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# Harriet Alexander

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## Education

- 2010–2016 **PhD, Biological Oceanography**, *Massachusetts Institute of Technology – Woods Hole Oceanographic Joint Program*, Cambridge / Woods Hole, MA.  
Thesis title: Defining the ecological and physiological traits of phytoplankton across marine ecosystems  
Advisor: Dr. Sonya Dyhrman
- 2006–2010 **BA, Biological Sciences**, *Wellesley College*, Wellesley, MA, *cum laude*.  
Departmental Honors in Biological Sciences, Minor in Mathematics  
Thesis Title: Phylogenetic analysis of the diversity of photosynthetic picoeukaryotic phytoplankton in the Monterey Bay using rDNA clone libraries

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## Positions Held

- 2016–present **Postdoctoral Fellow**, *University of California, Davis*, Davis, CA.  
Advisor: Dr. C. Titus Brown
- 2016 **Postdoctoral Research Scientist**, *Lamont-Doherty Earth Observatory, Columbia University*, Palisades, NY.  
Advisor: Dr. Sonya Dyhrman
- 2010–2016 **Graduate Student Researcher**, *Woods Hole Oceanographic Institution*, Woods Hole, MA.  
Advisor: Dr. Sonya Dyhrman
- 2008–2010 **Undergraduate Research Intern**, *Monterey Bay Aquarium Research Institute*, Moss Landing, CA.  
Advisor: Dr. Alexandra Worden

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## Selected Awards and Fellowships

- 2016 EMBL Travel Award  
2015 NSF ECOGEO Workshop Travel Award  
2015 OCB Trait-based Ecology Conference Travel Award  
2014–2015 Ocean Life Institute Fellowship  
2014 OCB Scoping Workshop Travel Award  
2011–2014 National Defense Science and Engineering Fellowship  
2011 National Science Foundation Graduate Research Fellowship *declined*  
2010–2011 MIT Presidential Fellowship  
2010 Lucy Allen Branch Prize in Natural History  
2010 Jane Harris Schneider Prize in Sculpture

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## Publications

### Peer-reviewed

Rouco M, Haley ST, **Alexander H**, Wilson ST, Karl DM, Dyhrman ST. (2016). Variable depth distribution of *Trichodesmium* clades in the North Pacific Ocean. *Environmental Microbiology Reports*. doi:10.1111/1758-2229.12488.

**Alexander H**, Rouco M, Haley ST, Wilson ST, Karl DM, Dyhrman ST. (2015). Functional group-specific traits drive phytoplankton dynamics in the oligotrophic ocean. *Proceedings of the National Academy of Sciences* 112:E5972–E5979. doi:10.1073/pnas.1518165112.

**Alexander H**, Jenkins BD, Rynearson TA, Dyhrman ST. (2015). Metatranscriptome analyses indicate resource partitioning between diatoms in the field. *Proceedings of the National Academy of Sciences* 112:E2182–E2190. doi:10.1073/pnas.1421993112.

Fischer A, Moberg E, **Alexander H**, Brownlee E, Hunter-Cevera K, Pitz K, Rosengard S, Sosik H. (2014). Sixty Years of Sverdrup: A Retrospective of Progress in the Study of Phytoplankton Blooms. *Oceanography* 27:222–235. doi:10.5670/oceanog.2014.26.

**Alexander H**, Jenkins BD, Rynearson TA, Saito MA, Mercier ML, Dyhrman ST. (2012). Identifying reference genes with stable expression from high throughput sequence data. *Frontiers in Microbiology* 3:385. doi:10.3389/fmicb.2012.00385.

Dyhrman ST, Jenkins BD, Rynearson TA, Saito MA, Mercier ML, **Alexander H**, Whitney LP, Drzewianowski A, Bulygin VV, Bertrand EM, Wu Z, Benitez-Nelson C, Heithoff A. (2012). The transcriptome and proteome of the diatom *Thalassiosira pseudonana* reveal a diverse phosphorus stress response. *PloS one* 7:e33768. doi:10.1371/journal.pone.0033768.

### Pending

Kujawinski E, Longnecker K, Dyhrman ST, **Alexander H**, Fiore CL, Johnson WM. (In revision *L & O Letters*). Functional group-specific traits drive phytoplankton dynamics in the oligotrophic ocean.

Caron DA, **Alexander H**, Allen A, Archibald JM, Armbrust EV, Bharti A, Bell CJ, Dyhrman ST, Guida S, Heidelberg KB, Kaye JZ, Metzner J, Smith SR, Worden AZ. (In press at *Nature Reviews Microbiology*). Gene discovery across the eukaryotic tree of life enables new insights into ocean ecosystems.

