

Winifred M. Johnson

Department of Chemistry and Biochemistry
University of North Carolina Wilmington
Dobo Hall, Cahill Dr., Wilmington, NC, 28403 USA
johnsonwm@uncw.edu

EDUCATION

Ph.D., Chemical Oceanography	MIT-WHOI Joint Program, USA	2011-2017
B.A., Chemistry with Honors	Haverford College, USA	2005-2009

EXPERIENCE

Assistant Professor, University of North Carolina Wilmington, Wilmington, NC, August 2020- .

National Research Council Postdoctoral Fellow, U.S. Naval Research Laboratory, Washington, DC, 2017-2020,
Supervisor: G. Vora

*Characterization of the marine bacterium *Vibrio natriegens* metabolome as a potential chassis for synthetic biology applications*
Techniques for LC-MS-based targeted and untargeted metabolomics. Instrumentation including Triple quadrupole mass spectrometry, high resolution mass spectrometry (time-of-flight, Orbitrap), analytical high performance liquid chromatography. Trouble shooting and maintenance of liquid chromatographs and mass spectrometers.

Graduate Student, Massachusetts Institute of Technology-Woods Hole Oceanographic Institution Joint Program, Cambridge and Woods Hole, MA, 2011-2017, Advisor: E. Kujawinski

Linking microbial metabolism and organic matter cycling through metabolite distributions in the ocean
Techniques including targeted and untargeted metabolomics with triple quadrupole mass spectrometry and Fourier transform ion cyclotron resonance mass spectrometry.

Research Assistant/Lab Manager/Undergraduate student mentor, Haverford College, Haverford, PA, 2010- 2011,
Supervisor: K. Åkerfeldt

Porphyrin-Peptide Nanowire Development

Senior research, Haverford College, Haverford, PA, 2008-2009, Advisors: K. Åkerfeldt, Haverford College; S. Linse, Lund University, Lund, Sweden

Plant and Vertebrate Calmodulin Target Binding

HHMI Interdisciplinary Scholar, Haverford College, Haverford, PA, 2007, Advisor: F. Blase

Antibiotic analog synthesis and "green" Aldol and Diels-Alder reactions

Field Assistant, USDA Forest Service, Delaware, OH, Summers 2005, 2006, Supervisor: J. Rebeck

Oak Regeneration and Emerald Ash Borer Studies

TEACHING AND OUTREACH

University of North Carolina Wilmington, August 2020-
General Chemistry I & II
Introduction to Chemical Research
Advanced Analytical Chemistry
Instrumental Analysis Laboratory

Coastal Ocean Environment Summer School in Ghana, Accra, Ghana, 2015, 2018-present
Chemical oceanography instructor in a weeklong program at the Regional Maritime University and the University of Ghana, sponsored by the University of Michigan, National Science Foundation, U.S. Office of Naval Research, and the International Centre for Theoretical Physics. Lectured, mentored student research, developed laboratories, and helped organize the schedule and projects.

MIT Teaching Certificate, MIT, 2015

Outreach, WHOI, 2013-2017

Activities including: ocean acidification demonstrations with middle school students; temperature and salinity monitoring and discussion with high school students; chromatography and metabolites in the ocean demonstration for WHOI visitors; ocean acidification activities and demonstrations for visiting K-12 teachers; “phytoplankton and the biological pump” demonstrations for the Cambridge Science Festival.

Research Mentoring, WHOI, 2012 Hosted high school student for summer research.

Research Mentoring, Haverford College, 2007-2009, 2010-2011 Trained and supervised 12 undergraduates.

Howard Hughes Medical Institute Mentoring and Student Teaching Program, Haverford College, 2009
Mentored Philadelphia City Schools students in a weekly lab-based science program.

General & Organic Chemistry Assistant, Haverford College, 2006-2009

GRANTS AND AWARDS

National Research Council Postdoctoral Fellowship, 2017-2020

Ecological Dissertations in the Aquatic Sciences (Eco-DAS), October 2016

Dissertations Symposium in Chemical Oceanography (DISCO), October 2016

Ocean Ventures Fund, 2015

CMORE Microbial Oceanography Workshop, University of Hawaii, 2012

National Defense Science and Engineering Graduate Fellowship, 2012-2015

Watson Fellow, postgraduate international independent study award, 2009-2010

Peirce Award in Chemistry, Haverford College, 2009

Koshland Integrated Natural Science Center Travel Grant to Lund University, Sweden, Haverford College, 2008

Howard Hughes Medical Institute Interdisciplinary Scholar, Haverford College, 2007-2009

