

## **PETER DYLAN COUNTWAY**

Bigelow Laboratory for Ocean Sciences

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[www.bigelow.org/research/srs/peter-countway/](http://www.bigelow.org/research/srs/peter-countway/)

### **Scientific Interests:**

Molecular diversity and ecology of aquatic protistan, bacterial and archaeal assemblages and how diversity affects ecosystem functions; Application of functional genomics (transcriptomics) to investigate microbial processes using qPCR, high-throughput sequencing of mRNA transcripts (RNA-Seq) to investigate the role of environmental factors on microbial gene expression.

### **A. PROFESSIONAL PREPARATION**

University of New Hampshire	Zoology	BA, 1990
College of William and Mary	Marine Science	MS, 1999
University of Southern California	Marine Biology & Biol. Oceanography	PhD, 2005
University of Southern California	Microbial Diversity & Ecology	Postdoc, 2005-2010

### **B. APPOINTMENTS AND PROFESSIONAL EXPERIENCE**

2010-present Senior Research Scientist, Bigelow Laboratory for Ocean Sciences  
2010-present Research Professor, Colby College (concurrent with Bigelow appointment)  
2008-2010 Consultant for PhycoSystems LLC/Proteus Environmental Technologies  
2005-2010 Postdoctoral Research Associate, University of Southern California  
1999-2005 Graduate Fellow/TA/RA, University of Southern California  
1996-1999 Graduate Research Assistant, Virginia Institute of Marine Science  
1991-1996 Oceanographic Research Technician, Bermuda Biological Station for Research

### **C. PUBLICATIONS**

Kim DY, **Countway PD**, Jones AC, Schnetzer A, Yamashita W, Tung C., Caron DA (in press) Monthly to interannual variability of microbial eukaryote assemblages at four depths in the eastern North Pacific. *ISME Journal*.

Coyne KJ, **Countway PD**, Pilditch C, Lee C, Caron DA, Cary SC (2013) Diversity and distributional patterns of ciliates in Guaymas Basin hydrothermal vent sediments. *The Journal of Eukaryotic Microbiology* 60:433-447

Caron DA, **Countway PD**, Jones AC, Kim DY, Schnetzer A (2012) Marine Protistan Diversity. In: Carlson CA, Giovannoni SJ (eds) *Annual Review of Marine Science*, Vol 4, Book 4. Annual Reviews, Palo Alto

Howard MDA, Jones AC, Schnetzer A, **Countway PD**, Tomas CR, Kudela RM, Hayashi K, Chia P, Caron DA (2012) Quantitative Real-Time Polymerase Chain Reaction for *Cochlodinium fulvescens* (Dinophyceae), A Harmful Dinoflagellate from California Coastal Waters. *Journal Of Phycology* 48:384-393

Kim DY, **Countway PD**, Yamashita W, Caron DA (2012) A combined sequence-based and fragment-based characterization of microbial eukaryote assemblages provides taxonomic context for the Terminal Restriction Fragment Length Polymorphism (T-RFLP) method. *Journal Of Microbiological Methods* 91:527-536

Garneau ME, Schnetzer A, **Countway PD**, Jones AC, Seubert EL, Caron DA (2011) Examination of the Seasonal Dynamics of the Toxic Dinoflagellate *Alexandrium catenella* at Redondo Beach, California, by Quantitative PCR. *Applied and Environmental Microbiology* 77:7669-7680

