

MALCOLM ALEXANDER BARNARD

CURRICULUM VITAE

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Institute of Marine Sciences
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EDUCATION

- MSc** University of North Carolina at Chapel Hill, Marine Sciences December 2021
 Committee: Dr. Hans Paerl (Major Advisor), Dr. Jaye Cable, and Dr. Marc Alperin
 Thesis Title: Adapting oceanic grazing techniques for use in high productivity aquatic ecosystems
- BSc** University of Georgia, Ecology August 2017
 Undergraduate Certificate, Environmental Ethics
 Undergraduate Certificate, Water Resources
Cum Laude with Honors
 Bernard Ramsey Honors Scholar, University of Georgia Honors Program
 CURO Undergraduate Research Scholar, Center for Undergraduate Research Opportunities
 Advisors: Dr. James W. Porter, Dr. Susan Wilde, & Dr. Alan P. Covich
 Honors Thesis Title: Utilizing *Spirogyra grevilleana* as a Phytoremediatory Agent for Reduction of
 Limnetic Nutrients and *Escherichia coli* Concentrations

PROFESSIONAL EXPERIENCE

- Laboratory Technician**, Coastal Environmental and Microbiological Processes Lab 2022-Current
 Institute of Marine Sciences, University of North Carolina at Chapel Hill, Morehead City, NC, USA
- Research Assistant**, Odum School of Ecology 2015-2017
 University of Georgia, Athens, GA, USA
- Research and Teaching Assistant**, Warnell School of Forestry and Natural Resources 2015-2017
 University of Georgia, Athens, GA, USA
- Summer Intern**, Husbandry Department and Tybee Island Sea Turtle Project 2016
 Tybee Island Marine Science Center, Tybee Island, GA, USA

TEACHING EXPERIENCE

- Graduate Research Consultant**, University of North Carolina at Chapel Hill May 2019-December 2021
 (ENEC 222/MASC 470) “Estuarine and Coastal Marine Science” Fall 2021
 (MASC 220/ENEC 220) “North Carolina Estuaries: Environmental Processes & Problems” May 2019
 Assisted Dr. Marc Alperin
- Teaching Assistant**, University of North Carolina at Chapel Hill August 2018- May 2019
 (MASC 401/BIOL 350/ENVR 417/GEOL 403) “Oceanography” Spring 2019
 Assisted Dr. Andreas Teske
 (ENEC 433/MASC 433) “Wetland Hydrology and Hydrodynamics” Fall 2018
 Assisted Dr. Jaye Cable
- Teaching Assistant**, University of Georgia August 2016-December 2016
 (FYOS 1001) “First Year Odyssey Seminar – Aquatic Life in UGA Watersheds.” Fall 2016
 Assisted Dr. Susan Wilde

PUBLICATIONS

Peer-Reviewed Articles

5. Dwivedi, D., Santos, A.L.D., **Barnard, M.A.**, Crimmins, T.M., Malhotra, A., Rod, K.A., Aho, K.S., Bell, S.M., Bomfim, B., Brearley, F.Q. and Cadillo-Quiroz, H., Chen, J., Gough, C.M., Graham, E.B., Hakkenberg, C.R., Haygood, L., Koren, G., Lilleskov, E., Meredith, L.K., Naeher, S., Nickerson, Z.L., Pourret, O., Song, H.-S., Stahl, M., Taş, N., Vargas, R., and Weintraub-Leff, S. 2022. Biogeosciences Perspectives on Integrated, Coordinated, Open, Networked (ICON) Science, *Earth and Space Science*. 9(3):e2021EA002119. <https://doi.org/10.1029/2021EA002119>.
4. **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>.
3. Paerl, H.W., Hall, N.S., Hounshell, A.G., Rossignol, K.L., **Barnard, M.A.**, Luettich, R.A. Rudolf, J.C., Osburn, C.L., Bales, J., and Harding, L.W. 2020. Recent increases of rainfall and flooding from tropical cyclones (TCs) in North Carolina (USA): implications for organic matter and nutrient cycling in coastal watersheds, *Biogeochemistry*. 150(2): 197–216. <https://doi.org/10.1007/S10533-020-00693-4>.
2. Paerl, H.W. and **Barnard, M.A.** 2020. Mitigating the global expansion of harmful cyanobacterial blooms: Moving targets in a human- and climatically-altered world, *Harmful Algae*. 96: 101845. <https://doi.org/10.1016/j.hal.2020.101845>.
1. **Barnard, M.A.**, Porter, J.W., and Wilde, S.B. 2017. Utilizing *Spirogyra grevilleana* as a Phytoremediatory Agent for Reduction of Limnetic Nutrients and *Escherichia coli* Concentrations, *American Journal of Plant Sciences*. 8(5): 1148-1158. <https://doi.org/10.4236/ajps.2017.85075>.