**Alexander H**, Dyhrman ST. (In review *ISME Journal*). Transcriptional response and strain variation of the *Emiliania huxleyi* species complex under changing nutrient environments.

Wurch LL, **Alexander H**, Frischkorn K, Haley ST, Gobler CJ, Dyhrman ST. (In review *ISME Journal*). Phosphorus availability controls the development of a marine harmful algal bloom caused by the pelagophyte *Aureococcus anophagefferens*.

Whitney LP, Rynearson TA, Dyhrman ST, **Alexander H**, Bertrand EM, Moran DM, Jenkins BD. (In revision at *Journal of Phycology*). Transcriptomic and proteomic response to iron limitation in the marine diatom *Thalassiosira pseudonana*.

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## Presentations

**Alexander H**, Durkin C, Dyhrman ST. Combining *in situ* and culture-based 'omic and biogeochemical measures to identify the physiological ecology of a blooming diatom in the Amazon River Plume. Ocean Sciences, New Orleans, LA. February 2016.

Kujawinski E, Longnecker K, **Alexander H**, Dyhrman S, Jenkins B, Ryneerson T. Multi-omics profiling of phytoplankton community metabolism: linking metatranscriptomics and metabolomics to elucidate phytoplankton physiology in a model coastal system. Ocean Sciences, New Orleans, LA. February 2016.

Rosengard SZ, **Alexander H**, Cramer C. SUBMERGE! Bringing the ocean closer to New York City. Ocean Sciences, New Orleans, LA. February 2016.

**Alexander H**, Dyhrman ST. Nutrient pulses uniquely drive physiological ecology of cosmopolitan phytoplankton strains. A New Age of Discovery for Aquatic Microeukaryotes, Heidelberg, Germany. January 2016.

**Alexander H**, Rouco M, Haley ST, Wilson ST, Karl DM, Dyhrman ST. Functional group-specific traits drive phytoplankton dynamics in the oligotrophic ocean. Trait-based Approaches to Ocean Life, Waterville, NH. October 2015.

**Alexander H**, Jenkins BD, Ryneerson TA, Dyhrman ST. Metatranscriptome analyses indicate resource partitioning between diatoms in the field. The Molecular Life of Diatoms. July 2015.

**Alexander H**, Rouco M, Haley ST, Dyhrman ST. Eukaryotic metatranscriptome profiling identifies the unique response of phytoplankton functional groups to deep water upwelling at Station ALOHA. ASLO, Granada, Spain. February 2015.

**Alexander H**. Sixty years of Sverdrup. Wellesley College, Wellesley, MA. June 2014. *Invited talk.*

**Alexander H**, Jenkins BD, Ryneerson TA, Dyhrman ST. Eukaryotic metatranscriptomics reveals niche differentiation between two diatoms in Narragansett Bay,. Marine Microbes Gordon Research Conference, Waltham, MA. June 2014.

**Alexander H**, Rouco M, Haley ST, Dyhrman ST. Eukaryotic metatranscriptomics illuminates physiological response of phytoplankton to nutrient pulses at Station ALOHA. Ocean Carbon and Biogeochemistry Summer Workshop, Woods Hole, MA. July 2013.

**Alexander H**, Jenkins B, Ryneerson T, Saito M, Mercier M, Dyhrman S. Identifying reference genes with stable expression from high throughput sequence data. ASLO, New Orleans, LA. February 2013.

**Alexander H**, Dyhrman S. Assessing patterns in expression from transcriptome data. Town Hall: Marine Microbial Transcriptome Project, ASLO, New Orleans, LA. February 2013. *Invited talk.*

**Alexander H**, Monier A, McRose D, Wilcox H, Worden A. Prasinophyte phylogenetic characterization along a transect from Monterey Bay to oligotrophic waters. Rhulman Conference, Wellesley, MA. April 2010.

**Alexander H**, Monier A, McRose D, Wilcox H, Worden A. Prasinophytae phylogenetic characterization along a transect from Monterey Bay to oligotrophic waters and application to 454-TAG sequence analysis. Ocean Sciences, Portland, OR. February 2010.