- Kim DY, **Countway PD**, Gast RJ, Caron DA (2011) Rapid Shifts in the Structure and Composition of a Protistan Assemblage During Bottle Incubations Affect Estimates of Total Protistan Species Richness. *Microbial Ecology* 62:383-398
- Schnetzler A, Moorthi SD, **Countway PD**, Gast RJ, Gilg IC, Caron DA (2011) Depth matters: Microbial eukaryote diversity and community structure in the eastern North Pacific revealed through environmental gene libraries. *Deep-Sea Research Part I-Oceanographic Research Papers* 58:16-26
- Steele JA, **Countway PD**, Xia L, Vigil PD, Beman JM, Kim DY, Chow CET, Sachdeva R, Jones AC, Schwalbach MS, Rose JM, Hewson I, Patel A, Sun FZ, Caron DA, Fuhrman JA (2011) Marine bacterial, archaeal and protistan association networks reveal ecological linkages. *ISME Journal* 5:1414-1425
- Countway PD**, Vigil PD, Schnetzler A, Moorthi SD, Caron DA (2010) Seasonal analysis of protistan community structure and diversity at the USC Microbial Observatory (San Pedro Channel, North Pacific Ocean). *Limnology And Oceanography* 55:2381-2396
- Gilg IC, Amaral-Zettler LA, **Countway PD**, Moorthi S, Schnetzler A, Caron DA (2010) Phylogenetic Affiliations of Mesopelagic Acantharia and Acantharian-like Environmental 18S rRNA Genes off the Southern California Coast. *Protist* 161:197-211
- Caron DA, **Countway PD**, Savai P, Gast RJ, Schnetzler A, Moorthi SD, Dennett MR, Moran DM, Jones AC (2009) Defining DNA-based operational taxonomic units for microbial-eukaryote ecology. *Applied and Environmental Microbiology* 75:5797-5808
- Caron DA, Worden AZ, **Countway PD**, Demir E, Heidelberg KB (2009) Protists are microbes too: a perspective. *ISME Journal* 3:4-12
- Caron DA, **Countway PD** (2009) Hypotheses on the role of the protistan rare biosphere in a changing world. *Aquatic Microbial Ecology* 57:227-238
- Rose JM, Vora NM, **Countway PD**, Gast RJ, Caron DA (2009) Effects of temperature on growth rate and gross growth efficiency of an Antarctic bacterivorous protist. *ISME Journal* 3:252-260
- Vigil P, **Countway PD**, Rose J, Lonsdale DJ, Gobler CJ, Caron DA (2009) Rapid shifts in dominant taxa among microbial eukaryotes in estuarine ecosystems. *Aquatic Microbial Ecology* 54:83-100
- Countway PD**, Gast RJ, Dennett MR, Savai P, Rose JM, Caron DA (2007) Distinct protistan assemblages characterize the euphotic zone and deep sea (2500 m) of the western North Atlantic (Sargasso Sea and Gulf Stream). *Environmental Microbiology* 9:1219-1232
- Countway PD**, Caron DA (2006) Abundance and Distribution of *Ostreococcus* sp. in the San Pedro Channel, California, as Revealed by Quantitative PCR. *Applied and Environmental Microbiology* 72:2496-2506
- Moorthi SD, **Countway PD**, Stauffer BA, Caron DA (2006) Use of quantitative real-time PCR to investigate the dynamics of the red tide dinoflagellate *Lingulodinium polyedrum*. *Microbial Ecology* 52:136-150
- Countway PD**, Gast RJ, Savai P, Caron DA (2005) Protistan diversity estimates based on 18S rDNA from seawater incubations in the western North Atlantic. *Journal of Eukaryotic Microbiology* 52:95-106
- Countway PD** (2005) Doctoral Dissertation: Molecular Ecology of Marine Protistan Assemblages. Dept. of Biology: Marine Biology & Biological Oceanography. University of Southern California
- Caron DA, **Countway PD**, Brown MV (2004) The growing contributions of molecular biology and immunology to protistan ecology: Molecular signatures as ecological tools. *Journal of Eukaryotic Microbiology* 51:38-48
- Caron DA, **Countway PD**, Lambert SE, Rose JM, Schaffner RA (2002) Protozoa in marine and estuarine waters. In: Bitton G (ed) *Encyclopedia of Environmental Microbiology*. John Wiley & Sons, Inc., New York

**Countway PD** (1999) Carbon production and growth physiology of heterotrophic bacteria in a subtropical coral reef ecosystem. M.S. Thesis, Virginia Institute of Marine Science, College of William and Mary.

