HALEY E. PLAAS

*Curriculum Vitae*

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Education

**Ph.D.** Environmental Sciences and Engineering, University of North Carolina-Chapel Hill 2023

Committee: Drs. Hans Paerl (major advisor), Nathan Hall, Jill Stewart, Jason Surratt, Ryan Paerl, and Karsten Baumann

Dissertation: *Understanding the Impacts of Harmful Cyanobacterial Blooms on Air Quality*

**B.S.** Biology and Marine Science, University of Miami, Florida 2019

with James Cook University, Australia (Study Abroad Fall 2017)

Committee: Drs. Kimberly Popendorf (major advisor), Larry Brand, and Cassandra Gaston.

Honors Thesis: *The Influence of Temperature on Microcystin Concentration in Bubble-Generated Lake Spray Aerosols*

Employment Record

**Postdoctoral Research Scholar** at NC State University, Raleigh, NC, USA

January 2024 – Present • 40 hours/ week

* Utilizing Earth System models to understand global nitrogen and phosphorus emissions, atmospheric processing, and deposition
* Conducting a systematic literature review concerning wildfire influences on atmospheric nutrient bioavailability and impacts to global freshwater systems
* Preparing fellowship applications
* Mentoring undergraduate and graduate research students

**Graduate Research Fellow** at UNC-Chapel Hill, Chapel Hill, NC, USA

May 2019 – December 2023 • 40+ hours/ week

* Identified, secured, and managed grant funds for scientific research and community-based projects;
* Designed, planned, and implemented environmental health research with specific aims to inform risk assessments of human exposure to novel air pollutants sourced from waterbodies;
* Interpreted, analyzed, and visualized environmental data using R, Matlab, and Microsoft Excel;
* Developed and implemented experimental atmospheric (aerosol chemistry) models with applications in human health and physical climate science; improving lab and field data collection methods;
* Communicated analyses and research results via academic journals, conference presentations, and outreach materials (received best review paper for *Environmental Science & Technology* in 2021);
* Generated and maintained professional contacts across governmental, NGO, and academic sectors (received UNC Impact award in 2023 for work with citizen science organizations);
* Mentored and provided technical expertise to undergraduate research and science communication interns to support and improve their research methods (received teaching award in 2022).

**Student Laboratory Assistant** at University of Miami, Coral Gables, FL, USA

August 2018 – May 2019 • 15 hours/ week

* Designed and conducted laboratory experiments modeling the impact of various climate scenarios on the aerosolization of harmful algal bloom toxins (presented an honors thesis with findings);
* Developed, improved, and implemented laboratory methods (SOPs) for weekly enzyme bioassays.

**Environmental Health Intern** at Mote Marine Laboratory and Aquarium, Sarasota, FL, USA

May 2018 – August 2018 • 40 hours/ week

* Provided assistance and advice to the public in email communications re: red tide beach closures.

Scientific Publications

* Ellen P. Preece, Janis Cooke, **Haley Plaas**, Alexandrea Sabo, Leah Nelson, Hans W. Paerl, Managing a cyanobacteria harmful algae bloom “hotspot” in the Sacramento – San Joaquin Delta, California, Journal of Environmental Management, Volume 351, 2024, 119606, ISSN 0301-4797, <https://doi.org/10.1016/j.jenvman.2023.119606>.
* **Plaas, H. E.;** Yan, J.; Christensen, C.; Chang, S.; Cortez, C.; Fern, S.; Nelson, L.; Sabo, A.; Armstrong, N. C.; Turpin, B. J.; Zhang, Y.; Paerl, H. W.; Surratt, J. D. Secondary Organic Aerosol Formation from Cyanobacterial-Derived Volatile Organic Compounds. ACS Earth Space Chem 2023. <https://doi.org/10.1021/acsearthspacechem.3c00177>.
* Barnard, M.A., **Plaas, H.E.,** Paerl, R.W., Karl, C.M., Holland, W.C., Hardison, D.R., Hall, N.S., Bartenfelder, A.N., Rossignol, K.L., Braddy, J.S., Sloup, R.S., and Paerl, H.W., Macronutrient and B vitamin dynamics of Chowan River (North Carolina, U.S.A.) CyanoHABs, In: Band-Schmidt, C.J. and Rodríguez-Gómez, C.F. (Eds.). 2022. Proceedings of the 19th International Conference on Harmful Algae, La Paz, B.C.S., Mexico. International Society for the Study of Harmful Algal Blooms. 365 pp, <https://doi.org/10.5281/zenodo.7034970>
* **H.E. Plaas**, R.W. Paerl, K. Baumann, et al., Harmful cyanobacterial aerosolization dynamics in the airshed of a eutrophic estuary, Science of the Total Environment (2022), <https://doi.org/10.1016/j.scitotenv.2022.158383>
* Barnard, M. A., Chaffin, J. D., **Plaas, H. E.,** Boyer, G. L., Wei, B., Wilhelm, S. W., Rossignol, K. L., Braddy, J. S., Bullerjahn, G. S., Bridgeman, T. B., Davis, T. W., Wei, J., Bu, M., & Paerl, H. W. (2021). Roles of Nutrient Limitation on Western Lake Erie CyanoHAB Toxin Production. Toxins, 13(1), 47. <https://doi.org/10.3390/toxins13010047>
* **Plaas, H. E.,** & Paerl, H. W. (2021). Toxic Cyanobacteria: A Growing Threat to Water and Air Quality. Environmental Science & Technology, 55(1), 44–64. <https://doi.org/10.1021/acs.est.0c06653>

