

**MARIA T. KAVANAUGH, Ph.D.**  
**CURRICULUM VITAE**

Woods Hole Oceanographic Institution  
Marine Chemistry and Geochemistry  
266 Woods Hole Road, MS #25

Woods Hole, MA, 02543  
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**CAREER SUMMARY**

I am a seascape ecologist, oceanographer, and data scientist interested in patterns and mechanistic responses of marine communities and ecosystems to multiscale environmental forcing including climate change. I utilize a multi-pronged approach that includes lab and field based studies, statistical and bioinformatic-type analyses of large datasets, satellite remote sensing and coupled climate ecosystem models.

**EDUCATION**

Postdoctoral Scholarship, Woods Hole Oceanographic Institution Nov 2012- 2014  
*Supervisor: Scott C. Doney*  
Ph.D. Biological Oceanography; Minor: Statistics (minor), Oregon State University Dec. 2012  
*Dissertation: Dynamic seascapes: a quantitative framework for scaling pelagic biogeochemistry and ecology; Advisor: Ricardo M. Letelier*  
M.S. Zoology (Marine Ecology); Oregon State University 2006  
*Thesis: Phytoplankton shading of benthic macrophytes: implications for community structure; Advisors: Bruce A. Menge and Jane Lubchenco*  
B.S. Zoology (cum laude), O.S.U. 2000

**PROFESSIONAL APPOINTMENTS**

**Woods Hole Oceanographic Institution,** Woods Hole, MA  
Postdoctoral Investigator 12/01/2014- current  
Postdoctoral Scholar 12/01/ 2012-11/30/2014  
*Supervisor: Dr. Scott C. Doney*

- Leading the development of biogeographic framework for a demonstration marine biodiversity observing network to characterize, monitor, and understand patterns of marine biodiversity within a broad array of coastal habitats.
- Investigating global and regional climate effects on biodiversity and multi-trophic level productivity of coastal ecosystems along the Western Antarctic Peninsula, New England Shelf, and California Current.
- Taught intensive marine biogeochemistry and climate change course (30 contact hours) for summer program designed to increase participation of underrepresented groups in marine science. Developed course on computational ecology and statistics for undergraduates.

**College of Oceanic and Atmospheric Sciences, Oregon State University** Corvallis, OR  
Graduate Research Fellow 03/21/2006-10/31/2012

- Developed and validated a quantitative framework for scaling dynamic processes and patterns in pelagic ecosystems with subsequent applications for plankton ecology, biogeochemistry and marine ecosystem management.

- Led cruise-based field research in subarctic (7 cruises; over 70 sea days), subtropical (1; 15 days), and coastal (9; approximately 20 days) waters where responsible for biogeochemical and taxonomic measurements.
- Coordinated with Quileute and Makah tribes, Olympic National Park, and Olympic National Marine Sanctuaries to conduct field based coastal research involving primary production of marine ecosystems and nutrient exchange with adjacent coastal forests (days in field > 70).

**Department of Zoology, Oregon State University**

Corvallis, OR

Graduate Research and Teaching Assistant

09/16/2003- 03/20/2006

- Led investigations on direct and indirect effects of changing coastal phytoplankton abundances on benthic communities. Supervised and trained faculty research assistants on taxonomic identification, field protocols and statistical analyses. Trained postdoctoral scientists and graduate students on multivariate statistics.

**Partnership for Interdisciplinary Studies of Coastal Oceans, OSU**

Corvallis, OR

Faculty Research Assistant

04/01/2000 - 09/15/2003

Supervisor: *Dr. Bruce Menge*

- Managed and conducted multiscale biodiversity survey of intertidal invertebrates and macroalgae along the US West coast, including within NMS and National Park jurisdiction. Curated and analyzed multiple year record of 48 sites, 300+ species, and more than 20 environmental indices.
- Supervised and trained faculty research assistants, undergraduate interns (6-10 per season), and volunteers on taxonomic identification, field protocols (>60 days per year in field).
- Collaborated with federal and state agencies, tribes, NGOs, and the private sector to facilitate the characterization, monitoring, and research in nearshore marine environments.