Preprinted Articles

2. **Barnard, M.A.** and Paerl, H.W. *In Review*. Using dilution grazing assays to measure size fractionated phytoplankton mortality rates across the freshwater-to-marine continuum, *Submitted to PLoS ONE*. Preprinted on *bioRxiv*. 24 February 2022. <https://doi.org/10.1101/2022.02.23.481667>.
1. **Barnard, M.A.**, Emani, S.R., Fortner, S.K., Haygood, L., Sun, Q., White-Newsome, J.L., and Zaitchik, B. *In Review*. GeoHealth Perspectives on Integrated, Coordinated, Open, Networked (ICON) Science, *Submitted to Earth and Space Science*. Preprinted on *Earth and Space Science Open Archive*. 12 December 2021. <https://doi.org/10.1002/essoar.10509342.1>.

Patents

2. **Barnard, M.A.**, 2014. Algal System for Improving Water Quality. Canadian Patent Application CA/2951817. Filed 12 June 2014 as International Patent Application WO/2014/201298. Patent Pending.
1. **Barnard, M.A.**, 2018. Algal System for Improving Water Quality. United States Patent 10,065,876. Issued September 4, 2018.

Repository Papers

3. **Barnard, M.A.** and Peissig, J.M. 2016. “Effects of Light Pollution on Loggerhead Sea Turtle (*Caretta caretta*) Nesting Behavior in Georgia and South Carolina,” University of Georgia Athenaeum Repository. Paper ID: 10724/35551. SeaTurtle.org Paper ID: 9775.
2. **Barnard, M.A.** 2015. “A Survey of the Tidal Cycle Influence on the Differential Phytoplankton Diversity of the Duplin River at Marsh Landing on Sapelo Island, Georgia,” University of Georgia Athenaeum Repository. Paper ID: 10724/35550.
1. **Barnard, M.A.**, Brock, H.K., Campbell, P., and Peissig, J.M. 2015. “Soil Manipulation by Leaf Cutter Ants at La Selva Biological Station, Puerto Viejo, Costa Rica,” University of Georgia Athenaeum Repository. Paper ID: 10724/35605.

Code and Data

3. **Barnard, M.A.** 2022 “GitHub: malcolmbarnard/Barnard_Paerl_PLoSOne_Data” <https://www.doi.org/10.5281/zenodo.5898592>.
2. **Barnard, M.A.** 2021 “GitHub: malcolmbarnard/GrazingMethodDevelopment” <https://www.doi.org/10.5281/zenodo.5026535>.
1. **Barnard, M.A.** 2020. “GitHub: malcolmbarnard/WLE_Barnard_et_al_Toxins” <https://www.doi.org/10.5281/zenodo.4281127>.

Protocols

1. **Barnard, M.A.** 2021. “Protocol for Creating Major Ion Solutions for Freshwater Systems.” Protocols.io. <https://www.doi.org/10.17504/protocols.io.bvyn7xn>.

GRANTS AND RESEARCH FELLOWSHIPS

3. **ACS Committee on Environmental Improvement and Committee on Local Section Activities Mini-Grant For Sustainability Programming**, (2020) Establishing a BIPOC seminar series through the Eastern North Carolina American Chemical Society Local Chapter (\$500)
2. **Kenan Graduate Student Award**, (2019) “Using stable isotopes to identify fertilizer-derived nitrogen (N) assimilation in microcystins” (\$2500)
1. **Sigma Xi Grants-in-Aid of Research**, (2019) “Understanding the effects of grazing on cyanoHAB toxicity” (\$750)