Academic Services

**Peer Reviewer for:**

* Frontiers in Microbiology, 2023-Present
* Nature Communications, 2023-Present
* Environmental Science and Technology, January 2020-Present

**Board Member:**

* North Carolina Sea Grant Advisory Board, Student Representative, 2021-Present

Grants & Awards

**Grants:**

* “HAPs and HABs: Investigating Associations between Air and Water Quality through Community Collaborations in Eastern North Carolina" North Carolina Sea Grant Community Collaborative Research Grant, 2022-23 (PI: Hans Paerl; Award: $24,999)
* “How Do Toxic Cyanobacteria Impact Air Quality?” North Carolina Sea Grant mini grant program, 2021-2022 (PI: Hans Paerl; Award: $9,999)
* “Addressing CyanoHABs as a Threat to Water and Air Quality in the San Francisco Bay-Delta, CA” California Sea Grant 2021 Delta Science Awards (PI: Hans Paerl, Award: $142,244.88)
* National Science Foundation (NSF) Graduate Research Fellowship (GRFP): #2020295001, 2020-2023 (Award: $34,000 stipend, $16,000 tuition for three years)
* North Carolina State University Centers for Human Health and the Environmental – Pilot Project Program: #P30ES025128, 2020-2021 (PI: Ryan Paerl; Award: $24,999)
* Graduate Fellowship in Estuarine Research, Albemarle-Pamlico National Estuary Partnership – North Carolina Sea Grant: #2019-R/MG-1905, 2020 (PI: Hans Paerl: Award: $9,999)

**Awards:**

* UNC-Chapel Hill Graduate Education Advancement Board Impact Award, 2023
* Environmental Science & Technology Best Paper Awards, “Review” category, 2021
* American Association for Aerosols (AAAR) Best Student Presentation Award, 2022
* EMES Marine Sciences Morrow Award for Teaching Excellence, 2022
* Gillings Merit Award, Gillings School of Global Public Health, UNC-Chapel Hill, 2019
* President’s Merit Scholarship, University of Miami, 2015-2019