**RESEARCH GRANTS AND AWARDS**

NOAA Ocean Acidification Program: Multi-scale prediction of California Current carbonate system dynamics ( <b>Lead PI</b> , \$84,000, <i>awarded</i> )	2016-2018
WHOI Technology and Innovation: Enabling hyperspectral monitoring of coastal ecology and water quality ( <b>Lead PI</b> , \$73,000, <i>awarded</i> )	2015-2017
NOPP: National Marine Sanctuaries as Sentinel Sites for a Demonstration Marine Biodiversity Observation Network ( <b>Co-PI</b> ; Lead PI: F.Muller-Karger; WHOI award: \$729,000) Press release: <a href="http://www.whoi.edu/news-release/biodiversity-network">http://www.whoi.edu/news-release/biodiversity-network</a>	2014-2019
NASA Carbon Cycle Science: Climate-driven Impacts on the Marine Ecology, Biogeochemistry, and Carbon Cycle of the West Antarctic Peninsula ( <b>Co-PI</b> ; Lead PI: Scott C. Doney WHOI award: \$1,093,000)	2014-2017
NASA Science of Aqua and Terra: Multiscale Satellite Analysis of the Biophysical Dynamics Governing Ocean Phytoplankton Community Structure ( <b>Co-PI</b> ; Lead PI: Scott C. Doney; WHOI award: \$865,000)	2014-2017
WHOI Postdoctoral Scholarship, Woods Hole, MA (~\$180,000)	2012-2014
NSF Advance Program (workshop sub-award, <b>co-PI</b> ). Advancing Toward Professorship in Biology, Ecology and Earth System Sciences (\$10,000)	2011
NASA Earth and Space System Graduate Fellowship (\$84,000)	2007-2011
Canon Foundation/AAAS National Park Scholarship (\$80,000)	2007-2011
Mamie Markham Graduate Research Award, (\$9900)	2004-2006