CONFERENCE PRESENTATIONS

20. “Nutrient Dynamics of Microcystin and Anatoxin Production in the Western Lake Erie Cyanobacterial Harmful Algal Blooms,” Society of Environmental Toxicology and Chemistry 2021 North America SciCon4 Virtual Conference. Portland, OR, USA, November 2021.
19. “Macronutrient and B vitamin dynamics of Chowan River (North Carolina, USA) CyanoHABs,” 19th Virtual International Conference on Harmful Algae. La Paz, BCS, Mexico, October 2021.
18. “Evaluating FluoroProbe as a tool for rapid chlorophyll a and phytoplankton group differentiation during bloom conditions,” Oceans and Human Health Virtual Meeting 2021. Bowling Green State University, Bowling Green, OH, USA, October 2021.
17. “Macronutrient and vitamin influences on Chowan River (North Carolina, USA) cyanobacterial harmful algal bloom biomass and toxicity,” American Chemical Society Fall 2021 National Meeting. Atlanta, GA, USA, August 2021. Presentation is available at <https://doi.org/10.1021/scimeetings.1c01003>.
16. “Macronutrient and vitamin influences on the Chowan River (North Carolina, USA) CyanoHABs,” 10.5 US Symposium on Harmful Algae Virtual Meeting. Virtual, USA, May 2021.
15. “Nutrient limitation dynamics of Western Lake Erie CyanoHAB biomass, microcystin, and anatoxin production,” International Association for Great Lakes Research Virtual Annual Conference. Michigan Technical University, Houghton, MI, USA, May 2021.
14. “Nutrient limitation dynamics of Western Lake Erie cyanoHAB biomass and toxin production,” American Chemical Society Virtual Spring 2021 National Meeting. San Francisco, CA, USA, April 2021. Presentation is available at <https://doi.org/10.1021/scimeetings.1c00521>.
13. “Nutrient limitation dynamics of the Western Lake Erie CyanoHABs,” Oceans and Human Health Virtual Meeting 2020. Woods Hole, MA, USA, October 2020.
12. “Understanding the roles of nutrient limitation on the Western Lake Erie Cyanobacterial Harmful Algal Blooms,” North Carolina State University LW Parks Lectureship ePoster Session. Raleigh, NC, USA, September 2020.
11. “Use of ¹⁵N compound specific analysis to trace N assimilation into microcystins in toxic cyanobacterial harmful algal blooms (cyanoHABs),” American Chemical Society 2019 Eastern North Carolina Poster Session, Greenville, NC, USA, November 2019.
10. “Utilizing the Alga *Spirogyra* to Improve Limnetic Water Quality: A Phytoremediatory Approach to Nutrient and Bacterial Pollution,” Association for the Sciences of Limnology and Oceanography 2018 Summer Meeting, Victoria, BC, Canada, June 2018.

9. "Utilizing *Spirogyra grevilleana* as a Phytoremediatory Agent for Reduction of Limnetic Nutrients and *Escherichia coli* Concentrations," 2018 European Geosciences Union General Assembly, Vienna, Austria, May 2018. Poster available on <http://essoar.org>. DOI: <https://doi.org/10.1002/essoar.884a8536f683a34d.b4c20790a6644e17.2>.
8. "Providing Potable Water from Lake Water: The Frontiers of Sustainability in Your Own Backyard," Ecological Society of America's Centennial Conference, Baltimore, Maryland, USA, August 2015.
7. "Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels," Center for Undergraduate Research Opportunities Symposium, Athens, GA, USA, March 2015.
6. "Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels," Georgia Association of Water Professionals Industrial Conference, Athens, GA, USA, March 2015.
5. "Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels," International Erosion Control Association Environmental Connection Conference, Portland, OR, USA, February 2015.
4. "Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels," UGA Sustainability Science Symposium, Athens, GA, USA, January 2015.
3. "Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels," Odum School of Ecology Graduate Symposium, Athens, GA, USA, January 2015.
2. "Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels," Georgia Association of Water Professionals Annual Conference, Savannah, GA, USA, July 2014.
1. "Utilization of *S. grevilleana* as a Novel Method of Bioremediation in Freshwater Lakes," Georgia Association of Water Professionals Annual Conference, Savannah, GA, USA, July 2013.

INVITED TALKS

7. **Brown Bag Seminar**, "The effects of nutrients and vitamins on the Chowan River CyanoHABs," Institute of Marine Sciences, University of North Carolina at Chapel Hill, Morehead City, NC, USA, February 2021.
6. **Mostly Marine Informal Seminar**, "Using FluoroProbes to Rapidly Quantify CyanoHABs," Duke University Marine Laboratory, Beaufort, NC, USA, May 2020.
5. **Brown Bag Seminar**, "Understanding Western Lake Erie CyanoHAB Bloom Dynamics," Institute of Marine Sciences, University of North Carolina at Chapel Hill, Morehead City, NC, USA, January 2020.
4. **National Wildlife Federation EcoLeader Panel**, Georgia Campus Sustainability Network Annual Conference, Atlanta, GA, USA, September 2016.
3. **TEDx Talk**, "Solving the Global Water Crisis," TEDxUGA Student Idea Competition, one of nine students campus-wide selected to present, Athens, GA, USA, January 2015.
2. **National Wildlife Federation Speech**, "The Importance of Volunteering in Your Community," Disney Kids and Nature Celebration, Orlando, FL, USA, February 2012.
1. **TEDx Talk**, "Follow Your Dreams," TEDxYouth@PiedmontPark, Atlanta, GA, USA, November 2011.