Conference Presentations

* *“Harmful Cyanobacterial Aerosolization Dynamics in the Airshed of a Eutrophic Estuary”,* NC Water Resources Research Institute, Platform Presentation, 2023
* “*Harmful Cyanobacterial Aerosolization Dynamics in the Airshed of a Eutrophic Estuary*”, American Geophysical Union Conference, Chicago, IL. Poster Presentation in Session: A017 - Aquatic Aerosols: From Microscale Processes to Impacts on Climate, 2022
* “*Harmful Cyanobacterial Aerosolization Dynamics in the Airshed of a Eutrophic Estuary*”, Society of Environmental Toxicology and Chemistry (SETAC) North America 43rd Annual Meeting, Pittsburgh, PA. In-person Oral Platform Presentation, 2022
* “*Harmful Cyanobacterial Aerosolization Dynamics in the Airshed of a Eutrophic Estuary*”, American Association for Aerosols Research Conference, Raleigh, NC. Platform Presentation in the special symposium, 2022
* “*Production of SOA from Hydroxyl Radical Oxidation of Two Cyanobacterial-Derived BVOCs, Geosmin and 2-Methylisoborneol*”, American Association for Aerosols Research Conference, Raleigh, NC. Poster Presentation, 2022
* “*Harmful Cyanobacterial Bloom Aerosolization Dynamics and Microcystin Production in the Chowan River, NC*”, Society of Environmental Toxicology and Chemistry (SETAC) North America 42nd Annual Meeting (virtual), Oral Session, 2021
* “*Harmful Cyanobacterial Bloom Aerosolization Dynamics and Microcystin Production in the Chowan River, NC*”, Coastal and Estuarine Research Federation (CERF) 26th Biennial virtual conference, Oral Session 2021
* “*Spray Aerosol Emissions from Harmful Cyanobacterial Blooms in the Chowan River, NC*”**,** American Association for Aerosol Research (AAAR) virtual conference, Platform Presentation 7HA.3, 2021. Link to abstract: <https://aaarabstracts.com/2021/viewabstract.php?pid=338>
* “*Harmful Cyanobacterial Bloom Aerosolization Dynamics and Microcystin Production in the Chowan River, NC*”, 10.5 US Symposium on Harmful Algae, Oral Session, 2021
* “Are Toxic Cyanobacteria in the Air we Breathe?” UNC Environmental Sciences and Engineering Centennial Speed Talk, 2021
* “*Harmful Cyanobacterial Bloom Aerosolization Dynamics and Microcystin Production in the Chowan River, NC*”, Water Resources Research Institute Conference, Student Lightning Talk, 2021
* *“Are Toxic Cyanobacteria in the Air We Breathe?”,* Oceans and Human Health virtual meeting, Poster Session, 2020
* “*Cyanobacterial Microcystin Production and Aerosolization Dynamics in the Chowan River-Albemarle Sound Estuarine Continuum, NC*”**,** American Association for Aerosol Research (AAAR) virtual conference, Poster Session 8.HA.23. Link to presentation: <https://www.youtube.com/watch?v=BjTD0DKhnc4&t=137s>
* “*The Influence of Temperature on Microcystin Concentration in Bubble-Generated Lake Spray Aerosols*”**,** American Association for Aerosol Research (AAAR) Conference, Poster Session, Portland, Oregon, 2019
* “*The Influence of Temperature on Microcystin Concentration in Bubble-Generated Lake Spray Aerosols*”, University of Miami Undergraduate Research Symposium, Coral Gables, Florida, 2019

Invited Talks

**Community-Based Participatory Research (University of Iowa course),** guest lecture: “*Community Science in Environmental Health Research”,* Iowa City, IA (virtual), November, 2023

**Albemarle Algal Bloom Summit, “***Using Low-Cost, Community-Based Sensors to Study Cyanobacterial Blooms and Air Quality”,* Elizabeth City, NC, November 2023

**California Department of Water Quality,** “*Aerosol Emissions from CyanoHABs in the Bay Delta*”, Virtual Talk and Q&A session, Sacramento, CA, April 2023

**California Cyanobacteria Harmful Algal Bloom Network,** “*Characterizing Aerosol Emissions from Harmful Cyanobacteria in the Bay Delta*”, Virtual Meeting, April 2023

**ENVR400 Seminar Series,** *“Algae! Aerosols! Action! Are toxic cyanobacteria in the air we breathe*?”, Environmental Science and Engineering Departmental Seminar, Chapel Hill, NC 2022

**Lunchtime Discovery Series**, *“Are Toxic Cyanobacteria in the Air We Breathe?”,* North Carolina Office of Environmental Education, Raleigh, NC, 2021

**Meeting Seminar**, North Carolina Sea Grant Coastal Resources and Communities, 2021

**Speed Talk,** *“Quantifying CyanoHAB DNA and toxins in spray aerosol of Lake Erie”,* Oceans and Human Health Virtual Meeting 2020

**MASC 055: Change in the Coastal Ocean**, “*Harmful Algal Blooms: Causes And Consequences*”, guest lecturer, 2020

**Lunchtime Discovery Series**, *“Are Toxic Cyanobacterial Blooms Affecting the Air We Breathe?”,* North Carolina Office of Environmental Education, Raleigh, NC, 2019