PUBLICATIONS

Cavaco, M. A., M. P. Bhatia, A. K. Hawley, M. Torres-Beltrán, **W. M. Johnson**, K. Longnecker, K. Konwar, E. Kujawinski, S. Hallam. 2022. Pathway-centric analysis of microbial metabolic potential and expression along

nutrient and energy gradients in the western Atlantic Ocean. *Frontiers in Marine Science*.
<https://www.frontiersin.org/articles/10.3389/fmars.2022.867310/full>

- McParland, E. P., H. Alexander, **W. M. Johnson**. 2021. The osmolyte ties that bind: genomic insights into synthesis and breakdown of organic osmolytes in marine microbes. *Frontiers in Marine Science*.
<https://www.frontiersin.org/articles/10.3389/fmars.2021.689306/full>
- Johnson, W. M.**, H. Alexander, R. Bier, D. Miller, M. Muscarella, K. Pitz, and H. Smith. 2020. Auxotrophic interactions: A stabilizing attribute of aquatic microbial communities? *FEMS Microbiology Ecology*. 96: 1-14.
<https://academic.oup.com/femsec/advance-article/doi/10.1093/femsec/fiaa115/5855490>
- Johnson, W. M.**, K. Longnecker, M. C. Kido Soule, W. Arnold, M. P. Bhatia, S. J. Hallam, B. A. S. Van Mooy, and E. B. Kujawinski. 2020. Metabolite composition of sinking particles from surface suspended particles across a latitudinal transect in the South Atlantic. *Limnol. Oceanogr.* 65: 111-127.
<https://aslopubs.onlinelibrary.wiley.com/doi/full/10.1002/lno.11255>
- Millette, N. C., J. Grosse, **W. M. Johnson**, M. J. Jungbluth, and E. A. Suter. 2018. Hidden in plain sight: The importance of cryptic interactions in marine plankton. *Limnol. Oceanogr. Lett.* 3: 341–356.
<https://aslopubs.onlinelibrary.wiley.com/doi/abs/10.1002/lol2.10084>
- Kujawinski, E. B., K. Longnecker, H. Alexander, S. T. Dyhrman, C. L. Fiore, S. T. Haley, and **W. M. Johnson**. 2017. Phosphorus availability regulates intracellular nucleotides in marine eukaryotic phytoplankton. *Limnol. Oceanogr. Lett.* 2: 119–129.
<https://aslopubs.onlinelibrary.wiley.com/doi/full/10.1002/lol2.10043#references-section>
- Johnson, W. M.**, M. C. Kido Soule, and E. B. Kujawinski. 2017. Extraction efficiency and quantification of dissolved metabolites in targeted marine metabolomics. *Limnol. Oceanogr. Methods*. 15: 417–428.
<http://onlinelibrary.wiley.com/doi/10.1002/lom3.10181/full>
- Johnson, W. M.**, M. C. Kido Soule, and E. B. Kujawinski. 2016. Evidence for quorum sensing and differential metabolite production in response to DMSP. *The ISME Journal*. 10:2304–2316.
<http://www.nature.com/ismej/journal/vaop/ncurrent/full/ismej20166a.html>
- Kido Soule, M. C., K. Longnecker, **W. M. Johnson**, and E. B. Kujawinski. 2015. Environmental metabolomics: Analytical strategies. *Marine Chemistry*. 177:374–387.
<http://www.sciencedirect.com/science/article/pii/S0304420315300153>
- O’Connell, D. J., M. C. Bauer, J. O’Brien, **W. M. Johnson**, C. A. Divizio, S. L. O’Kane, T. Berggård, A. Merino, K. S. Åkerfeldt, S. Linse, and D. J. Cahill. 2010. Integrated protein array screening and high throughput validation of 70 novel neural calmodulin binding proteins. *Molecular and Cellular Proteomics*. 9:1118–1132.
<http://www.mcponline.org/content/9/6/1118.abstract>

INVITED PRESENTATIONS

- “Diversifying Oceanography: The Coastal Ocean Environment Summer School in Ghana,” Brian Arbic, Winifred Johnson, Tashiana Osborne, Edem Mahu, Harvard University, November 2021.
- “Diversifying Oceanography: The Coastal Ocean Environment Summer School in Ghana,” Brian Arbic, Winifred Johnson, Ebenezer Nyadjro, UNCW, September 2021.
- “Diversifying Oceanography: The Coastal Ocean Environment Summer School in Ghana,” Brian Arbic, Winifred Johnson, Joseph Ansong, Madelyn Cook, University of Rhode Island, Nov 2020.
- “Diversifying Oceanography: The Coastal Ocean Environment Summer School in Ghana,” Brian Arbic, Winifred Johnson, Woods Hole Oceanographic Institution, October 2020.