Knap, A.J., Michaels, A.F., Steinberg, D., Bahr, F., Bates, N., Bell, S., **Countway, P.**, Close, A.R., Doyle, A.P., Dow, R.L., Howse, F.A., Gundersen, K., Johnson, R.J., Kelly, R., Little, R., Orcutt, K., Parsons, R., Rathburn, C., Sanderson, M., Stone, S. (1997) U.S. JGOFS Bermuda Atlantic Time-series Study Method Manual, Version 4.

#### **D. SYNEGISTIC ACTIVITIES**

- 2011, '12,'13 Hosted and advised a total of four summer REU students at Bigelow Laboratory  
2011,2012 Taught courses titled 'Diversity & Function of Life in Oceanic Realms' (2011) and 'Biological Oceanography' (2012) for Colby College  
2011, '12,'13 Co-taught 'Phytoplankton Culturing Techniques' course at Bigelow Laboratory  
2010- Lecturer for the Bigelow Laboratory sponsored *Café Scientifique* lecture series  
2006- Peer Reviewer for; *The ISME Journal, Hydrobiologia, Deep-Sea Res. II, Appl. Environ. Microbiol., J. Eukaryot. Microbiol., J. Plankton Res., Environ. Microbiol., FEMS Microbiol. Ecol., Limnol. and Oceanogr., Aquat. Microb. Ecol.*, NSF Biological Oceanography Program, NSF OTIC Program, NSF CAREER program  
2005-2006 Outreach during NSF-sponsored Antarctic research cruise to the Ross Sea (NBP-05-08) including classroom presentation to 4<sup>th</sup> grade students in Southern California  
2003-2008 Participant in outreach activities associated with the 'Extreme' series of deep-sea hydrothermal vent cruises in 2003 <http://www.ceoe.udel.edu/extreme2003/> and 2008 <http://www.expeditions.udel.edu/extreme08/>, e-mail correspondence with an elementary school classroom in a rural part of NH during the cruise

#### **E. COLLABORATORS AND OTHER AFFILIATIONS**

##### **i) Collaborators and Co-authors**

Linda A. Amaral-Zettler (MBL), J. Michael Beman (UC Merced), S. Craig Cary (U.Del.), Pam Chia (USC), Cheryl Chow (USC), Kathy Coyne (U.Del.), Elif Demir (MBARI), Jed Fuhrman (USC), Rebecca J. Gast (WHOI), Marie-Eve Garneau (Univ. of Zürich), Ilana C. Gilg (Bigelow), Chris J. Gobler (Stony Brook), Kendra Hayashi (UCSC), Karla B. Heidelberg (USC), Ian Hewson (Cornell), Meredith Howard (SCCWRP), Adriane C. Jones (USC), Diane Y. Kim (USC), Raph Kudela (UCSC), Darcy J. Lonsdale (Stony Brook), Stefanie D. Moorthi (Oldenburg, Germany), Anand Patel (USC), Julie M. Rose (NOAA/EPA), Rohan Sachdeva (USC), Erica L. Seubert (USC), Astrid Schnetzer (USC), Michael S. Schwalbach (Great Lakes Biofuel Research Center), Barry F. Sherr (OSU), Evelyn B. Sherr (OSU), Joshua A. Steele (Cal Tech), Fengzhu Sun (USC), Carmelo Tomas (UNCW), Patrick D. Vigil (U. Michigan), Li Xia (USC), Alex Z. Worden (MBARI)

##### **ii) Graduate and Postdoctoral Advisors**

David A. Caron (Postdoc and PhD, USC), Hugh W. Ducklow (MS, VIMS)

##### **iii) Thesis Advisor and Postgraduate-Scholar Sponsor (past 5 years)**

None yet, new investigator at Bigelow and no current affiliation with a graduate school

#### **F. RESEARCH EXPERIENCE**

- 2010- Senior Research Scientist at Bigelow Lab for Ocean Sciences  
2008- Science Consultant for Proteus Environmental Technologies' algal biomass to energy venture, PhycoSystems, to provide expertise on algal growth, culturing and molecular techniques. <http://phycosystems.com/team.htm>  
2007-2008 Research Cruise Participant (Oct./Nov. 2007, Nov. 2008) on "Extreme 2007" and "Extreme 2008" <http://www.expeditions.udel.edu/extreme08/> Hydrothermal vent

