

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

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

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

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 *Emiliana 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*.

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, Rynearson 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, Rynearson 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, Rynearson 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, Rynearson 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.

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

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.

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.

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