

Hannah M. Carroll, Ph.D.

Department of Earth, Planetary, and Space Sciences, University of California, Los Angeles

Curriculum Vitae

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Education

Ph.D., Ecology and Evolutionary Biology 2020

Co-major: Environmental Science

Iowa State University, Ames

Dissertation: “Late Quaternary Paleoecology of the North American Midcontinent”

Advisors: Dr. Lynn G. Clark and Dr. Alan D. Wanamaker

B.Sc., Environmental Science 2008

University of Washington, Tacoma

Thesis: “Evaluating Conditions in *In-Situ* Mesocosms”

Advisor: Dr. Bonnie J. Becker

Postdoctoral Training

IRACDA@UCLA Postdoctoral Fellow 2020 - present

Department of Earth, Planetary, and Space Sciences, University of California, Los Angeles

- Postdoctoral fellow in the NIH-funded Institutional Research and Academic Career Development Awards (IRACDA) program
- Participate in CIRTL training leading to undergraduate teaching certification at the Scholar level
- Conduct research in functional paleoecology in the labs of Drs. Nathan Kraft and Aradhna Tripathi
- Engage in mentorship of graduate and undergraduate STEM students

Early Career Fellow, Center for Diverse Leadership in Science 2020 - present

- Engage in ongoing training in the implementation of anti-racist practices in teaching and research
- Engage in outreach promoting diversity, equity, and inclusion in the sciences

Postdoctoral Research Associate 2020

Department of Ecology, Evolution, and Organismal Biology, Iowa State University, Ames, IA

- Conducted analyses on high resolution limnological data in the lab of Dr. Grace Wilkinson using high-powered computing.

Awards and Honors

Iowa State University Graduate College Research Excellence Award	2020
This award is to recognize academically superior graduate students for outstanding research accomplishments as documented in their theses and dissertations.	
Department of Ecology, Evolution, and Organismal Biology Senior Assistantship	2019
Competitive research assistantship provides one semester of stipend, tuition, and benefits.	
Iowa State University Professional and Scientific Team Citation Award	2017
Presented to the members of the ISU Stormwater Management Committee.	
This award honors a team that: 1) has performed above and beyond the call of duty,	
2) has done something extraordinarily well, and	
3) has acted in such a way as to make a significant impact on the institution within the past year.	
Iowa State University Graduate College Teaching Excellence Award	2016
This award honors the top 10% of graduate students at ISU for outstanding teaching, as evaluated by their academic departments.	
Participant, {GeoChronR} Workshop	2016
Competitive-entry 3-day workshop hosted at Northern Arizona University in time-uncertain data analysis using the GeoChron package for R.	
NSF-funded; travel, room and board, and workshop entry expenses paid.	
Organizers: Nick McKay, Julien Emile-Geay	

Peer-Reviewed Publications

- Ulrich, R.N., M. Guillermin, J. Campbell, A. Hakim, R. Han, S. Singh, J.D. Stewart, C. Román-Palacios, **H.M. Carroll**, I. De Corte, R.E. Gilmore, W. Doss, A. Tripathi, J.B. Ries, and R.A. Eagle. In press. Patterns of trace element incorporation in carbonate biominerals recapitulate phylogeny for diverse marine organisms. *Frontiers in Earth Science, Special Issue: Proxies and biomineralisation: From the lab bench to paleoenvironments*.
- Wamboldt, J.J., A.D. Wanamaker, **H.M. Carroll**, R. Schultz, and J.E. Morris. 2020. Trophic dynamics of a reservoir fishery following an introduction of a top predator: Insights from stable carbon and nitrogen isotopes. *Fisheries Management and Ecology*. 27:531–539. DOI: <http://dx.doi.org/10.1111/fme.12445>
- Carroll, H.M.**, A.D. Wanamaker, L.G. Clark, and B.J. Wilsey. 2020. Ragweed and sagebrush pollen can distinguish between vegetation types at broad spatial scales. *Ecosphere* 11(5):e03120. DOI: <https://doi.org/10.1002/ecs2.3120>
- Carroll, H.M.**, D.D. Houston, S. Ankerstjerne, and A.D. Wanamaker, Jr. Available online Dec. 31, 2019. Using light stable isotopes to assess stream food web ecology in a general ecology laboratory course. *Journal of Biological Education*. DOI: <https://doi.org/10.1080/00219266.2019.1707263>