SELECTED HONORS AND AWARDS

Registration Fee Award for the 2021 International Conference on Harmful Algae , Awarded by US National Office for Harmful Algal Blooms on behalf of NOAA NCCOS	2021
IAGLR Science Communication Scholar , Recognized by the International Association of Great Lakes Research due to being an IAGLR 2021 Student Presentation Award Finalist	2021
2020 National Science Foundation Graduate Research Fellowship Honorable Mention	2020
Kenan Graduate Student Award , awarded by the Department of Marine Sciences, University of North Carolina at Chapel Hill	2019
Election to Full Membership, Sigma Xi	2018
Josh Laerm Memorial Outstanding Ecology Undergraduate Award Awarded to a graduating senior Ecology major based on a combination of research, classroom, and service performance (<i>i.e.</i> , all-around qualities as a professional ecologist)	2017
1st place in UGA Sustainability Science Symposium poster session	2015
2nd place in Odum School of Ecology Graduate Symposium poster session	2015

University of Georgia Bernard Ramsey Honors Scholarship (4-yr academic scholarship)	2014
IBM Watson Scholarship (4-yr academic scholarship)	2014
U.S. National Stockholm Junior Water Prize , State of Georgia winner for algal research	2013, 2014
Georgia's 20 Under 20 , 21 st Century Leaders	2012
2011 Atlanta Cox Conserves Heroes Finalist , Cox Enterprises and The Trust for Public Land	2011
Awarded for contribution to community conservation	

PROFESSIONAL TRAINING / CERTIFICATION

Science Communication Workshop , Phipps Conservatory and Botanical Gardens, Pennsylvania (Virtual) USA (2022)	
Twitter for Science 101 , University of North Carolina – Chapel Hill Department of Earth, Marine, and Environmental Sciences, North Carolina, USA (2021)	
Unlearning Racism in Geosciences (URGE) Training , UNC Marine and Geosciences Pod Member (2021)	
Diver First Aid (DFA) Pro (CPR-HCP, First Aid, AED, O₂ Provider) , Divers Alert Network (2020)	
Pursuing Respect, Inclusion, Diversity, and Equity (PRIDE) Training , Duke University Center for Sexual and Gender Diversity, Duke University Marine Lab, North Carolina, USA (2020)	
Scientific Diving Certification – American Academy of Underwater Science , University of North Carolina (2019-2020), University System of Georgia (2016-2017)	
2019 ComSciCon-Triangle Science Communication Training Workshop , Raleigh/Research Triangle Park, North Carolina, USA (2019)	
Entering Mentoring Training Workshop , University of North Carolina – Chapel Hill Graduate School, North Carolina, USA (2019)	
University of North Carolina – Chapel Hill Safe Zone Training , University of North Carolina – Chapel Hill LGBTQ Center, North Carolina, USA (2018)	
Helping Advocates for Violence Ending Now (HAVEN) Training , University of North Carolina – Chapel Hill Equal Opportunity & Compliance Office, North Carolina, USA (2018)	
Methods in Environmental Acquisition / Remote Data Acquisition (RDA) Sensor Training Workshop , University of New Mexico, Sevilleta Field Station, New Mexico, USA (2018)	
Introduction to Remote Sensing and GIS for Ecological Applications , PR Informatics, Glasgow, Scotland, UK (2018)	
Stable Isotope Ecology Course , Sicily Center for International Education, Siracusa, Sicily, Italy (2018)	
Master SCUBA Diver, Scuba Schools International Certification , Stress and Rescue (2017), Navigation, Deep, Wreck, Night/Reduced Visibility, and Nitrox (2016)	
Georgia Soil and Water Conservation Commission Level 1-A Certified Personnel/Blue Card Holder Georgia NPDES Training Institute (2016)	
Georgia Adopt-A-Stream QA/QC Certification , State of Georgia's Environmental Protection Division Chemical (2009, 2010, 2016); Biological (2010, 2016); and Bacterial (2012) water quality testing	