## **PUBLICATIONS (18) \* student mentee**

1. **Kavanaugh, M.T.**, Oliver, M., Chavez, F., Letelier, R.M., Montes, E., Muller Karger, F. and Doney, S.C. Quo Vadimus: Seascapes as a new vernacular for ocean monitoring, management and conservation. Accepted pending revision *ICES Journal of Marine Science*
2. Mackey, K.M., **Kavanaugh, M.T.** Chen, Y., Liu, F., Glover, D., Paytan, A. Nitrogen deposition fuels harmful algal blooms in the East China Sea. Submitted. *Environmental Science and Technology*.
3. **Kavanaugh, M.T.**, Letelier, R.M. and E. Sherr. Satellite derived seascapes describe coherent microbial assemblages and environmental forcing in the NE Pacific. Submitted *PLOS One*
4. **Kavanaugh, M.T.**, \*Abdala, F.N. Ducklow, H., Glover, D., Schofield, O., Stammerjohn, S., and Doney, S. C. Canyon effects on phytoplankton biomass and community structure along the Western Antarctic Peninsula. 2015 *Marine Ecology Progress Series*, 524:11-26
5. Saunders, M., Brown, C., Foley, M.E., Febria, C., Albright, R., Mehling, M., **Kavanaugh, M.T.** and Burfeind, D. 2015. Human impacts on connectivity in marine and freshwater ecosystems assessed using network measures. *Marine and Freshwater Research*. DOI:10.1071/MF14358
6. **Kavanaugh, M.T.**, Hales, B. Lockwood, D., Emerson, S., Quay, P.D., Letelier, R.M. Physicochemical and biological controls on primary and net community production across NE Pacific seascapes. 2014. *Limnology and Oceanography* 59(6), 2013-2027
7. Muller-Karger, F.E., **M.T. Kavanaugh**, E. Montes, W.M. Balch, M. Breitbart, F.P. Chavez, S.C. Doney, E.M. Johns, R.M. Letelier, M.W. Lomas, H.M. Sosik, and A.E. White, 2014: A framework for a marine biodiversity observing network within changing continental shelf seascapes. *Oceanography*, 27(2), 18–23, <http://dx.doi.org/10.5670/oceanog.2014.56>.
8. **Kavanaugh, M.T.**, Hales, B., Saraceno, M., Spitz, Y.H., White, A.E., Letelier, R.M., 2014. Hierarchical and dynamic seascapes: a quantitative framework for scaling pelagic biogeochemistry and ecology. *Progress in Oceanography* 120: 291-304
9. **Kavanaugh, M.T.**, Holtgrieve, G.W., Baulch, H., Brum, J.R., Cuvelier, M.L., Filstrup, C.T., Nickols, K.J, Small, G.E., 2013. A salty divide within ASLO? *Limnology and Oceanography Bulletin* (22) 2: 34-37
10. Lockwood D, Quay, P.D., **Kavanaugh, M.T**, Juranek, LW, Feely, R. 2012. Influence of net community production on air-sea CO<sub>2</sub> flux in the Northeast Pacific. *Global Biogeochemical Cycles* 26: GB4010. doi:10.1029/2012GB004380
11. **Kavanaugh, M. T. 2012**. Dynamic seascapes: a quantitative framework for scaling pelagic biogeochemistry and ecology. Ph.D. dissertation. <http://hdl.handle.net/1957/34739>
12. Hamme, R., and 15 others. 2010. Volcanic ash fuels anomalous plankton bloom in the subarctic NE Pacific. *Geophysical Research Letters* VOL. 37, L19604, doi:10.1029/2010GL044629
13. **Kavanaugh, M.T.**, Nielsen, K.J., Chan, F.T, Menge, B.A., Letelier, R.M., and \*Goodrich, L.M. 2009. Experimental assessment of shading on an intertidal kelp: do phytoplankton inhibit open-coast macroalgae? *Limnology and Oceanography* (54) 276-288
14. Davis C.O., **Kavanaugh, M.T.**, Letelier, R.M. Bissett, P and Kohler, D. 2007. Spatial and spectral resolution considerations for imaging coastal waters. *Proceedings of SPIE* 6680
15. Schoch, G.C., Menge, B.A., Allison, G.W., **Kavanaugh, M.T.**, Thompson, S.A., and Wood, S.A. 2006. Fifteen degrees of separation: Examining patterns and processes on Pacific coast rocky intertidal benches. *Limnology and Oceanography* (52): 2564-2585
16. **Kavanaugh, M.T.**, 2006. Phytoplankton shading of benthic macrophytes: implications for intertidal community structure. MS Thesis. <http://hdl.handle.net/1957/1357>

### ***Book chapters***

17. **Kavanaugh, M.T.**, Boersma, K., Close, S., Ganio, L., Hooven., L. and B. Lachenbruch: Advancing Toward Professorship in Biology, Ecology and Earth System Sciences. In FORWARD to Professorship in STEM: Inclusive Strategies That Work. C. Mavriplis, P. Sabila and S. Heller (Eds). Elsevier Press.
18. **Kavanaugh, M.T.**, Holtgrieve, G.W., Baulch, H., Brum, J.R., Cuvelier, M.L., Filstrup, C.T., Nickols, K.J, Small, G.E., 2014. A salty divide within ASLO? Chapter 5 In P.F. Kemp [ed.] 2014. Eco-DAS IX Symposium Proceedings. Waco, TX: Association for the Sciences of Limnology and Oceanography. DOI: 10.4319/ecodas.2014.978-0-984559-3-8.

