

## Curriculum Vitae

### David Louis Kirchman

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#### Education

Ph.D., 1982, Environmental Engineering (Microbiology), Harvard University  
M.S., 1979, Environmental Engineering, Harvard University  
B.A., *magna cum laude*, 1976, Phi Beta Kappa, Phi Sigma, Biology, Lawrence University

#### Positions

January 2021-	Professor emeritus
July 1998-June 2020	Maxwell P. and Mildred H. Harrington Professor of Marine Science, School of Marine Science and Policy
Jan 2011-2014	Adjunct Scientist, National Institute of Oceanography, Goa (India)
January 2009-2014	Director, Center for Environmental Genomics
July 2001-June 2006	Associate Dean, College of Marine Studies (now College of Earth, Ocean, and Environment), University of Delaware
Mar 1999-Aug 1999	Fellow, Hanse Institute for Advanced Studies, Delmenhorst, Germany
July 1994-June 1998	Marine Biology/Biochemistry Program Director, College of Marine Studies
June 1992-present	Professor, College of Marine Studies
June 1989-June 1992	Associate Professor, College of Marine Studies
Jan 1986-June 1989	Assistant Professor, College of Marine Studies
Jan 1985-Dec 1985	Postdoctoral Research Associate, Department of Molecular Genetics and Cell Biology, University of Chicago
Sept 1982-Dec 1984	Postdoctoral Fellow, Department of Microbiology, University of Georgia

#### Teaching Experience

MAST 406 Technical Writing for the Marine Sciences  
MAST 427 Marine Biology  
MAST 607 Writing Papers in the Marine Sciences  
MAST 618 Marine Microbial Ecology  
MAST 623 Marine Physiology  
MAST 624 Biological Oceanography

MAST 627 Marine Biology and Biological Oceanography  
MAST 634 Marine Biochemistry  
MAST 816 Biological Oceanographic Processes  
MAST 818-12 Microbes and the Greenhouse Problem  
MAST 828 Advanced Marine Microbiology  
MAST 827-10 Microbiology of Marine Food Webs  
MAST 821 Marine Biology Seminar

1980-1982 Harvard University Tutorial Program, Biology Department. Selected for two consecutive years in competitive program to teach a course in microbial ecology.

1978-1979 Teaching Fellow for Environmental Microbiology, Harvard University. Designed and organized laboratory experiments for course.

**Graduate Students Advised:** Gerardo Chin Leo (1988), Edward Urban (1989), Michael Montgomery (1992), Richard Keil (1991), Matthew Hoch (1992), James Rich (1994), Cynthia Smialek (1997), Niels Borch (1997), Jessica Moore (1998), Kimberly Hoffman (2001), Sinéad Ní Chadhain (2001), Dawn Castle (2003), Kathleen Preen (2003), Rex Malmstrom (2005), Paul Jones (2005), Hila Elifantz (2006), Lisa Waidner (2007), Vanessa Michelou (2009), Tiffany Straza (2009), Glen Christman (2009), Mrinalini Nikrad (2013) and Monica Stegman (2013), Thomas Lankiewicz (2014)

**Undergraduate Students Advised:** Kirchman advised undergraduate students in the summer as part of an NSF REU program and was co-PI on the current program. Every summer from 1996-2012, he also mentored undergraduate students from Lincoln University, the nation's oldest historically Black college, as part of a summer intern research program. This program was supported by grants from DOE and NSF. Kirchman has also advised several undergraduate students as part of the marine sciences major in CEOE.

## Grants

Wisconsin Honor Grant, 1972

“Role of Attached Bacteria in Aquatic Ecosystems”, Ph.D. Dissertation Improvement Award, June 1979-May 1982, National Science Foundation (\$4,000).

“Bacterial feeding by freshwater macro-zooplankton, microzooplankton, and myxotrophic algae”, June 1984-May 1986, National Science Foundation (\$200,000; with K.P. Porter).

“Roles of bacteria and the microbial loop in trophic dynamics of the subarctic Pacific Ocean”, December 1986-November 1989, National Science Foundation (\$266,913).

“Transposon mutagenesis of chitin-degrading marine bacteria”, January 1987-December 1987, University of Delaware Research Foundation (\$13,000).

“Role of proteins in microbial film development”, February 1987-January 1990, Office of Naval Research (\$386,444; with S.D. Dexter).

“Effect of geochemical sinks and microbial activity on inorganic nutrients in the Delaware Estuary”, February 1987-January 1989, Sea Grant (\$203,600; with J.H. Sharp).