Peer-Reviewed Publications (Submitted or In Prep)

*Indicates undergraduate co-author

- Houston, D.D., J.D. Satler, T.K. Stack*, **H.M. Carroll**, A.M. Bevan*, A.L. Moya*, and K.D. Alexander. A Phylogenomic perspective on the evolutionary history of the stonefly genus *Suwallia* (Plecoptera: Chloroperlidae) revealed by ultraconserved genomic elements. Under review at *Molecular Phylogenetics and Evolution*.

- Upadhyay, D., J. Lucarelli, A. Arnold, R. Flores, H. Bricker, R.N. Ulrich, G. Jesmok, L. Santi, W. Defliese, R. Eagle, **H.M. Carroll**, J. Bateman, V. Petryshyn, S. Loyd, J. Tang, A. Priyadarshi, B. Elliott, and A. Tripathi. Carbonate clumped isotope analysis ($\Delta 47$) of 21 carbonate standards determined via gas source isotope ratio mass spectrometry on four instrumental configurations using carbonate-based standardization and multi-year datasets.
Under revision at *Rapid Communications in Mass Spectrometry*.
- Lucarelli, J.K, **H.M. Carroll**, B. Elliott, A. Arnold, R. F., R. Eagle, A. Priyadarshi, A. Tripathi. In prep. Equilibrated gas-based carbonate standard clumped isotope ($\Delta 47$ and $\Delta 48$) values on the absolute reference frame. Target: *Rapid Communications in Mass Spectrometry*. Anticipated submission: April 2021
- Carroll, H.M.**, M. Balmer, E.Q. Albright, T.J. Butts, Q. Shingai, G.M. Wilkinson. In prep. Spatiotemporal complexity of microcystin production in a hypereutrophic reservoir.
Target: *Limnology and Oceanography*. Anticipated submission: April 2021.
- Cox, M., **H.M. Carroll**, T. Gallaher, H.T. Horner, P.C. Klahs, and L.G. Clark. In prep. Mature grass (Poaceae) root anatomy: A phylogenetic survey and potential functional correlations.
Target: *American Journal of Botany*. Anticipated submission: May 2021.
- Carroll, H.M.**, A.D. Wanamaker, and L.G. Clark. In prep. GeoPollen: An interactive, user-friendly Shiny Dashboard application for visualization and analysis of pollen data. Target: *PLOS One*. Anticipated submission: June 2021.
- Carroll, H.M.**, A.D. Wanamaker, L.G. Clark, B.E. Caissie, J.K. Galang*, and D.D. Houston. In prep. Late Quaternary vegetation, fire, and hydroclimate at the southern limit of the temperate tallgrass prairie, Missouri, USA. Target: *Quaternary Science Reviews*. Anticipated submission: July 2021.