### ***In preparation***

19. **Kavanaugh, M.T.**, Luis, K.\*, Rheuban, J. and Doney, S.C. Climate induced change of benthic temperatures along the New England Shelf: implication for fisheries. *Manuscript available on request.*
20. **Kavanaugh, M.T.** Church, M., Davis, C., Hales, B., Spitz, Y.H., White, A.E., Karl, D., Letelier, R.M and S.C. Doney. Multiscale biophysical variability in the North Pacific oligotrophic gyre. *Manuscript available on request.*
21. **Kavanaugh, M.T.**, Ducklow, H., Schofield, O., and Doney, S. C. Interannual shifts in phytoplankton community structure along the western Antarctic Peninsula. *Manuscript available on request.*

### **PRESENTATIONS**

I have given over 50 presentations at regional, national and international scientific meetings. In addition, I have given public talks to stakeholders and informal educators related to natural resource management and changes to ecosystems with climate change.

\* Abstract published; <sup>1</sup>Invited

- Kavanaugh, M.T.**, Ducklow, H. Glover, D. Schofield, O., Doney, S.C. **2015**. Local and regional shifts in phytoplankton abundance and community structure along the western Antarctic Peninsula. NASA Carbon Cycles and Ecosystems, College Park, MA.
- Kavanaugh, M.T.**, Montes, E., Doney, S, Muller-Karger, F.E., Chavez, F., Messie, M. and Gittings: S. **2015**. National Marine Sanctuaries as Sentinel Sites for a Demonstration Marine Biodiversity Observation Network (MBON): Remote Sensing of Dynamic Biogeographical Seascapes NASA Carbon Cycles and Ecosystems, College Park, MA.
- Kavanaugh, M.T.**, Lima, I.D., Doney, S.C. **2015**. Detecting climate induced shifts in areal extent and habitat diversity in pelagic seascapes. NASA Carbon Cycles and Ecosystems. College Park, MA.
- Kavanaugh, M.T.**<sup>1</sup>. **2015**. Dynamic seascape ecology: characterizing and tracking oceanic habitats. Monterey Bay Aquarium Research Institute, Moss Landing CA. April, 2015
- Kavanaugh, M.T.**<sup>1</sup>. **2015**. Spatiotemporal variability of phytoplankton abundance and community structure along the western Antarctic Peninsula. CEOAS Seminar, Oregon State University, Corvallis, OR. April, 2015.
- Kavanaugh, M.T.** **2015**. Pelagic seascape ecology and CMIP5: characterizing trajectories of dynamic ecosystems with climate change. Woods Hole, MA.
- Kavanaugh, M.T.**<sup>1</sup>. 2014. Characterizing dynamic ocean habitats. NOAA Webinar.
- Kavanaugh, M.T.** 2014. Ocean carbon cycles and climate change. National Network of Ocean and Climate Change Interpretation Workshop. Woods Hole, MA.