- cruises to Guaymas Basin (Gulf of California) and 9°N (East Pacific Rise) *R/V Atlantis*, DSV *Alvin* dive #s 4362, 4471, 4476
- 2005- Postdoctoral Research Associate: University of Southern California. (D.A. Caron, Postdoctoral Advisor)
- 2005 Research Cruise Participant on NBP0508, Antarctic research cruise to the Ross Sea, Antarctica, aboard *R/V N.B. Palmer*
- 2003 Research Cruise Participant on "Extreme 2003", Hydrothermal vent cruise to 9°N East Pacific Rise aboard *R/V Atlantis*, DSV *ALVIN* dive #3955 to 2,500 m
- 2000-2005 Research Cruise Participant/Graduate Research Assistant: USC Microbial Observatory aboard *R/V SeaWatch*
- 2000 Research Cruise Participant on EN343, Sargasso Sea and Eastern US Continental Shelf aboard *R/V Endeavor*
- 1999-2005 Graduate Fellow/Teaching/Research Assistant: University of Southern California. (D.A. Caron, Doctoral Dissertation Advisor)
- 1996-1999 Graduate Research Assistant: Virginia Institute of Marine Science. (H.W. Ducklow, MS Thesis Advisor; Coral Reef Microbial Ecology)
- 1995-1996 Research Technician/Cruise Participant: BATS lab, Bermuda Biological Station for Research, Chief scientist on BATS bloom cruise #89a aboard *R/V Weatherbird II*
- 1995 Research Technician/Cruise Participant: JGOFS Arabian Sea Process Study #2 cruise aboard *R/V Thomas G. Thompson*
- 1994 Research Technician/Cruise Participant: Sargasso Sarcodine project, Chief scientist on four "Sarcodine" cruises aboard *R/V Weatherbird II*.
- 1991-1994 Research Technician/Cruise Participant: A Seasonal Study of Nitrogen Cycling in the Sargasso Sea aboard *R/V Weatherbird II*
- 1991-1994 Research Technician/Cruise Participant: Deep Ocean Nitrite Profiling Time Series project at Hydrostation "S" aboard *R/V Weatherbird II*
- 1991 Postgraduate Volunteer: Bermuda Biological Station, (C.B. Cook, P.I.)

## H. PRESENTATIONS, POSTERS, AND WHITE PAPERS

- Countway, P.D.**, Caron, D.A. (2013) Microbial Euks from the Deep: Insights from DNA- & RNA-based gene libraries, single-cell whole genome amplicons, and high-pressure grazing experiments. Invited speaker at the Satellite Molecular Biology and Evolution meeting on Eukaryotic 'Omics. UC Davis, Davis, CA.
- Kim, D.Y., **Countway, P.D.**, Gast, R.J., Caron, D.A. (2010) Rapid shifts in protistan community structure and composition during bottle incubations. Poster presentation at the 2006 Gordon Research Conference on Marine Microbes, Tilton, NH (presented by D.Y.K.)
- Edgcomb, V.P., Biddle, J., Caron, D.A., Heidelberg, K.B., **Countway, P.D.**, Teske, A. (2009) New Frontiers: The Evaluation of Eukaryotic Populations in the Deep Marine Subsurface: Scientific Goals and Approaches for Future Ocean Drilling Projects. A white paper submitted to IODP New Ventures in Exploring Scientific Targets (INVEST), Bremen, September 23-25, 2009
- Countway, P.D.**, Amaral-Zettler, L.A., Gast, R.J., Sherr, B.F., Sherr, E.B. and Caron, D.A. (2009) Global Protistan Survey: Comparison of High-Throughput '454' Pyrosequencing vs. 'Deep' Sanger Sequencing of 18S rRNA genes in Arctic (Chukchi Sea) and Antarctic (Ross Sea) Ecosystems. Poster presentation at the ICoMM Spring Meeting, Woods Hole, MA (presented by P.D.C)