**Group on Atmospheric Science and Pollution (GASP) Seminar**, *“Asphyxiation by algae: are toxic cyanobacterial blooms affecting the air we breathe?”,* Environmental Science and EngineeringGASP seminar series, 2019

**World Oceans Day,** Guest Speaker and Panelist, Summit Betchel Reserve, Boy Scouts of America 24th World Scout Jamboree, 2019

**TEDx Talk,** “*An Individual’s Solution to Plastic Pollution*”, Keynote Speaker**, TEDxUMiami,** Coral Gables, Florida, 2019

Teaching & Mentoring Experience

**Students Mentored**

* **Deborah Itzel-Castillo** (undergraduate, San Joaquin Delta College) and **Cheyenne Celada** (undergraduate, Cal Poly-Humboldt), May-August 2023. Trained field skills to complete nutrient-addition bioassay experiments, install and maintain aerosol sampling equipment, and process environmental samples. Served as primary mentor to develop independent research project on community scientists’ involvement in HAB research across North America.
* **Rachael Cogbill** (Master of Public Health, UNC-Chapel Hill), January – Present. Served as primary mentor to complete a practicum project assessing links between particulate matter and cyanobacterial blooms in the Chowan-Albemarle Sound of eastern NC. Guided community partner collaborations, formulation of research questions, API calls, data cleaning, and statistical analyses.
* **Pegah Montazeri** (undergraduate, UNC-Chapel Hill), February 2023 – Present. Trained analytical skills for cyanotoxin sample peak integration, calibration curve generation, quantification, and visualization.
* **Madison Sholes** (undergraduate, NC State University), May - December 2022. Advertised the communications internship, reviewed applications, interviewed candidates, and selected the finalists. Aided in website development using ArcGIS, assigned short film work, trained in the lab, met weekly for progress reports. Taught videography and science communication skills using Adobe Suite. Wrote and submitted letters of recommendation.
* **Seyong Chang** (undergraduate, Brandeis University – current MS student, Harvard University), May - August 2022. Served as the primary hiring-coordinator and intern mentor as research lead of the *Bay Delta Science Program Project.* Assigned research roles, trained in the field, met weekly for progress reports, provided help on a self-guided epidemiological project, taught data management and visualization skills using R. Resulted in co-authorship on our papers. Wrote and submitted letters of recommendation.
* **Morgan Pirozzi** (undergraduate, UNC-Chapel Hill), November 2021- May 2023. Served as a one-on-one mentor for a female undergraduate as part of NSF’s Improving Undergraduate STEM Education Program: Promoting Geoscience Research, Education, & Success (PROGRESS), providing support and helping to connect early-career women in science with REUs and other opportunities.
* **Abe Loven** (undergraduate, UNC-Chapel Hill), June – October, 2020. Mentored a science communication intern funded by my 2020 APNEP – NC Sea Grant fellowship. Helped the intern plan, film and edit a short length documentary featuring scientific research on Chowan River cyanobacterial blooms, his photos were featured in *Coastwatch*, NC Sea Grant’s magazine.

**Formal Coursework Taught**

**Graduate Research Consultant**, MASC 055: Change in The Coastal Ocean, *UNC-Chapel Hill,* Fall 2021. Assisted in a first year (freshman) classroom with curriculum and lesson plan building, lecturing, moderating discussion, and research project mentorship with Dr. Chris Martens. Led lectures in aquatic toxicology and marine plastic pollution.

ENVR 600: Environmental Health, *UNC-Chapel Hill,* **Graduate Teaching Assistant-** Fall 2019 – Spring 2020. Assisted in the classroom for Dr. Louise Ball. Graded assignments and exams, kept records, mentored students, and guest lectured.