- Kavanaugh, M.T.\*** et al. 2014. Role of canyons on phytoplankton dynamics along the West Antarctic Peninsula. Ocean Sciences 2014. Honolulu HI
- Doney S.C\*. et al., 2014. Numerical modeling and remote sensing studies of regional marine biogeophysical variability around the Hawaii Ocean Time-Series (HOT) station ALOHA. Woods Hole, MA.
- Kavanaugh, M.T.** et al. 2014. Climate-induced shifts of plankton functional diversity revealed through seascape-based model intercomparison. Gordon Research Conference. Waterville Valley, NH.
- Kavanaugh, M.T.**<sup>1</sup> 2013. Dynamic Seascapes: Scaling from the Sample to the System. December, 2013. Hatfield Marine Science Center, Newport OR.
- Kavanaugh, M.T.\***, Abdala F. Ducklow, H. Glover, D. Schofield, O. Stammerjohn, S. Doney, S. 2013. Spatiotemporal variability of phytoplankton along the Western Antarctic Peninsula: role of submarine canyons. July, 2013. Ocean Carbon and Biogeochemistry Summer Meeting. Woods Hole Oceanographic Institution. Woods Hole, MA.
- Kavanaugh, M.T.** 2013. ATPinBEESS at Oregon State University. Forward to Professorship workshop meeting. April, 2013. Washington DC.
- Kavanaugh, M.T.**, Lima, I. Sailley, S., Doney, S. 2013. Pelagic ecosystem dynamics revealed through satellite and modeled seascapes. Marine Ecosystem Modeling Intercomparison Project meeting. March, 2013. Paris, France.
- Kavanaugh, M.T.** 2013. Dynamic Seascapes: An objective and hierarchical framework for scaling pelagic ecosystem variability. WHOI Marine Chemistry and Geochemistry Departmental Seminar. Woods Hole Oceanographic Institution, Woods Hole, MA.
- Kavanaugh, M.T.\***, Hales, B., Letelier, R.M. Spitz, Y., White, A.E., Church, M., Doney, S. Dynamic Seascapes: A dynamic and objective framework to understand pelagic ecosystem spatiotemporal variability. February 2013, ASLO Aquatic Sciences, New Orleans, LA.
- Boersma, K.\*, Close, S., **Kavanaugh, M.T.** Ganio, L., Hooven, L and B. Lachenbruch. 2012. Advancing toward professorship in biology, ecology, and earth systems sciences: Perceptions of confidence in early career scientists. Ecological Society of America. Portland, OR.
- Kavanaugh, MT.** 2011. Seascape studies of microbial structure and function. Line P Symposium. Sidney, BC.
- Kavanaugh\***, Letelier, Lockwood, Emerson, Quay. 2010. Ecophysiological constraints on the biological pump across the Pacific subarctic transition zone. ASLO/AGU Portland, OR.
- Lockwood\*, Quay, Emerson, **Kavanaugh**, Letelier. 2010. Carbon export rates and air-sea CO<sub>2</sub> flux across the North Pacific Transition Zone. ASLO/AGU Ocean Sciences, Portland, OR.
- Kavanaugh** and Letelier. 2009. Spatio-temporal variability of primary production in the NE Pacific: Brief summary of OSP observations. Line P Symposium. Sidney, BC.
- Kavanaugh\***, Letelier, Saraceno, Spitz. 2008. Satellite-derived biophysical provinces: tools for objective investigations of marine ecosystems. ASLO/AGU Ocean Sciences, Orlando, FLA
- Palacios\*, Peterson, **Kavanaugh**, Kudela. 2008. Optical detection of a dinoflagellate bloom in Monterey Bay, CA. ASLO/AGU Ocean Sciences, Orlando, FLA
- Kavanaugh\***, Letelier, Spitz. 2008. Determining objective biophysical provinces from multiple satellite sensor observations. NASA Ecosystems and Carbon Cycles, College Park, MD.
- Kavanaugh.** 2008. Effect of changing phytoplankton production on Oregon kelp communities. Northwest Algal Symposium, Charleston, OR.
- Kavanaugh**, Letelier, Strutton, Davis. 2006. Scales of Variability in Coastal Oceans: Lessons from EO-1 Hyperion. NOAA/NESDIS/StAR/CoRP Symposium. Fort Collins, CO.
- Kavanaugh**, Nielsen, and Menge, 2004. Phytoplankton Shading of Benthic Macrophytes: implications for community structure. Western Society of Naturalists, Rohnert Park, CA.

## **TEACHING EXPERIENCE**

<sup>1</sup> curriculum development <sup>2</sup> classroom/lab/field management <sup>3</sup> assessment