- Fuhrman, J.A., Steele, J., Sun, F., Xia, L., **Countway, P.**, Caron, D. (2009) Association network analysis shows potential marine food web interactions. Oral presentation at the 2009 ASLO Meeting, Nice, France (presented by J.A.F.)
- Schnetzler, A., Moorthi, S.D., **Countway, P.D.**, Gast, R.J., Gilg, I.C., Caron, D.A. (2009) Depth matters: microbial eukaryote diversity and community structure in the eastern North Pacific as indicated by environmental gene libraries. Oral presentation at the 2009 ASLO Meeting, Nice, France (presented by A.S.)
- Moorthi, S.D., Schnetzler, A., **Countway, P.D.**, Savai, P., Caron, D.A. (2009), Interannual seasonal variability of protistan diversity and community structure in the San Pedro channel, eastern North Pacific. Oral presentation at the 2009 ASLO Meeting, Nice, France (presented by S.D.M.)
- Steele, J.A., **Peter D. Countway**, Jerry Huang, Patrick D. Vigil, J. Michael Beman, Michael S. Schwabach, Ian Hewson, Julie M. Rose, Sheila G. O'Brien, Mark V. Brown, Adriane C. Jones, Anand Patel, Quansong Ruan, Mahira Z Kakajiwala, Cheryl-Emiliane T. Chow, Troy Gunderson, Ilana Gilg, Rebecca Schaffner, Fengzhu Sun, David A. Caron, Jed A. Fuhrman (2008) Ecological Relationships of Marine Microbes Described through Interaction Networks at the San Pedro Channel, California. Poster at the 2008 ASLO Meeting, Orlando, FL (presented by J.A.S)
- Steele, J. A., **Countway, P. D.**, Schwabach, M. S., Rose, J. M., Vigil, P. D., O'Brien, S. G., Hewson, I., Brown, M. V., Jones, A. C., Patel, A., Ruan, Q., Huang, J., Sun, F., Caron, D. A., Fuhrman, J. A. (2007) Bacterial and protistan co-occurrence and interactions at the San Pedro Ocean Time Series in the San Pedro Channel, California. Poster at the 2007 ASLO Meeting, Santa Fe, NM (presented by J.A.S)
- Jones, A. C., Moorthi, S. D., **Countway, P. D.**, Caron, D. A. (2007) Trophic Interactions between a cryptophyte alga and the smallest known eukaryote, the prasinophyte *Ostreococcus* sp. Poster at the 2007 ASLO Meeting, Santa Fe, NM (presented by A.C.J)
- Countway, P.D.**, Gast, R.J., Dennett, M.R., Savai, P., Rose, J.M and Caron, D.A. (2006) A Comparison of Protistan Diversity in the North Atlantic and North Pacific Oceans Based on 18S rRNA Gene Surveys. Poster presentation at the 2006 Gordon Research Conference on Marine Microbes, Biddeford, ME (presented by P.D.C)
- Countway, P.D.**, Savai, P., Gast, R.J., Caron, D.A. (2006) Protistan diversity in the Sargasso Sea and Gulf Stream (N. Atlantic Ocean): A comparison of euphotic zone and deep-sea (2500 m) protistan assemblages. Poster presentation at the 2006 AGU/ASLO Ocean Sciences Meeting, Honolulu, HI (presented by P.D.C)
- Countway, P.D.**, Vigil, P.D., Savai, P., Caron, D.A. (2005) Protistan diversity at the USC Microbial Observatory by 18S rDNA sequence analysis. Oral presentation at the 2005 ASLO Meeting, Salt Lake City, UT (presented by P.D.C)
- Caron, D.A., Gast, R.J., **Countway, P.D.**, Savai, P., Schnetzler, A., Moorthi, S.D. (2005) Protistan DNA sequence information and the species concept: defining taxa for ecological studies. Oral presentation at the 2005 ASLO Meeting, Salt Lake City, UT (presented by P.D.C.)
- Moorthi, S.D., **Countway, P.D.**, Stauffer, B.A., Schnetzler, A., Caron D.A. (2005) Use of molecular approaches to investigate the dynamics of the red tide dinoflagellate *Lingulodinium polyedrum*. Poster at the 2005 ASLO Meeting, Salt Lake City, UT (presented by S.D.M.)
- Countway, P.D.** (2004) Tracking the World's smallest eukaryote off the Coast of Southern California using real-time Q-PCR. Invited speaker, BioRad Q-PCR Users Symposia, USC Health Sciences Campus, Dec. 2004