- “The small molecule puzzle of marine organic carbon cycling,” University of North Carolina Wilmington interview seminar, Wilmington, NC, 27 February 2020.
- “Molecule-specific exchanges between organisms: auxotrophy and preferential utilization of organic matter,” Ecological Dissertations in the Aquatic Sciences (Eco-DAS), Honolulu, HI, October 2016.
- “Metabolomics: A new approach to linking microbial activity and organic matter composition,” Dissertations Symposium in Chemical Oceanography (DISCO), Honolulu, HI, October 2016.
- “What metabolomics can tell us about microbial activity in the ocean,” MIT Microbial Systems Seminar, Cambridge, MA, May 2016.
- “The challenges of ocean living (& how to cope),” Ohio Wesleyan University, Delaware, OH, April 2016.

CONFERENCE PRESENTATIONS AND POSTERS (presenting author in bold)

- “Osmolyte synthesis and utilization in the marine bacterium *Vibrio natriegens*,” **W. M. Johnson**, E. E. Kelly, G. A. Ellis, D. H. Leary, G. J. Vora. Ocean Sciences Meeting, San Diego, CA, February 2020. (talk)
- “Osmolyte production in the salt marsh bacterium *Vibrio natriegens*,” **W. M. Johnson**, E. E. Kelly, G. A. Ellis, D. H. Leary, G. J. Vora. Association for the Sciences of Limnology and Oceanography Meeting, San Juan, PR, February 2019. (talk)
- “Metabolic responses in the salt marsh bacterium *Vibrio natriegens* to differences in temperature and salinity,” **W. M. Johnson**, E. E. Kelly, E. S. Gerlach, G. A. Ellis, D. H. Leary, G. Vora. Synthetic Biology for Defense Workshop, Arlington, VA, September 2019. (poster)
- “Targeted metabolomics for the physiological characterization of *Vibrio natriegens*,” **W. M. Johnson**, G. A. Ellis, E. Kelly, D. H. Leary, G. Vora. Synthetic Biology for Defense Workshop, Arlington, VA, September 2018. (poster)
- “Targeted metabolomics for characterization of marine microbes,” **W. M. Johnson**, G. A. Ellis, E. Kelly, D. H. Leary, G. Vora. American Society for Mass Spectrometry Meeting, San Diego, CA, June 2018. (poster)
- “Untargeted metabolomics reveals novel metabolites within the coastal and open ocean,” **E. B. Kujawinski**, W. M. Johnson, M. C. Kido Soule, K. Longnecker. American Society for Mass Spectrometry Meeting, Indianapolis, IN, June 2017. (poster)
- “Metabolite dynamics on sinking particles,” **W. M. Johnson**, W. A. Arnold, M. C. Kido Soule, K. Longnecker, B. A. S. Van Mooy, E. B. Kujawinski. Association for the Sciences of Limnology and Oceanography Meeting, Honolulu, HI, February 2017. (talk)
- “Metabolic profiling across a coastal-open ocean gradient.” **E. B. Kujawinski**, W. M. Johnson, M. C. Kido Soule, K. Longnecker. Association for the Sciences of Limnology and Oceanography Meeting, Honolulu, HI, February 2017. (talk)
- “Building a metabolome of the Atlantic Ocean,” **W. M. Johnson**, M. C. Kido Soule, K. Longnecker, E. B. Kujawinski. Ocean Sciences Meeting, New Orleans, LA, February 2016. (talk)
- “What can metabolomics tell us about microbial activity in the ocean?,” **W. M. Johnson**. WHOI Marine Chemistry & Geochemistry Department Seminar, Woods Hole, MA, January 2016. (talk)
- “Metabolic profiling of a latitudinal transect of the Atlantic Ocean,” **W. M. Johnson**, M. C. Kido Soule, K. Longnecker, E. B. Kujawinski. Chemical Oceanography Gordon Research Conference, Holderness, NH, July 2015. (poster)
- “Identification of novel microbial metabolites in the surface ocean.” **E. B. Kujawinski**, K. Longnecker, W. M. Johnson, C. Fiore, J. Futrelle. Association for the Sciences of Limnology and Oceanography Meeting,

Granada, Spain, February 2015. (talk)