### **Undergraduate courses**

- Marine Biogeochemistry and Global Change (Woods Hole PEP and UMES) 2013-current  
Developed and taught course on principles of biogeochemistry, lower trophic level ecology, and causes and effects of eutrophication, ocean warming and ocean acidification. Led field trips and facilitated lab measurements. Coordinated field trips and in field demonstrations and lectures by local experts. Assessed student mastery through participation of engaged discussion, data analysis, short answer, and literature review.
- Introduction to Data Analysis <sup>1,2,3</sup> (Woods Hole PEP, UMES) June 2015  
Developed course to teach students with no prior background basic statistical concepts and methods to facilitate their research. Topics included metrics of central tendency and dispersion, t-tests, ANOVA and linear regression.
- Matlab Computational Ecology Workshop<sup>1,2</sup> (WHOI) June 2014  
Developed primer based to introduce students to programming in Matlab including basic operations, scripts, 1D and 2D visualization, and mapping.
- General Biology 21X, graduate teaching assistant<sup>1,2,3</sup> (OSU) 2003-2005  
Led laboratory investigations, tutorials and field trips for required course for Life Science majors. Topics included cell metabolism, anatomy, physiology, genetics, phylogenetics, evolution ecology, functional morphology, and biodiversity
- Marine Ecology, graduate teaching assistant<sup>1,2,3</sup> (OSU) 2004  
Created lectures, assignments and field trips for upper-division, intensive Marine Invertebrates and Algae Course. Developed assessment materials, prepared laboratories, and assessed mastery through written assignments and practical exams.

### **Graduate courses**

- Biogeochemical Earth, teaching assistant and guest lecturer<sup>1,2,3</sup> (OSU) 2012  
Developed lecture, computer lab assignments, and exams for core course for incoming Ocean Ecology and Biogeochemistry graduate students. Assessed and provided feedback on lab assignments, exams and student presentations.
- Phytoplankton Ecophysiology, regular guest lecturer<sup>1,2</sup> (OSU) 2009-2010  
Developed lectures, facilitated discussions, and assessed literature review assignments on primary production and biodiversity of phytoplankton.
- Coastal Ecology and Resource Management<sup>1,2</sup>, Invited lecturer (OSU) 2004-2006  
Developed lecture and field trip for rocky intertidal module.

### **K-12 and teacher training**

- Microbial Oceanography from Space <sup>1,2,3</sup>(OSU) 2008  
Developed lecture, lessons, and core curriculum links for middle school teachers from Hawaii, California and Oregon
- Coastal Oceanography Science Connections<sup>1,2</sup>(OSU) 2003-2006  
Led field marine ecology primer and field studies for high school students from underrepresented populations served by Portland Public Schools, Portland OR.
- Ecology: Discovering the World around Us<sup>1,2</sup> (OSU) 2005  
Taught a six week ecology module to elementary students

### **MENTEES, CURRENT POSITION, PROJECT**

2004-2005. Lea Goodrich, now with Corvallis School District 509J, Corvallis, OR. *Growth and physiological state of intertidal kelp in tank experiments.*

2008- 2010. Andrew Traylor, now with Bonneville Power Administration, Portland OR. 2008-2009. *spatial variability of marine wrack-derived nitrogen subsidies to coastal forests along the Olympic Coast, WA.*

2008- 2010. Pamela Tyhurst, now with National Park Service, TX and HI. *Diversity and resource use of ground-foraging arthropods in the high intertidal debris zone along the Olympic Coast, WA.*

2008-2009. Erin Wells, now with Naval Civilian Service, Bremerton, WA. *GIS studies of spatial and interannual variability of kelp canopy cover along the Olympic Coast, WA.*

2013. Felipe Nalin Abdala, Visiting student (WHOI), Federal University of Rio Grande, Brazil. *Pigment-based patterns of phytoplankton diversity along the western Antarctic Peninsula*

2014. Maria Ordovas Montanes, WHOI Summer Student Fellow, now at Oxford University, UK. *Phytoplankton Community Composition along the Western Antarctic Peninsula: a comparison of pigment and genomic classification methods.*

2014. Shanna Williamson. WHOI PEP student, now at Virginia Institute of Marine Sciences. *Modeling nutrient loading to Buzzards Bay, MA*

2015. Laura Crews, WHOI Summer Student Fellow, Stanford University. *Phytoplankton Bloom Phenology near Palmer Station Antarctica*

2015. Kelly Ruiz, WHOI PEP student. *Phenological shifts in spring warming along the New England shelf: comparisons across multiple sensors.*

### **WORKSHOPS AND TRAINING**

2010. Ocean Carbon and Biogeochemistry Workshop. Sea change: charting the course for ecological and biogeochemical time series research. Honolulu, HI.