Technical Reports

- Significant contributor**, Municipal separate storm sewer system 2017 annual report. Dept. of Environmental Health and Safety and Facilities Planning and Management. Iowa State University.
- Significant contributor**, Municipal separate storm sewer system 2016 annual report. Dept. of Environmental Health and Safety and Facilities Planning and Management. Iowa State University.
- Downing, J.A., C.T. Filstrup, D.L. Kendall, L. Whitehouse, and **H. Carroll**. 2016. A diagnostic–feasibility study for the restoration of Silver Lake, Palo Alto County. Iowa State University Limnology Laboratory and Iowa Dept. of Natural Resources.
- Downing, J.A., C.T. Filstrup, D.L. Kendall, L. Whitehouse, and **H. Carroll**. 2015. A diagnostic–feasibility study for the restoration of North and South Twin Lakes. Iowa State University Limnology Laboratory and Iowa Dept. of Natural Resources.
- Significant contributor**, Municipal separate storm sewer system 2015 annual report. Dept. of Environmental Health and Safety and Facilities Planning and Management. Iowa State University.
- Significant contributor**, Municipal separate storm sewer system 2014 annual report. Dept. of Environmental Health and Safety and Facilities Planning and Management. Iowa State University.
- Significant contributor**, Municipal separate storm sewer system 2013 annual report. Dept. of Environmental Health and Safety and Facilities Planning and Management. Iowa State University.
- Norris, J.G., I.E. Fraser, and **H. Julich**. 2012. Underwater Videographic Survey of Submerged Aquatic Vegetation in Sequim Bay, WA, August 2011. Report to Hansi Halls, Environmental Planning Manager, Jamestown S’Klallam Tribe, Sequim, WA.
- Norris, J.G., I.E. Fraser, and **H. Julich**. 2011. Defining fish use of subtidal vegetated habitats of the Elwha and comparative shorelines. Report to Cathy Lear, Clallam County Planning Biologist, Port Angeles, Washington.
- Schanz, A., **H. Julich**, L. Ferrier, and H. Berry. 2010. Eelgrass Stressor-Response Project: Report 2007–2008. Nearshore Habitat Program. Washington Dept. of Natural Resources, Olympia, WA.

Teaching

Indicates redevelopment or co-redevelopment of existing course

Indicates development of new course

Courses Taught as Instructor of Record

California State University of Los Angeles

Biol 4540: Special Topics, biological sciences journal club (co-instructor) (1 semester) 2021

Iowa State University, Ames

EnSci 490: Independent Study (6 semesters) 2014—2018
EnSci 203: Exploration of Environmental Science (5 semesters) 2014—2018
EnSci 202: Exploration of Environmental Issues (5 semesters) 2013—2017
EnSci 204X: Applied Exploration of Environmental Science I (3 semesters) 2015—2017
EnSci 205X: Applied Exploration of Environmental Science II (2 semesters) 2016—2017
Biol 486xw: Aquatic Ecology Online (1 semester) 2016
Biol 486L: Aquatic Ecology Laboratory, field & laboratory components (1 semester) 2013

Courses Taught as a Teaching Assistant

Iowa State University, Ames

Biol 312L: General Ecology Laboratory, field and laboratory components (3 semesters) 2018—2019
Biol 212L: Principles of Biology Laboratory II (1 semester) 2019
Biol 394: Study Abroad: Maya Mountains & Calabash Caye, 2015
international field course (1 semester in classroom, 2 weeks abroad in Belize)
Biol 486xw: Aquatic Ecology Online (3 semesters) 2013—2015

University of Washington, Tacoma

Undergraduate Teaching Assistant - TESC 442: Marine Ecology, field course (1 quarter) 2008

Grants

Co-Principal Investigator. **Pending.** *Risky Sex? Macroevolutionary and functional aspects of pollen and pollination in the grasses (Poaceae).* National Science Foundation.
Iowa State University Environmental Science Program Professional Development Grant 2019
Awarded for travel to the American Geophysical Union annual meeting
Iowa State University Department of Ecology, Evolution, and Organismal Biology, Harry and Audrey Finch Scholarship (Finch Funds Award). *A high-resolution, multiproxy record of climate, vegetation, and fire history at the southern limit of the temperate tallgrass prairie, USA* 2019
Awarded for travel to the American Geophysical Union annual meeting
Iowa State University Graduate and Professional Student Senate Professional Advancement Grant 2019
Awarded for travel to Botany 2019
Iowa State University Department of Ecology, Evolution, and Organismal Biology 2019
PAG funds matching. Awarded for travel to Botany 2019