- “The metabolic response of *Ruegeria pomeroyi* to growth on dimethylsulfoniopropionate,” **W. M. Johnson**. WHOI Biogeochemistry Seminar, Woods Hole, MA, June 2014. (talk)
- “Insights into carbon cycling along Line P from integration of microbial metabolomics and dissolved organic matter composition.” **E. B. Kujawinski**, J. Carozza, W. M. Johnson, M. C. Kido Soule, K. Longnecker. Ocean Sciences Meeting, Honolulu, HI, February 2014. (talk)
- “Coupling targeted and untargeted metabolomics to understand the impact of carbon substrate on the metabolism of *Ruegeria pomeroyi*,” **W. M. Johnson**, C. Fiore, K. Longnecker, M. C. Kido Soule, E. B. Kujawinski. Ocean Sciences Meeting, Honolulu, HI, February 2014. (poster)
- “Dissolved organic matter composition across a coastal-open ocean gradient in the eastern Pacific Ocean.” **E. B. Kujawinski**, W. M. Johnson, K. Longnecker. Goldschmidt Meeting, Florence, Italy, August 2013. (talk)
- “The impact of carbon substrate on the metabolic profile of the heterotrophic bacterium *Ruegeria pomeroyi*,” **W. M. Johnson**, I. Howard-Åkerfeldt, K. Longnecker, M. C. Kido Soule, E. B. Kujawinski. Association for the Sciences of Limnology and Oceanography Meeting, New Orleans, LA, February 2013. (talk)
- “Shifts in dissolved organic matter composition across a coastal-open ocean gradient in the eastern Pacific Ocean.” **E. B. Kujawinski**, W. M. Johnson. Association for the Sciences of Limnology and Oceanography Meeting, New Orleans, LA, February 2013. (talk)
- “Development of porphyrin-peptide self-assembling nanowires,” **W. M. Johnson**, K. Åkerfeldt. Frontiers at the Chemistry-Biology Interface, University of Delaware, Newark, DE, May 2011. (poster)
- “Development of porphyrin-peptide self-assembling nanowires,” **W. M. Johnson**, K. Åkerfeldt. Biophysical Meeting, Baltimore, MD, March 2011. (poster)
- “Calmodulin specificity in target binding,” **W. M. Johnson**, K. Åkerfeldt. American Chemical Society Undergraduate Poster Presentation, Temple University, Philadelphia, PA, January 2009. (poster)
- “Calmodulin specificity in target binding,” **W. M. Johnson**, K. Åkerfeldt. HHMI Interdisciplinary Scholar Poster Session, Haverford College, Haverford, PA, September 2008. (poster)
- “Developing Aldol and Diels-Alder reactions for organic chemistry laboratories,” **W. M. Johnson**, F. Blase. HHMI Interdisciplinary Scholar Poster Session, Ursinus College, Collegeville, PA, November 2007. (poster)

RESEARCH CRUISES

- July 2016: Scientist on BIOS-SCOPE cruise off Bermuda. Diel sampling of organic matter on board the R/V *Atlantic Explorer*. Chief Scientist: C. Carlson.
- Aug-Sept 2013: Scientist on northern Atlantic cruise from Booth Bay, Maine to the Labrador Sea ending in Bermuda on the R/V *Atlantic Explorer*. Sampling for metabolomics analyses. Responsible for all cruise logistics for our research group as well as sampling and post-cruise logistics for a colleague. Chief Scientist: M. Lomas.
- Mar-May 2013: Scientist on western Atlantic cruise from Montevideo, Uruguay, to Bridgetown, Barbados, on the R/V *Knorr*. Sampling for metabolomics analyses and incubation experiments. Chief Scientists: E. B. Kujawinski and K. Longnecker.
- June 2012: Participant on CMORE Microbial Oceanography Training cruise to Station ALOHA on the R/V *Kilo-Moana*. Collected basic chemical and microbial data including nutrients, cell counts using flow cytometry, primary production and bacterial production rates, and bacterial diversity. Chief Scientist: M. Church.
- May 2012: Scientist on GeoMICS cruise along Line P off the coast of Washington on the R/V *Thompson*.

Sampling for TOC, DOC, and metabolomics. Chief Scientist: E. V. Armbrust.

SERVICE AND PROFESSIONAL SOCIETIES

Peer Reviewer: Communications Biology, Marine Chemistry, Limnology & Oceanography, L&O: Methods, Talanta, Estuarine, Coastal, and Shelf Science

Proposal Reviewer: Chemical Oceanography proposals for NSF, Sea Grant

Member: American Society for Mass Spectrometry, Association for the Sciences of Limnology and Oceanography

Organizer: Cruise blog for Deep DOM research cruise on the R/V *Knorr*

Co-organizer: Adaptive Microbial Physiology session, Ocean Sciences Meeting in Honolulu, 2017 (with H. Alexander)

Co-coordinator: Coastal Ocean Environment Summer School in Ghana (COESSING), Accra, Ghana, 2019-present

Organizing Committee Member: Ocean Corps: Moving Ocean Science, People and Ideas Around the World for Sustainable Development, 2020-present