- Countway, P.D.**, Caron, D.A., Gast, R.J., Savai, P. (2004) Molecular diversity of a protistan assemblage in the western N. Atlantic: DNA sequencing vs. T-RFLP profiling. Invited speaker, The Annual Meeting of the Society of Protistology, Bryant College, Smithfield, Rhode Island, June, 2004 (presented by P.D.C.)
- Countway, P.D.**, Caron, D.A. (2003) Protistan community diversity at the USC Microbial Observatory. Oral presentation at the N.S.F. Microbial Observatory Principal Investigators' Workshop (Sept. 15-16, 2003), Arlington, VA (presented by P.D.C.)
- Fuhrman, J.A., Caron, D.A., Brown, M.V., **Countway, P.D.**, Hernandez, X.A., Hewson, I., Liang, X., Patel, A., Savai, P., Schaffner, R., Schnetzer, A., Schwalbach, M.S., Steele, J.A., Travao, M. (2003) The USC microbial observatory. Poster at the N.S.F. Microbial Observatory Principal Investigators' Workshop (Sept. 15-16, 2002), Arlington, VA (presented by J.A.F.)
- Countway, P.D.**, Caron, D.A., Schnetzer, A., Travao, M., Gast, R.J., Dennett, M.R. (2003) Community fingerprints of eukaryotic marine microbes at a coastal time-series station. Poster presentation at the 2003 ASLO Meeting, Salt Lake City, UT (presented by P.D.C.)
- Fuhrman, J., Caron, D., Brown, M., **Countway, P.**, Hewson, I., Hernandez, X., Liang, X., Patterson, D. J., Schwalbach, M., Schnetzer, A., Schaffner, R., Travao, M. (2002) The USC Microbial Observatory. Poster at the N.S.F. Microbial Observatory Principal Investigators' Workshop (Sept. 22-24, 2002), Arlington, VA (presented by J.A.F.)
- Countway, P.D.**, Caron, D.A., Gast, R.J., Dennett, M.R., Moran, D.M. (2002) Molecular analyses of protistan assemblages from the Sargasso Sea suggest radical community shifts in nutrient-amended bottle incubations. Oral presentation at the European Union Pico-Div Workshop, Station Biologique, Roscoff, FR (presented by P.D.C.)
- Dennett, M.R., Gast, R.J., **Countway, P.D.**, Caron, D.A., Moran, D.M. (2002) Analysis of containment effects on the diversity of protistan assemblages from the Sargasso Sea and San Pedro Channel by denaturing gradient gel electrophoresis. Poster at the 2002 ASLO Meeting, Victoria, British Columbia (presented by M.R.D.)
- Countway, P.D.**, Caron, D.A., Gast, R.J., Dennett, M.R., Moran, D.M. (2002) Molecular analyses of protistan assemblages from the Sargasso Sea suggest radical community shifts in nutrient-amended bottle incubations and throughout the water column. Poster presentation at the 2002 AGU/ASLO Ocean Sciences Meeting, Honolulu, HI (presented by P.D.C.)
- Countway, P.D.**, Caron, D.A., Gast, R.J., Dennett, M.R. (2001) Terminal Restriction Fragment Length Polymorphism (T-RFLP) analysis of protistan assemblages of the North Atlantic. Oral presentation at the 2001 ASLO Meeting, Albuquerque, NM (presented by P.D.C.)
- Countway, P.D.**, Ducklow, H.W., Carlson, C.A. (2000) Carbon production and growth physiology of heterotrophic bacteria in a subtropical coral reef ecosystem. Oral presentation at the 2000 AGU/ASLO Ocean Sciences Meeting, San Antonio, TX (presented by P.D.C.)