2010. Ecological Dissertations in the Aquatic Sciences (EcoDAS). Honolulu, HI

2014 Gordon Research Conference: Global Change Marine Biology. Waterville Valley, NH

2014. International Ocean Colour Coordinating Group: Frontiers in Ocean Optics and Ocean Colour Science, Villefranche, France (deferred).

2015.NSF Cutting Edge: Preparing for an Academic Career in the Geosciences. Madison, WI.

### **PROGRAMS AND INSTRUMENTATION**

I am a proficient in Matlab, SAS, PC-Ord, Access, ArcGIS, ENVI, Wet-view, Sat-view for statistical programming, image analysis, and interfacing with instruments. Instruments/Methods used: attenuation absorption meters, Fast Repetition Rate and Pulse Amplitude Modulated fluorometers, hyperspectral spectroradiometric buoys and profilers, spectrophotometer, flow cytometer, high-performance liquid chromatography, and stable and radioisotope tracer methods. SCUBA (PADI open water) certified since 1999.

## **SERVICE**

Reviewer (5 yrs.): *Limnology and Oceanography*, *Progress Oceanography*, *LO Methods*, *Deep Sea Research*, *Marine Biology*, *Biogeosciences*, *National Environmental Research Council (UK)*, *Great Lakes Research*, *Global Biogeochemical Cycles*, *Methods in Ecology and Evolution*

Science Fellow/Advisor, National Network for Ocean and Climate Change Interpretation	2014
Professional Development Workshop Committee (ATPinBEESS, OSU)	2011-2012
Oregon Women in Higher Education: Chair, Concurrent Session Chair	2007-2009
Faculty Award selection committee, Oregon State University (OSU)	2008-2009
Graduate School Strategic Review Committee (OSU)	2008-2009
Promotion and Tenure Committee, OSU CEOAS	2008
Advisor, Oregon Department of Transportation (land slide mitigation)	2005-2006
Advisor, Oregon State Parks (macroalgal harvesting permit process)	2005-2006

## **RELEVANT GRADUATE COURSEWORK (PhD GPA=3.9/4.0)**

Marine Microbial Processes	Community Ecology
Ocean Carbon Cycles	Phytoplankton Ecology
Satellite Oceanography	Phytoplankton Physiology
Biological Oceanography	Behavioral Ecology
Geological Oceanography	Methods of Data Analysis I, II
Physical Oceanography	Mathematical Statistics I, II
Chemical Oceanography	Community Analysis
Coastal Oceanography	Quantitative Ecology
Bio/Physical Interactions Upper Ocean	Analysis in the Time and Space Domains
Global Biogeochemistry	Success in the College Classroom
Global Climate Change	(Preparation for the Professoriate)

### Post-baccalaureate Coursework

Advanced Ichthyology  
Biology and Systematics of Fishes  
Marine and Fisheries Economics

## **REFERENCES**

**Dr. Scott Doney**, Marine Chemistry and Geochemistry, MS 25. Woods Hole Oceanographic Institution, Woods Hole, MA 02541, [sdoney@whoi.edu](mailto:sdoney@whoi.edu)

**Dr. Burke Hales**, College of Oceanic and Atmospheric Sciences, Oregon State University. Corvallis, OR 97331. 541-737-8121. [bhales@coas.oregonstate.edu](mailto:bhales@coas.oregonstate.edu)

**Dr. Ricardo Letelier**, College of Oceanic and Atmospheric Sciences, Oregon State University. Corvallis, OR 97331. 541-737-3890. [letelier@coas.oregonstate.edu](mailto:letelier@coas.oregonstate.edu)

**Dr. Oscar Schofield**, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ. 08901 848-932-3265 [oscar@marine.rutgers.edu](mailto:oscar@marine.rutgers.edu)

**Dr. Frank Muller-Karger**, College of Marine Science, University of South Florida, St. Petersburg, FL. 727.553.3335. [carib@usf.edu](mailto:carib@usf.edu)