“Balance between oxygen production and consumption in estuarine waters”, February 1989-January 1991, Sea Grant (\$24,910; with R. Geider and J.H. Sharp).

“Role of adsorbed proteins in bacterial colonization and growth on surfaces”, February 1989-January

- 1991, Sea Grant (\$33,648).
- “Nitrogen uptake by heterotrophic bacteria during the North Atlantic spring bloom”, May 1989-November 1990, National Science Foundation (\$4,000).
- “Regulation of attached bacterial growth by adsorbed proteins”, May 1990-April 1992, Office of Naval Research (\$164,390).
- “Excretion of dissolved organic matter by protozoa”, September 1990-December 1991, Undergraduate Research, National Science Foundation (\$3,200).
- “Transformation of labile dissolved organic matter”, January 1992-December 1992, Undergraduate Research, National Science Foundation (\$3,750).
- “Bacterial fouling of metal surfaces”, February 1991-January 1993, Sea Grant (\$29,000).
- “What regulates assimilation of inorganic nitrogen by heterotrophic bacteria?”, July 1991-July 1993, National Science Foundation (\$100,000).
- “Mangrove detritus: Sink or link”, Oct 1992-Sept 1993, National Science Foundation (\$91,166; with C. Epifanio).
- “Bacterial production and N uptake in the equatorial Pacific”, August 1991-December 1993, National Science Foundation (\$178,906).
- “The effect of bacteria and microbial metabolites on mineral dissolution in subsurface environments”, June 1991-May 1994, Department of Energy (\$351,643; with W. Ullman).
- “Molecular characterization of specific attachment by a marine bacterium: A common motif?” January 1993-December 1996, Office of Naval Research (\$331,879).
- “Purchase of a continuous-flow nutrient analyzer”, October 1992-September 1993, National Science Foundation (\$80,000; with G. Luther).
- “Degradation of particulate organic matter in coastal oceans: The chitinase system at a molecular level”, October 1993-September 1996, Department of Energy (\$312,265).
- “AASERT: Molecular characterization of specific attachment by a marine bacterium” September 1993-August 1996, Office of Naval Research (\$86,475).
- “Degradation of colloidal organic material and the formation of semi-refractory DOM”, January 1995-December 1997, National Science Foundation (\$268,828).
- “US-Indo Visiting Scientist Program”, September 1995 - August 1997, Office of Naval Research (\$60,000).
- “Bacterial production uncoupled from primary production: Implications for DOM fluxes in the Southern Ocean (JGOFS)”, May 1996-April 1999, National Science Foundation (\$330,911).
- “Regulation of attachment by a marine bacterium: Bioadhesion proteins”, June 1996-May 1999, Office of Naval Research (\$369,313).
- “Bacterial degradation of organic matter at the molecular level: Chitinases as tracers for carbon export from coastal oceans”, November 1997-October 2000, Office of Energy Research (\$306,176).
- “Biological and chemical controls on Fe uptake by marine phytoplankton and bacteria”, April 1998-March 2000, National Science Foundation (\$391,838; with D. Hutchins and G. Luther).
- “Coordination for visiting scientists: US-Indo program”, May 1998-August 1999, Office of Naval Research (\$21,306).
- “Effects of terrestrial carbon on microbial community structure and function in the Hudson River”, November 1999-October 2001, Hudson River Foundation (\$142,375; with S. Findlay).
- “Impact of organic pollutants on microbial community structure in estuarine ecosystems”, February 1999-December 2001, NOAA Sea Grant (\$54,000).
- “Formation of modified biochemicals and their contribution to dissolved organic nitrogen in marine ecosystems”, October 1999- September 2002, National Science Foundation (\$595,000; with R.

Harvey).