Select Outreach Experience

* **“DNA out of thin air: New study finds animal DNA in the airshed of a zoo.”** –Article written for a featured story on *The Pipettepen*, the Science Writing and Communication Club (SWAC) at UNC’s online blog. Link to publication: <http://www.thepipettepen.com/dna-out-of-thin-air-new-study-finds-animal-dna-in-the-airshed-of-a-zoo/>
* **Greater Kansas City Science and Engineering Fair** – Kansas City, MO, February-May 2022. Team Mentor for the project titled: *“The Effect of Silver Nanoparticles at Concentration Additives of 5 µg/L, 60 µg/L, and 120 µg/L on Chlorella Algae”.* Mentored three high school students to conduct, analyze, and present a science fair project; <https://studentcorner.io/projects/QGQCHIM6TGMM>, Poster awarded Top 10 in the Biomedical Research category
* **“Chlorophyll: removed from your drinking water, added to your smoothie.”** –Article written for a featured story on *The Pipettepen*, the Science Writing and Communication Club (SWAC) at UNC’s online blog. Link to publication: <http://www.thepipettepen.com/chlorophyll-removed-from-your-drinking-water-added-to-your-smoothie/>
* Animated Video Short, *UNC-Chapel Hill*, **Project Lead/ Client**, September 2020 - December 2020. Wrote an outreach script and directed an undergraduate student group to animate an educational film on the causes, consequences, and controls of harmful cyanobacterial blooms (link here: <https://vimeo.com/492115907>).
* **“In Full Bloom”—** Article written for a featured story in the Spring 2021 issue of *Coastwatch,* North Carolina Sea Grant’s print and digital publication. Link to publication: <https://ncseagrant.ncsu.edu/coastwatch/current-issue/spring-2021/in-full-bloom/>
* **St. Timothy’s Virtual Science Fair** – Raleigh, NC, January 2021. Guest Judge. Assessed and graded six science fair projects for students from K-8th grade.
* **Scientific Research and Education Network (SciREN) Coast-** Morehead City, NC, October 2020 – 2023. Logistics Coordinator for the 2021-2023 SciREN Coast events. Conducted the virtual Lesson Plan Workshop for researchers, coordinated three teams (logistics, education, research) of graduate peers, and planned the networking events.
* **Waterloop Podcast** – Wilmington, NC, September 2020. Guest speaker for the waterloop episode #51: “Haley Plaas on the Science of Harmful Algal Blooms”, link to: <https://www.waterloop.org/post/waterloop-51-haley-plaas-on-the-science-of-harmful-algal-blooms>
* **In Pursuit: UNC Research-** Edenton, NC, July 2020. Interviewed for the story, “*Algal Blooms Pose Possible Respiratory Threat*”, link to: <https://research.unc.edu/2020/07/29/algal-blooms-pose-possible-respiratory-threat/>
* **Scientific Research and Education Network (SciREN) Coast-** Morehead City, NC, October 2019-March 2020. Logistics Coordinator for the 2020 SciREN Coast event. Managed the social media campaigns, coordinated volunteers, and elicited and organized donations from local companies.
* **Drive Away Waste**- Durham, NH, June 2018- August 2019. Co-founder of a zero-waste initiative to reduce the impact of plastic pollution on marine ecosystems through public outreach. Composed proposals, budgets, and grant submissions in addition to generating community lesson plans.

* **Ocean Kids**- Rosenstiel School of Marine & Atmospheric Science***,*** January 2016- March 2019. Co-chair of the STEM educative field trip event, Ocean Kids, for over 2000 underprivileged Miami-Dade elementary students over the course of four years. Coordinated student volunteers and planned annual events.
* **Cape Ann Whale Watch**- Gloucester, MA, May-July 2016. Educated the public about environmental and marine conservation as a field research naturalist and environmental educator. Surveyed public response to the outreach program and spearheaded a promotional video for the program.

Technical Skills

* Coding proficiencies: R, Excel
* Various applications with Liquid Chromatography
* Nontargeted/ targeted Mass Spectrometry
* Scientific data analyses in public and environmental health topics
* Expertise in intersectional air quality and water quality research
* Scientific writing and data visualization
* Graphics/ Visualization proficiencies: FinalCut ProX (film editing software), Adobe Suite
* Languages spoken: English, Spanish (beginner)

Relevant Coursework

Mass Spectrometry (UNC), Aerosol Physics and Chemistry (UNC), Microbial Ecology (NCSU), Proposal Writing for Environmental Engineering (UNC), Environmental Exposure Assessment (UNC), One Health: Philosophy to Practical Integration (UNC/Duke/NCSU), Marine Environmental Toxicology (UMiami), Environmental Chemistry (UMiami), Chemical and Physical Oceanography (UMiami)

References

*University of Miami Rosenstiel School of Marine & Atmospheric Science, 4600 Rickenbacker Cswy. Miami, FL 33149*

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