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## Grants Awarded

- 2012-2015 "Molecular metabolic fingerprinting to identify drivers of phytoplankton bloom dynamics in the Southern Ocean." *Access to the Sea*, Woods Hole Oceanographic Institution. Awarded to **Alexander, H** and Dyhrman, ST, Co-Principal Investigators. **Total Award: \$56,917.**
- 2012-2015 "Metabolic fingerprinting to identify drivers of phytoplankton bloom dynamics in the Southern Ocean." *Ocean Ventures Fund*, Woods Hole Oceanographic Institution. Awarded to **Alexander, H**, Principal Investigators. **Total Award: \$11,000.**

## Teaching Experience

- Sept. 2015 **Co-instructor**, *Metagenomic Workshop*, Scripps Institute of Oceanography.  
Co-taught workshop on metagenomic data analysis at Scripps Institute of Oceanography.
- Sept. 2015 **Instructor**, *Software Carpentry Workshop*, Woods Hole Oceanographic Institution.  
Organized and taught Software Carpentry course at WHOI, teaching introductory UNIX shell scripting, Python programming, and Git versioning.
- 2014 **Teaching Assistant**, *Biological Oceanography course*, MIT-WHOI Joint Program.  
Conducted recitation sections, wrote and graded tests, problem sets, and daily assignments, advised professors on student performance.
- 2014 **Guest Lecturer**, *Biological Oceanography course*, MIT-WHOI Joint Program.  
Designed and presented lecture on application of molecular techniques to biological oceanography.
- 2007-2010 **Writing Tutor**, *Pforzheimer Learning and Teaching Center*, Wellesley College, Wellesley, MA.
- 2009-2010 **Tutor and Grader**, *Mathematics Department*, Wellesley College, Wellesley, MA.
- 2006-2009 **Night Assistant**, *Introductory Astronomy, Astronomy Department*, Wellesley College, Wellesley, MA.

## Research Cruises

- 2014 **Seasonal Trophic Roles of *Euphasia superba* STRES; NBP14-10**, *R/V Nathaniel B. Palmer*, 30 November - 29 December, West Antarctic Peninsula.  
Chief Scientist: Edward Durbin
- 2013 **Deep Dissolved Organic Matter (DeepDOM; KN210-04)**, *R/V Knorr*, 25 March - 9 May, Montevideo, Uruguay to Bridgetown, Barbados.  
Chief Scientist: Elizabeth Kujawinski
- 2012 **Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN 9; KM12-19)**, *R/V Kilo Moana*, 21 August - 11 September, Station ALOHA.  
Chief Scientist: Sam Wilson
- 2012 **Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN 7; KM12-17)**, *R/V Kilo Moana*, 4 -14 August, Station ALOHA.  
Chief Scientist: Sonya Dyhrman

## Academic Service

### Conferences

- 2017 Co-chair of session entitled "Molecular Insights into Adaptive Microbial Physiology" at ASLO Meeting, Honolulu, HI.
- 2016 Co-chair of mini-symposium on "Computational Reproducibility" at SciPy, Austin, TX.

### Reviewer

Manuscripts *ISME Journal*, *Limnology and Oceanography*, *Journal of Phycology*

Grants NSF

Committee Membership

2012 Holgar Jannasch Visting Scholar Award Committee

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Outreach

- 2014 **Submerge!** New York City marine science festival. Designed and manned booth of hands-on activities focused cycle for WHOI. Estimated more than 4000 people in attendance.
- 2014 **Women in Ocean Engineering.** Volunteered weekends to work with middle school age girls, introducing them to engineering concepts in a marine environment.
- 2011-2014 **Artistic Oceanographer Program.** Used a program that combines science and art to help communicate concepts.
- 2011-2013 **Falmouth Public School Science Fair.** Judged science fair projects for middle and high school aged children.
- 2012 **STEM for Girls at the New England Aquarium.** Mentored and volunteered for a program designed to encourage girls from underrepresented minorities to pursue math and science.

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Professional Development and Workshop Participation

- 2016 Participant, National Academies Keck Futures Initiative (NAKFI): Discovering the Deep Blue Sea, Irvine, CA.
- 2016 Participant, EcoDAS XII: Ecological Dissertations in the Aquatic Sciences, Honolulu, HI.
- 2016 Invited Participant, Plant Science Research Network Scenario Modeling Workshop, Chevy Chase, MD.
- 2015 Participant, OCB Scoping Workshop: Trait-based approaches to ocean life, Waterville Valley, NH.
- 2014 Participant, OCB Scoping Workshop: Improving predictive biogeochemical models through single cell-based analyses of marine plankton physiological plasticity, genetic diversity and evolutionary processes, Boothbay, ME.

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Skills and Certifications

**Certifications** PADI SCUBA Open Water, Software Carpentry Instructor Training

**Computation** Python (language of choice), Matlab, R, shell script

**Lab Techniques** Aseptic cell culturing, Nucleic acid extraction, PRC, pPCR, Sequencing, FISH, Flow cytometry, Microscopy

**Languages** English, French