- “Hydrolysis and uptake of organic material by major bacterial groups in a coastal ocean”, December 2000-November 2003, Department of Energy (\$358,934).
- “DOM consumption by marine bacterioplankton: Is the *Cytophaga-Flavobacter* group important?” August 2000-July 2003, National Science Foundation (\$153,963; with M. Cottrell).
- “Metagenomic analysis of uncultured *Cytophaga* and  $\beta$ -1,4 glycanases in marine consortia”, Department of Energy, September 2001-August 2003 (\$407,564).
- “The biogeochemistry and polymer physics of seawater gels: A new paradigm for the microbial loop and global element cycles”, October 2001-January 2006, UW/ National Science Foundation (\$244,936).
- “Carbon cycling in the Chukchi and Beaufort Seas”, January 2002-December 2006, National Science Foundation (\$431,767).
- “Quantitative impact of organic pollutants on microbial community structure and activity in estuarine ecosystems”, February 2002-January 2003, Sea Grant-NOAA (\$75,758; with S.C. Cary).
- “Cycling of DOC and DON by novel heterotrophic and photoheterotrophic bacteria in the ocean”, Department of Energy, September 2003-August 2007 (\$595,000).
- “Bacterial production and community structure during the North Atlantic spring bloom”, March 2005-February 2008, National Science Foundation (\$302,000).
- “MO: Photoheterotrophic microbes of the Mid-Atlantic Bight”, January 2006-December 2011, National Science Foundation (\$814,401).
- “IPY: Chemolithoautotrophy in the Arctic Ocean—environmental genomics and functional analyses”, April 2007-March 2010, National Science Foundation (\$399,967).
- “REU site University of Delaware summer undergraduate research program”, March 2005-February 2008, National Science Foundation (\$397,904; with A. Dittel).
- “Reservoirs of pathogenic and pathogen-related *Epsilonproteobacteria* in Delaware coastal water”, February 2007-January 2009, Sea Grant NOAA (\$37,300; with B. Campbell).
- “URM collaboration: Biology of an urbanized estuary”, September 2007-August 2012, National Science Foundation (\$285,962).
- “The role of microbial food webs in carbon fluxes and shelf-basin exchange in the Arctic Ocean”, September 2008-August 2011, National Science Foundation (\$266,139).
- “Characterization of methane degradation and methane-degrading microbes in Alaska coastal waters”, October 2008-September 2010, DOE-NETL (\$272,294).
- “Collaborative research: Are abundant bacteria more active than rare bacteria in the Sargasso Sea?”, October 2008-September 2011, National Science Foundation (\$445,461; with B. Campbell).
- “Photoheterotrophic microbes in the West Antarctic Peninsula marine ecosystem” (Co-PI, with M. Cottrell), National Science Foundation, August 2009-July 2012 (\$425,541)
- “Collaborative Research: Activity and abundance of photoheterotrophs fueled by photochemically-produced substrates” (Lead PI, with M. Cottrell and D. Kieber), National Science Foundation January 2011- December 2014 (\$490,925)
- “Growth rates of bacterial taxa in coastal marine ecosystems” (Lead PI, B. Campbell), National Science Foundation, October 2012- September 2016 (\$368,476 for Delaware component)

## Professional Activities

Reviewer for: EPA, DOE, NASA, NIH, NSF, (Biol. Oceanogr., Ecology, Ecosystems, Cell Biology, Biochemistry, Polar Programs), Sea Grant, Hudson River Foundation, NSF- State of Montana, Natural Environment Research Council (UK), Appl. Environ. Microb., Biofouling, Biogeochemistry, Bioscience, Canadian J. Microbiol., FEMS Microb. Ecol., Hydrobiologie, J. Industrial Microbiol., J. Marine Res., J. Marine Systems, J. Exper. Mar. Biol. and Ecol., J. Geophys. Res., Limnol. Oceanogr., Mar. Biol., Mar. Chem., Mar. Ecol. Progr. Ser., Microbiology-U.K., Microb. Ecol., Nature, Science, Polar Biology, Water Research, Estuaries, Austrian National Science Foundation, International Science Foundation, National Institute of Standards and Technology (DOC), Journal of Molecular Microbiology and Biotechnology, PNAS, ISME J., Environmental Microbiology, Molecular Ecology, Climate Change, American Naturalist, PloS Biology, PloS One, Nature-Geosciences, BMC Microbiology, BMC Genomics, Deutsche Forschungsgemeinschaft (German NSF)

DOE Genomes to Life Review Panel (2003)

DOE Microbial Sequencing Review Panel (2006, 2010, 2011, 2012)

DOE Bioremediation Review Panel (2008)

NIEH-NSF Panel (2003)

NSF Review Panels, Biological Oceanography (ten since 1987)

NSF Review Panel, Microbial Observatory (2006)

Session Chairman for AGU-ASLO meetings (1987, 1988, 1998, 1999, 2001)

Functional Group Leader, Biotechnology UD Sea Grant Program (1988-1996)

Session Chairman for International Symposium on Microbial Ecology, Japan (1989)

Chair - Elect, Division N, American Society of Microbiology (1989)

Chair, Division N, American Society of Microbiology (1990)

Associate Editor, *Limnology and Oceanography* (1990-1992)

Editor-in-chief, *Limnology and Oceanography* (1993-1998)

