HALEY E. PLAAS

CURRICULUM VITAE

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EDUCATION

Ph.D. Environmental Science 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
Research Focus: How Do Harmful Cyanobacterial Blooms Affect 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

2020-	Graduate Research Fellow, National Science Foundation, GRFP (UNC-Chapel Hill)
2019- 2020	Graduate Teaching Fellow, Gillings School of Global Public Health, UNC-Chapel Hill
2019	Research Assistant, Institute of Marine Sciences, UNC-Chapel Hill
2018-2019	Student Laboratory Assistant, Rosenstiel School of Marine Science, University of Miami

PUBLICATIONS

Plaas, H. E., Paerl, R. W., Baumann, K., Popendorf, K. J., Barnard, M. A., Chang, N. Y., Curtis, N., Huang, H., Mathieson, O., Sanchez, J., Maizel, D. J., Bartenfelder, A., Braddy, J., Hall, N. S., Rossignol, K., Sloup, R., and Paerl, H.W. (*In Review*). Cyanobacterial aerosolization dynamics inthe airshed of a eutrophic estuary. Science of the Total Environment. http://ssrn.com/abstract=4125290

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 Review:

Manuscript review, *Scientific Reports*, May 2021

Proposal reviews, 2020 NSF GRFP Virtual Peer Review Workshop, *UNC-Chapel Hill*, September 2020

Manuscript review, *Science of the Total Environment*, September 2020

Manuscript review, *Lake and Reservoir Management*, August 2020

Reviewer for: *Environmental Science and Technology*, January 2020-

Proposal review, *Polish National Science Center*, September 2019

GRANTS, HONORS, & AWARDS

Grants: **(FUNDED)**

"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)

"How Do Toxic Cyanobacteria Impact Air Quality?" North Carolina Sea Grant mini grant program, 2021-2022 (PI: Hans Paerl)

"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)

National Science Foundation (NSF) Graduate Research Fellowship (GRFP): #2020295001, 2020-2023 (PI: Hans Paerl)

North Carolina State University Centers for Human Health and the Environmental – Pilot Project Program: #P30ES025128, 2020-2021 (PI: Ryan Paerl)

APNEP – NC Sea Grant: Graduate Fellowship in Estuarine Research, Albemarle-Pamlico National Estuary Partnership – North Carolina Sea Grant: #2019-R/MG-1905, 2020 (PI: Hans Paerl)

(NOT FUNDED)

"Approaching CyanoHAB expansion in the Chowan River – Albemarle Sound Estuary as a One Health Issue" North Carolina Sea Grant 2022-2024 Biennial Competitive Research Call, 2021 (PI: Hans Paerl)

FlowCam® Graduate Research Equipment and Travel Grant Application, 2020 (PI: Hans Paerl)

SECOORA 2020 Education and Outreach Request for Proposals Enhancing Marine Science Curriculum for K-12 Formal and Informal Educators, 2020 (PI: Kerry Irish)

Sigma Xi Grants in Aid of Research, 2020 (PI: Hans Paerl)

Member:

IMS Art Mural Committee, Student Representative 2022
North Carolina Sea Grant Advisory Board, Student Representative, 2021-
Society of Environmental Toxicology and Chemistry (SETAC), 2021-
Coastal and Estuarine Research Federation (CERF), 2021-
American Chemical Society (ACS), 2020-
North Carolina Water Resources Research Institute (WRRI), 2019-
American Association for Aerosols Research (AAAR), 2019-

Awards:

EMES Marine Sciences Morrow Award for Teaching Excellence, 2022

Coastal and Estuarine Research Federation (CERF) Conference Participation Award, 2021

Society of Environmental Toxicology and Chemistry (SETAC) Student Travel Grant, 2021

Gillings Merit Award, Gillings School of Global Public Health, UNC-Chapel Hill, 2019

Robert A. Mah and Adeline Yen Mah Student Support Endowment Fund, Gillings School of Global Public Health, UNC-Chapel Hill, 2019

Alan and Linda Rimer Scholarship in Environmental Science, Gillings School of Global Public Health, UNC-Chapel Hill, 2019

B.B. Parker Fellowship, Gillings School of Global Public Health, UNC-Chapel Hill, 2019

Edward Kuenzler Endowed Scholarship in Field Ecology, Gillings School of Global Public Health, UNC-Chapel Hill, 2019

President's Merit Scholarship, University of Miami, 2015-2019

CONFERENCE PRESENTATIONS

"*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

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

Brown Bag Seminar, UNC Institute of Marine Sciences, 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 Engineering GASP 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

RESEARCH EXPERIENCE

Department of Environmental Science and Engineering –*Institute of Marine Sciences*, Morehead City, NC
Research Fellow, May 2020- present
Conducted field and lab work for dissertation effort. Coordinated field campaign to measure and quantify cyanobacterial DNA and microcystin in spray aerosol of the Chowan River, NC. Deployed aerosol collection instrumentation in the field, collected water samples, organized community science efforts. Extracted algal pigments and cyanotoxins in the lab. Analyzed and interpreted resultant datasets: integrated LC-MS/MS peaks, constructed generalized additive models in R.

Department of Marine Sciences –*Institute of Marine Sciences*, Morehead City, NC
Research Assistant, May-August 2019
Field work conducted with Dr. Hans Paerl. Assisted with nutrient bioassays to determine nutrient limitations in eutrophic systems including Lake Erie, OH and the Neuse River, NC. Processed, extracted and prepared water samples for analysis. Assisted with peer journal reviews.