Geological Society of America Graduate Student Research Grant, <i>Paleoecology of the Tallgrass Prairie-Ozark Forest Ecotone</i>	2019
Geological Society of America Graduate Student Research Grant, <i>Late Quaternary Paleoecology of the Tallgrass Prairie-Ozark Forest Ecotone</i>	2018
Iowa State University Department of Ecology, Evolution, and Organismal Biology, Harry and Audrey Finch Scholarship (Finch Funds Award), <i>Paleoecological Investigation of the Tallgrass Prairie-Ozark Forest Ecotone</i>	2016
Iowa State University Department of Ecology, Evolution, and Organismal Biology, Lois Tiffany Scholarship Award, <i>Holocene Paleoecology of the Midwestern United States</i>	2016
Iowa State University Department of Ecology, Evolution, and Organismal Biology, Harry and Audrey Finch Scholarship (Finch Funds Award), <i>Paleoecology of the bamboo thickets of eastern Bolivia</i>	2015
Iowa State University College of Liberal Arts and Sciences Curriculum Development Grant, awarded to redevelop Biol 488 - <i>Identification of Aquatic Organisms Online Course</i> .	2014
Association for the Sciences of Limnology and Oceanography (ASLO) Student Travel Award	2014
Significant contributor , Downing, J.A., C. Filstrup, and C. Williams. <i>Twin Lakes, Iowa, Diagnostic and Feasibility Study</i> Contributed to portion awarded by Iowa Department of Natural Resources for paleolimnological study of Twin Lakes, Iowa.	2013
Significant contributor , Downing, J.A., C. Filstrup, and C. Williams. <i>Silver Lake, Iowa, Diagnostic and Feasibility Study</i> Contributed to portion awarded by Iowa Department of Natural Resources for paleolimnological study of Silver Lake, Iowa.	2013

Service

Facilitator - Cultivating Leadership for Change and Justice in the Geosciences Workshop 3: Effective strategies for student organizing American Meteorological Society Annual Meeting	2021
Facilitator - Cultivating Leadership for Change and Justice in the Geosciences Workshop 2: Exploring challenges to diversifying faculty American Geophysical Union Annual Meeting	2020
Panelist - Biol 606: Ecological Research Methods, Career panel for MS Ecology Students about lesser-known subdisciplines of ecology, Western Colorado University	2020
Assistant Facilitator - Cultivating Leadership for Change and Justice in the Geosciences Workshop 1: Call to action: Anti-racism efforts in the geosciences Geological Society of America Annual Meeting	2020
Volunteer - Letters to a Pre-Scientist penpal program	2019
Graduate Student Representative - ISU Stormwater Management Committee	2014—2018
Curriculum Committee Representative , Department of Ecology, Evolution, and Organismal Biology Graduate Student Organization	2017—2018
Skype a Scientist, two high school classrooms	2018
Certified Volunteer - IOWATER volunteer water quality monitoring program	2014—2017
President - Environmental Science Graduate Student Organization	2014—2015
Graduate Student Representative - Plant or Microbial Processes Faculty Search Committee	2014—2015
Volunteer Judge - Eco Day, Nevada Middle School	2015
Volunteer Judge - Des Moines Public Schools Science Fair	2014—2015
Graduate Student Representative - EEOB external review panel	2014
Volunteer Judge - Iowa State Science and Technology Fair	2014
Volunteer Judge - Introduction to Environmental Issues Final Projects	2014
Workshop Leader - <i>All About Mussels</i> workshop for fifth grade students	2014
Social Outreach and Safety Chair - Environmental Science Graduate Student Organization	2013—2014
Volunteer - Iowa Children's Water Festival	2013

Workshops

- Carroll, H. and C. Román-Palacios. *R stats bootcamp: Part 2* 2021
Hands-on R statistics and coding workshop. Tripati lab, Department of Earth, Planetary, and Space Sciences, University of California Los Angeles.
- Carroll, H. *Publication quality plotting in R*. Hands-on R coding workshop for the Statistics Tutoring Center's Statistics Bootcamp series. Western Colorado University, Gunnison. 2021
Recording: <https://youtu.be/9cGO9fjtbvg>
- Carroll, H. and C. Román-Palacios. *R stats bootcamp: Part 1* 2021
R statistics demonstration. Tripati lab, Department of Earth, Planetary, and Space Sciences, University of California Los Angeles.
- Carroll, H. *You've got data! Now what?: How to pick the right tests for your dataset (and why you should choose your tests first next time)*. R workshop in statistics for graduate students. Western Colorado University, Gunnison. 2020
Recording: <https://www.youtube.com/watch?v=-IKle5byG2Y&feature=youtu.be>