Co-Convener of Seminar, ASM annual meeting (1990, 1993)

Symposium on Coastal Ocean Processes, NSF (1990)

Review of DOE Coastal Ocean Program (1991)

Organizer of ONR-Biofouling Seminar Series (1991)

Maryland Sea Grant Review Panel (1993)

Editorial Board, *Microbial Ecology* (1991-1993)

Editorial Board, *Marine Microbial Food Webs* (1992-1994)

Editorial Board, *Aquatic Microbial Ecology* (1995-2006)

Editorial Board, *Applied and Environmental Microbiology* (2002- 2008)

Editorial Board, *Biofouling* (1996-2001)

Editorial Board, *FEMS Microbiological Ecology* (1997 - 2020)

Editorial Advisory Board, John Wiley & Sons (1997- )

Editorial Board, ISME Journal (2011- 2020)

Editorial Board, PLoS One (2012-2013)

Editorial Board, Microbiome (2012- )

Rapporteur for NATO ARW "Towards a model of biogeochemical ocean processes", Bonas, France (1992)

Organizer for 15th International Botanical Congress, Japan (1993)  
Review panel for EPA Biotechnology Risk Assessment Programs (1994)  
Rapporteur for Workshop on Aquatic Microbial Ecology, Konstanz, Germany (1994)  
External examiner on Ph.D. committees: Umea, Sweden (1995), Sydney, Australia (1998), Uppsala, Sweden (2005), Newfoundland University (2006), University of Montreal (2007), University of Paris (2008), Flinders University (Australia) (2011 and 2014), University of Bergen, Norway (2012), UPMC University of Paris 06 (2013), Uppsala, Sweden (2015)  
ASM committee on global change (1999)  
NSF-sponsored EDOCC Workshop (2000)  
External Science Advisory Board, Uppsala Microbiomics Center (Sweden), (2009-2012)  
Chair of Gordon Conference on Marine Microbes (2010)  
Gulf of Mexico Research Initiative panel (2012)  
Moore Foundation review committee (2012)  
WHOI promotion and tenure review panel (2012, 2013, )  
NAKFI Microbial Ecosystem Services Expert Workshop (2013)  
NSF Ocean Acidification Review Panel (2014)

### **Honors**

Fulbright Fellowship (declined), 1982  
Appointed Name Professor, University of Delaware, 1998  
Highly Cited Researcher (ISIHighlyCited.com), 2006  
Faculty of 1000, 2006-2008  
American Academy of Microbiology, 2008  
Francis Alison Professorship, University of Delaware, 2010 (University's highest faculty award)  
ASLO Fellow, 2015  
AAAS Fellow 2021

### **Selected Service Activities for College and University of Delaware**

Associate Dean (2002-2006)  
Marine Biology/Biochemistry Program Director (1994-1998)  
Promotion and Tenure Committee (1991-1993; 2006-2008)  
Chair, Promotion and Tenure Committee (1993)  
Chair, Promotion and Tenure Committee (2007-2008)  
Chair, Search Committee for Senior Geological Oceanographer (1998)  
Chair, Ship Advisory Committee (2000-2001)  
Chair, Futures Committee (2003)  
Chair, Committee for R/V *Cape Henlopen* Replacement (2000-2004)  
Chair, Search committee for phytoplankton oceanographer (2006)  
Chair, Search committee for molecular microbial ecologist (2008)  
Chair, Promotion and Tenure Committee (2013-2014)  
Chair, CEOE Promotion and Tenure Committee (2015-2016)  
Chair, CEOE Awards Committee (2018-2019)  
UD ADVANCE, CEOE representative (2016-2018)

Service on the following search committees

Head of Department of Biology (College of Arts and Sciences) (1995)

Phytoplankton Oceanographer (1989; 1996; 2006)

Associate Dean (1993)

Molecular Environmental Microbiologist, College of Agriculture and Natural Science (2000)

Molecular Biologist (1996)

Cosgrove Chair (2011-2012)