Department of Ocean Sciences- *Rosenstiel School of Marine & Atmospheric Science*, Miami, FL
Undergraduate Research Assistant October 2018-May 2019
Honors thesis conducted with Dr. Kimberly Popendorf and Dr. Cassandra Gaston regarding bubble-generated cyanotoxin aerosols. Performed weekly enzyme bioassays (ELISA kits) to quantify BMAA and microcystin in algal samples collected from Lake Okeechobee.

Department of Marine Biology & Ecology - *Rosenstiel School of Marine & Atmospheric Science*
Student Laboratory Assistant August 2018-May 2019
Monitored harmful algal blooms in South Florida and processed samples for chlorophyll with Dr. Larry Brand. Collected aerosol and water samples in the field. Gained research cruise experience.

Environmental Health Laboratory- *Mote Marine Laboratory & Aquarium*, Sarasota, FL
Environmental Health Intern May-August 2018
Investigated mitigation techniques on the Florida red tide (*K. brevis*) via biofiltration and studied the impact of storm winds on brevetoxin transport and aerosolization with Dr. Tracy Fanara. Assisted in public outreach efforts at the Mote Aquarium and fielded messages from the public regarding red tide bloom events.

Department of Marine Biology & Ecology - Rosenstiel School of Marine & Atmospheric Science
Undergraduate Research Assistant April 2017-October 2018
Managed coral husbandry and aquarium operations. Conducted research on antibiotic exposure and wound healing in stony coral, *P. damicornis,* with Dr. Nikki Traylor-Knowles. Composed, filmed, and edited a promotional film for usage on the lab website and in future grant applications.

TEACHING/ MENTORSHIP EXPERIENCE

Undergraduate Intern Mentor, *Bay Delta Science Program Project*, March 2021 - Present. As lead of the Bay Delta Science research project, budgeted for the hiring of two paid undergraduate interns (Seyong Chang and Madison Sholes). Served as the primary hiring-coordinator to select two undergraduate interns for the summer of 2022. Advertised the internship, reviewed applications, interviewed candidates, and selected two finalists, a scientific research assistant and multi-media intern. Currently mentoring the two interns: assigning primary roles, meeting bi-weekly for progress reports, providing independent project guidance, teaching science visualization skills in RStudio and Adobe Suite.

NSF PROGRESS Mentor, *NSF's Improving Undergraduate STEM Education Program: Promoting Geoscience Research, Education, & Success (PROGRESS),* Fall 2021- Present. Served as a one-on-one mentor for a female undergraduate (Morgan Pirozzi) in STEM at UNC-Chapel Hill, providing overall support and helping to connect early-career women in science with REUs and other opportunities.

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.

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).

Undergraduate Intern Mentor, *UNC-Institute of Marine Science*, June 2020 - October 2020. Mentored a science communication intern (Abe Loven) as 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. Created a website to host the documentary and associated information (link here: https://tarheels.live/infullbloom/).

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.

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/

"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 – Present. Logistics Coordinator for the 2021 SciREN Coast events. Conducted the virtual Lesson Plan Workshop for researchers, coordinated three teams (logistics, education, research) of graduate peers, and planned the 2021 networking event.

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.

Scientific Research and Education Network (SciREN) Triangle- Raleigh, NC, August 2019
Designed a scientific lab experiment and supplementary lesson: "*Crazy Cyanobacteria! Algae and Water Quality in NC*" for K-12 classrooms, adhering to state and national educational standards. Collaborated with educators regarding science curriculum development. Visited local middle schools as a visiting scientist and guest Science Fair judge.

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.

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 Oceanography (UMiami)

MEDIA HITS

- 11/17/2021 – FOX 46 Charlotte https://www.fox46.com/weather/bacterial-booms-toxic-blue-green-algae-still-blooming-in-area-lakes-thanks-to-warm-dry-fall/
- 11/01/2021 – WRAL https://www.wral.com/commentary-my-firsthand-experience-with-an-algal-bloom/19955759/
- 09/07/2021 – Coastal Review Online https://coastalreview.org/2021/09/something-is-causing-more-algal-blooms-in-more-places/
- 09/01/2021 – WITN https://www.witn.com/2021/09/01/algae-blooms-cause-problems-parts-chowan-river/
- 07/28/2021 – Great Lakes Now https://www.greatlakesnow.org/2021/07/great-lakes-algae-threatens-air-quality/
- 07/01/2021 – Spartan News Room https://news.jrn.msu.edu/2021/07/great-lakes-algae-threaten-air-quality/

TECHNICAL SKILLS & PROFICIENCIES

- various applications with Mass Spectrometry
- various applications with Liquid Chromatography
- Coding proficiencies: RStudio, MatLab
- Graphics / Visualization proficiencies: FinalCut ProX (film editing software), Adobe Photoshop
- Advanced Open Water Dive certification + Nitrox
- Languages spoken: English, Spanish (conversational)

REFERENCES

University of Miami Rosenstiel School of Marine & Atmospheric Science, 4600 Rickenbacker Cswy. Miami, FL 33149
Dr. Cassandra Gaston
+1 (305) 421-4979 cjg174@miami.edu
Dr. Kimberly Popendorf
+1 (305) 421-4328 kxp442@miami.edu
Dr. Nikki Traylor-Knowles
+1 (305) 421-4000 ntk1717@gmail.com

Mote Marine Laboratory, 1600 Ken Thompson Pkwy, Sarasota, FL 34236
Dr. Tracy Fanara
+1 (941) 302-2046 tfanara@mote.org

North Carolina State University Marine, Earth, and Atmospheric Sciences. Jordan Hall, 2800 Faucette Dr. Raleigh, NC 27607
Dr. Ryan W. Paerl
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