Invited Talks and Guest Lectures

- Carroll, H. *Stable isotopes analysis*. Guest lecture with lab for general ecology course (Biology 302) in stable isotopes analysis using R. Western Colorado University, Gunnison 2020
- Carroll, H. *Spatial data wrangling in R*. Demonstration for LunchinatioRS: an R-focused lunch seminar. Iowa State University, Ames 2019
- Carroll, H. *New Solutions for Old Problems: The Power of Big Data in Late Quaternary Paleoecology*. Departmental seminar. University of Washington, Tacoma 2018
- Carroll, H. *Stream Health and Ecology*. Invited guest lecture with field component. Biology 211 - Introductory Biology for Nonmajors. Iowa State University, Ames 2018
- Carroll, H. *Water Quality on the Iowa State University Campus*. National Pollutant Discharge Elimination System Stakeholders Meeting. Iowa State University, Ames 2016
- Carroll, H. *Lake Eutrophication and Land Use*. Departmental seminar. University of Wisconsin - Stout, Menomonie 2015

Presentations and Posters

[†]Denotes presenter, if other than self

- [†]Samuelson, R., D. Cammack, **H. Carroll**, D. Houston, R. Japuntich, and K. Thompson. 2021. *Passive monitoring of the native 'three-species' in the Dolores River Basin and land management implications*. Colorado-Wyoming American Fisheries Society virtual conference.
- Carroll, H.**, A.D. Wanamaker, L.G. Clark, B.E. Caissie, and J. Galang*. 2019. *A high-resolution, multiproxy record of climate, vegetation, and fire history at the southern limit of the temperate tallgrass prairie, USA*. American Geophysical Union Meeting, San Francisco, CA
- Carroll, H.**, A.D. Wanamaker, L.G. Clark, B.J. Wilsey. 2019. *Ambrosia and Artemisia pollen can distinguish between vegetation types at broad spatial scales*. Botany 2019 Meeting, Tucson, AZ
- Carroll, H.**, L.G. Clark, B.E. Caissie, and A.D. Wanamaker. 2019. *Late Quaternary vegetation dynamics at the southern limit of the temperate tallgrass prairie*. Environmental Science Graduate Student Symposium, Ames, IA
- Carroll, H.**, L.G. Clark, and A.D. Wanamaker. 2018. *Preparation of a phytolith reference collection for the study of late Quaternary paleoecology in Missouri*. Environmental Science Graduate Student Symposium, Ames, IA
- Carroll, H.**, 2018. *Late Quaternary paleoecology of the North American midcontinent*. Iowa State University Dept of Ecology, Evolution, and Organismal Biology Three Minute Thesis Competition

