: 102nd Annual Meeting |
| 2017 | Poster: **Contextual factors that impact early-career faculty teaching practices**<br>Society for the Advancement of Biology Education Research west conference |
| 2015 | Co-organizer and presented in the Organized session: **Head in the clouds: How fog and dew affects ecosystems around the world.**<br>Ecological Society of America: 100th Annual Meeting |
| 2014 | Poster: **Fog Water Use in Coastal California Shrub Species**<br>American Geophysical Union: Fall Meeting |

2014 Talk: **Coastal fog effects on live fuel moisture of California shrublands**
MEDECOS XIII: Crossing Boundaries across Disciplines and Scales (Chile)

2014 Talk: **Foliar uptake and physiology of California shrub species**
Ecological Society of America 99th Annual Meeting

2013 Talk: **Fog water use in coastal California shrublands**
Ecological Society of America 98th Annual Meeting

2012 Talk: **How does fog affect fuel moisture?**
California Native Plant Society Conservation Conference

## *Professional Development/Training*

Present **Language fluency**: Proficient in reading, writing and speaking Spanish.

2021 **Equity and Diversity Facilitator Training,** University of Wisconsin Madison

2021 **Cultural Competency Training for Personal, Organizational and Community Change**, College of Natural Science, Michigan State University

2021 **Ecology and Justice Discussion Workshop**, Cary Institute of Ecosystem Studies

2021 **MSU Dialogues Program: Building Inclusive Communities**, Michigan State University

2020 **DEI Foundations course**, Michigan State University

2019 **Future Faculty Teaching Summit**, Center for the Integration of Research Teaching and Learning

2018 **PhysFest II: Short course in plant ecophysiology**, Holden Arboretum/Kansas State University

2018 **Student Success Summit and 2018 Teaching & Learning Spring Conference,** Michigan State University

- Participated in workshop on data-driven assessment of student learning

2017 **BioQuest/QUBES Workshop,** Making Meaning through Modeling: Problem solving in biology

2017 **Advanced Learning through Evidence-Based STEM Teaching Course**, Center for the Integration of Research Teaching and Learning

2016 **Universal Design in Learning: Reaching and Teaching Diverse Learners**, Center for the Integration of Research, Teaching and Learning

2016 **Pathways to Scientific Teaching Course**, Michigan State University

2016 **Certificate in College and Undergraduate Teaching**, UC Santa Barbara

2016 **Geographic Information Systems course**, Bren School of the Environment, UC Santa Barbara

2015 **Software Carpentry R workshop**, UC Santa Barbara

2015 **Advanced Remote Sensing course**, UC Santa Barbara

2013 **Summer Teaching Institute for Associates**, UC Santa Barbara

2011 **Stable Isotopes in Ecology workshop**, University of Utah

2011 **Advanced Biostatistics course**, UC Santa Barbara

2005 **Costa Rica study abroad program**, Organization for Tropical Studies

## *Professional Service*

**Peer-Reviewer for**: "International Journal of Wildland Fire", "American Journal of Botany", "CBE Life Science Education", "Tree Physiology", "CourseSource", "Physical Review Physics Education Research", "Annals of Botany", "Plant, Cell, and Environment", "Plant Ecology", "Planta", "Journal of Geophysical Research – Biogeosciences", "Ecology & Evolution", "Frontiers in Psychology", "Science

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| | Advances", "Science of the Total Environment", "Journal of Geophysical Research – Biogeosciences", "Ecology & Evolution", "BioScience" |
| 2019-present | **Associate Editor,** CourseSource<br>• An open-access journal of peer-reviewed teaching resources for undergraduate biology and physics |
| 2021-present | **Equity, Diversity, and Community Committee member**, Great Lakes Bioenergy Research Center |
| 2021 | **Sustainability Meeting Planning Committee member**, Great Lakes Bioenergy Research Center |
| 2021 | **Plant Ecology Faculty Search Committee member**, Plant Biology Department, Michigan State University |
| 2019-2022 | **Publications Committee member**, Ecological Society of America |
| 2019 | **Search Committee member** for Office of Postdoctoral Affairs Director, Michigan State University |
| 2018-2019 | **Professional Development Committee Chair**, Michigan State University – Postdoc Association |
| 2018-2019 | **Chair**, Ecological Society of America Early-Career Ecologists Section<br>• Attended ESA Governing Board meetings and ran section activities/programs |
| 2017-2018 | **Vice-Chair**, Ecological Society of America Early-Career Ecologists Section<br>• Organized and led a professional development webinar series |
| 2013-2014 | **UC Natural Reserve System Graduate Student Representative**, UC Santa Barbara |
| 2011-2013 | **Departmental Seminar Series Coordinator**, EEMB, UC Santa Barbara |

## *Professional Membership*

Ecological Society of America

Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)

## *Press & Outreach*

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| 2021 | **"Got Data? Instructors surveyed on using, teaching data science in life science courses"** (https://natsci.msu.edu/news/got-data-instructors-surveyed-on-using-teaching-data-science-in-life-science-courses/) |
| 2020 | **The Science Pawdcast** (https://bunsenbernerbmd.buzzsprout.com/413041/3218998-season-2-episode-10-peak-cuteness-in-puppies-and-plants-with-dr-nate-emery) |
| 2020 | **Biology on Tap,** Grand Rapids, Michigan |
| 2018-2020 | **Skype a Scientist** |
| 2017-2018 | **#ClimateChanged Blog author**, Plant People |
| 2017 | **Biology on Tap,** Lansing, Michigan.<br>• Two different science café talks on wildfires and non-native plants |
| 2015 | **SciTrek**, UC Santa Barbara Chemistry Department.<br>• Taught 7$^{th}$ graders about electrochemistry |
| 2015 | **Science on Site**, SB Museum of Natural History.<br>• Taught visitors how to do stomatal peels to learn about gas exchange |
| 2013-2016 | **Scienceline contributor** for educational outreach, UCSB<br>• Answered science questions from students of all ages |

2010-2016 **Santa Barbara County Science Fair Judge (High school students)**, UCSB

2014 **SciencePub** hosted by the Santa Barbara Natural History Museum
Talk: *California on Fire: How native plants respond to wildfire*

2014 **Santa Barbara Native Plant Society**, Talk - Fog use in shrub species

2014 **Santa Barbara Fire Safety Council**, Talk - Fuel moisture research

2013 **Master Gardeners of Santa Barbara County,** Talk - Fire disturbance

2013 **SciencePub** hosted by the Santa Barbara Natural History Museum
Talk: *I invade with a little help from my friends: How plants have moved around the world*

2013 **The Santa Barbara Sentinel** article about my research, pg. 23
Title: *June Gloom is Good (Sort Of)*