SELECTED UNIVERSITY INVOLVEMENT

University of North Carolina – Chapel Hill – Marine Sciences Department Diversity, Equity, and Inclusion Committee Member	2020-2021
University of North Carolina – Chapel Hill – Marine Sciences Graduate Student Symposium Co-Chair	2019-2020
University of Georgia Student Government Association – Odum School of Ecology Senator Chair of Auxiliary Services Committee	2015-2017
University Council – Odum School of Ecology Student Representative Library Committee Member	2016-2017
American Water Resources Association, UGA Chapter – Treasurer	2015-2017
National Wildlife Federation – Campus EcoLeader	2014-2017

SELECTED PROFESSIONAL SERVICE

North Carolina American Water Works Association/Water Environment Association (NC AWWA/WEA) Public Education Committee Member , 2018-current	
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Eastern North Carolina Section of the American Chemical Society Diversity in the Chemical Sciences Seminar Series Coordinator, 2020-2021

Peer Reviewer

Academia Letters, Coral Reefs, Journal of Geophysical Research – Biogeosciences, Life: The Excitement of Biology, Microbial Ecology, PCIEcology

STATISTICAL SOFTWARE PROFICIENCIES

MatLab, mathematical modeling
R/R Studio, statistical analysis utilizing **LaTeX** for formatting
Grass GIS, Open Source Global Information Systems Software
P.A.S.T., population analysis
JMP, population modeling

SELECTED COMMUNITY OUTREACH

Future City Competition National Judge, North Carolina Regional Judge, December 2021-January 2022; International Competition judge, March 2021 and February 2022.

Blue Heron Ocean Sciences Bowl, Manteo, NC Science Judge, February 2021; Morehead City, NC Moderator, February 2022

Skype a Scientist, communicating science to campers and school students, 2020-current.

North Carolina Stockholm Junior Water Prize Judge, acting as member of the North Carolina Water Environment Association Public Education Committee, 2019-2022. Helped to select the North Carolina state SJWP winner.

North Carolina Science and Engineering Fair Judge – Region I February 2020; **Region II** February 2019 and February 2022; **Region IIIB** February 2021 and February 2022; **Region V** February 2019 and February 2022, **Region VI** February 2022; **State Fair**, March 2022.

SciREN Coast, 2019-2021 Admin Team member and Educator Team leader.

Future City Competition Mentor, mentoring one team of seventh graders and two teams of eighth graders at Epiphany School of Global Studies in New Bern, North Carolina, USA for the 2020 Future City Competition, October 2019-January 2020.

Science Fair Mentor, mentoring eight grade students at Beaufort Middle School, Beaufort, North Carolina, USA. November 2019-December 2019.

Raleigh Model Water Competition, volunteer with the 2019 Model Water Competition hosted by the North Carolina Water Environment Association at Abbotts Bridge Elementary School, Raleigh, North Carolina, USA, October 2019.

Girls Exploring Science and Technology, volunteer with the 2019 Girls Exploring Science and Technology at the University of North Carolina – Chapel Hill Institute of Marine Sciences, Morehead City, North Carolina, USA, October 2019.

United States National Stockholm Junior Water Prize Coach, acting as coach at the 2019 United States National Stockholm Water Prize competition at The Ohio State University, Columbus, Ohio, USA, June 2019.

SciREN Coast, Lesson Plan Workshop at Duke University Marine Lab, January 2019.

Georgia DNR Tybee Island Sea Turtle Project, Sea Turtle Patrol, 2014-2018. Conducting morning beach surveys, nocturnal nest sitting, nest transfers, and egg genetic sample field preparation.

Tybee Island Marine Science Center, Volunteer, 2011-2018. Educating visitors through gallery interpretation and assistance with beach walks, husbandry, and research.

National Park Service, Park Volunteer, 2010-2018. Assisting with educational programs, event preparation, and park cleanup at the Chattahoochee River National Recreation Area.

Upper Oconee Watershed Network, Volunteer, 2015-2017. Quarterly water quality monitoring of Athens-Clarke County, GA streams.

Georgia State Science and Engineering Fair, Junior Division Science Fair Judge, Athens, GA, April 2016.

Rivers Alive, River Clean Up, Athens, GA, 2015.

National Wildlife Federation, Project leader and volunteer, 2010-present, Youth Ambassador, 2010-2014. Created and led Johns Creek Certified Community Wildlife Habitat Project.

Chattahoochee Nature Center, Docent, 2009-2014. Completed docent training program; educated visitors through artifact biobuggies and exhibit gallery interpretation.