- Carroll, H.**, L.G. Clark, and A.D. Wanamaker. 2017. *Tracking Holocene vegetation change in the tallgrass prairie region: the power of big data in paleoecology*. Environmental Science Graduate Student Symposium, Ames, IA
- Carroll, H.**, C.T. Filstrup, and J.A. Downing. 2016. *Comparative palynology of two agriculturally eutrophic lakes* Environmental Science Graduate Student Symposium, Ames, IA
- Carroll, H.** and J.A. Downing. 2015. *Water quality declines and diversity loss in an agriculturally eutrophic landscape* Environmental Science Graduate Student Symposium, Ames, IA
- Carroll, H.** and J.A. Downing. 2015. *Paleolimnological analysis of Iowa's changing landscapes* Graduate Research in Evolutionary Biology and Ecology symposium, Ames, IA
- Julich, H.** and J.A. Downing. 2014. *Two hundred years of landscape change: Consequences for East Okoboji Lake, Iowa*. Assoc. for the Sciences of Limnology and Oceanography Meeting, Portland, OR
- Julich, H.** and J.A. Downing. 2014. *Use of palynological techniques to reconstruct macrophyte loss and multiple stable states in a eutrophic lake*. Graduate Research in Evolutionary Biology and Ecology symposium, Ames, IA
- Julich, H.** and J.A. Downing. 2013. *Use of palynological techniques to reconstruct macrophyte loss and multiple stable states in a eutrophic lake*. Assoc. for the Sciences of Limnology and Oceanography Meeting, New Orleans, LA
- Julich, H.** and B.J. Becker. 2008. *An evaluation of conditions in situ mesocosms* Western Society of Naturalists Meeting, Vancouver, BC, Canada
- Julich, H.** and B.J. Becker. 2008. *In situ culturing of larval sand dollars, Dendraster excentricus, in Friday Harbor, Washington*. University of Washington Tacoma Environmental Research Symposium, Tacoma, WA
- Julich, H.** and B.J. Becker. 2008. *In situ culturing of larval sand dollars, Dendraster excentricus, in Friday Harbor, Washington*. UW Undergraduate Research Symposium, Seattle, WA
- Julich, H.** and B.J. Becker. 2007. *In situ culturing of larval sand dollars, Dendraster excentricus, in Friday Harbor, Washington*. Western Society of Naturalists Meeting, Ventura, CA

Mentorship

[30 total; includes 18 women and 7 students from traditionally minoritized demographics in STEM; undergraduate students except where noted]

*Indicates mentorship of Master's student ‡Indicates mentorship of PhD student °Indicates advisory committee membership +Indicates undergraduate mentee who subsequently completed a Master's degree

University of California, Los Angeles

Deepshikha Upadhyay[‡], Jamie Lucarelli[‡], Robert Ulrich[‡]

Western Colorado University, Gunnison

Reece Samuelson*, Ellie Orr*, Bronwyn Taylor*^c, Jake Bartholomew*^c, Ashley Hurst*^c

Iowa State University, Ames

Jacqueline Galang, Alejand Hernandez-Delgado, Juan-Carlos Mungaray, Juan Perez, Kathryn Holmes, Logan Crees⁺, Lindsay Mack, Josiah Ihnen, Marlyssa Crow⁺, Nicole Stout, Shelby Poole, Samuel Free-stone, Emily Martin (Honors)⁺, Eric Tagatz, Megan Koppenhafer, Connor Nicholas, Molly Zelinskas, Mollie Wienhold, Mariah Mahaney, Sarah Leichty (Honors)⁺, William Tony Manriquez

University of Washington, Tacoma

Lindsay McCormick

Interviews in the Popular or University Press

Iowa State University Department of Ecology, Evolution, and Organismal Biology. Departmental Spotlight. “Introducing environmental science to a growing number of undergraduates.” September 2017

Visions Magazine (Iowa State University Alumni Association). “Three Billion Years: The Evolution of a State.” November 2016

Environmental Monitor. “Future scientists get real-world skills in Iowa State water quality monitoring courses.” March 5, 2014

<http://www.fondriest.com/news/future-scientists-get-real-world-skills-iowa-state-water-quality-monitoring-courses.htm>

Iowa State Daily. “ISU students to monitor campus impact on water.” February 28, 2014

http://www.iowastatedaily.com/news/article_01050a06-9fe2-11e3-9d48-001a4bcf887a.html

Ames Tribune. “ISU students study campus impact on waterways.” February 25, 2014

<http://www.amestrib.com/news/ames-and-story-county/isu-students-study-campus-impact-waterways>

Iowa State University News Service. “Iowa State students will check water quality on campus this semester.” February 19, 2014

<http://www.news.iastate.edu/news/2014/02/19/watertesting2014>

Iowa State Daily. “Carolyn Hoskinson makes first appearance in Iowa, speaks out about underground leakage.” November 19, 2013

Professional Memberships (Past Five Years)

The Geological Society of America (GSA), Botanical Society of America (BSA), American Geophysical Union (AGU), Ecological Society of America (ESA)