### **Publications:** Refereed Journals

- Kirchman, D. L., H. W. Ducklow, and R. Mitchell. 1982. Estimates of bacterial growth from changes in uptake rates and biomass. *Appl. Environ. Microbiol.* 44:1296-1307.
- Kirchman, D. L. and R. Mitchell. 1982. Contribution of particle-bound bacteria to total microheterotrophic activity in five ponds and two marshes. *Appl. Environ. Microbiol.* 43:200-209.
- Kirchman, D. L., J. Sigda, R. Kapuscinski, and R. Mitchell. 1982. Statistical analysis of the direct count method for enumerating bacteria. *Appl. Environ. Microbiol.* 44:376-382.
- Kirchman, D. L., S. Graham, D. Reish, and R. Mitchell. 1982. Lectins may mediate in the settlement and metamorphosis of *Janua (Dexiospira) brasiliensis*. *Mar. Biol. Lett.* 3:131-142.
- Kirchman, D. L., S. Graham, D. Reish, and R. Mitchell. 1982. Bacteria induce settlement and metamorphosis of *Janua (Dexiospira) brasiliensis* Grube (Polychaeta:Spirrbridae). *J. Exp. Mar. Biol. Ecol.* 56:153-163.
- Ducklow, H. W., D. L. Kirchman, and G. T. Rowe. 1982. Production and vertical flux of attached bacteria in the Hudson River Plume of the New York Bight as studied with floating sediment traps. *Appl. Environ. Microbiol.* 43:769-776.
- Kirchman, D. L. 1983. The production of bacteria attached to particles suspended in a freshwater pond. *Limnol. Oceanogr.* 28:858-872.
- Ducklow, H. W. and D. L. Kirchman. 1983. Bacterial dynamics and distribution during a spring diatom bloom in the Hudson River Plume, USA. *J. Plankton Res.* 5:333-355.
- Kirchman, D. L., L. Mazzella, R. S. Alberte, and R. Mitchell. 1984. Epiphytic bacterial production on *Zostera marina*. *Mar. Ecol. Prog. Ser.* 15:117-123.
- Kirchman, D. L. and R. Hodson. 1984. Inhibition by peptides of amino acid uptake by bacterial populations in natural waters: Implications for the regulation of amino acid transport and incorporation. *Appl. Environ. Microbiol.* 47:624-631.
- Kirchman, D. L., B. J. Peterson, D. Juers. 1984. Bacterial growth and tidal variation in bacterial abundance in the Great Sippewissett Salt Marsh. *Mar. Ecol. Prog. Ser.* 19:247-259.
- Kirchman, D. L., E. K'nees, and R. Hodson. 1985. Leucine incorporation and its potential as a measure of protein synthesis by bacteria in natural aquatic waters. *Appl. Environ. Microbiol.* 49:599-607.
- Kirchman, D. L. and R. Hodson. 1986. Metabolic regulation of amino acid uptake in marine waters. *Limnol. Oceanogr.* 31(2):339-350.
- Kirchman, D. L., S.Y. Newell, and R. Hodson. 1986. Incorporation versus biosynthesis of leucine: implications for measuring rates of protein synthesis and biomass production by bacteria in marine systems. *Mar. Ecol. Prog. Ser.* 32:47-59.
- Glibert, P. M., T. M. Kana, R. J. Olson, D. L. Kirchman, and R.S. Alberte. 1986. Clonal comparisons of growth and photosynthetic responses to nitrogen availability in marine *Synechococcus* spp. *J. Exp. Mar. Biol. Ecol.* 101:199-208.

- Fuhrman, J. A., H. W. Ducklow, D. L. Kirchman, J. Hudak, G. McManus and J. Kramer. 1986. Does adenine incorporation into nucleic acids measure total microbial production? *Limnol. Oceanogr.* 31(3):627-636.
- Fuhrman, J. A., H. W. Ducklow, D. L. Kirchman, and G.B. McManus. 1986. Adenine and total microbial production: A reply. *Limnol. Oceanogr.* 31(3):1395-1400.
- McDonough, R. J., R. W. Sanders, K. G. Porter, and D. L. Kirchman. 1986. Depth distribution of bacterial production in a stratified lake with anoxic hypolimnion. *Appl. Environ. Microbiol.* 52:992-1000.
- Plumley, F. G., D. L. Kirchman, R. E. Hodson, and G. W. Schmidt. 1986. Ribulose biphosphate carboxylase from three chlorophyll *c*-containing algae: Physical and immunological characterizations. *Plant Physiol.* 80:685-691.
- Wheeler, P. A. and D. L. Kirchman. 1986. Utilization of inorganic and organic nitrogen by bacteria in marine systems. *Limnol. Oceanogr.* 31(5):998-1009.
- Kirchman, D. L. and M. P. Hoch\*. 1988. Bacterial production in the Delaware Bay estuary estimated from thymidine and leucine incorporation rates. *Mar. Ecol. Prog. Ser.* 45:169-178.
- \*Chin-Leo, G. and D. L. Kirchman. 1988. Estimating bacterial production in marine waters from the simultaneous incorporation of thymidine and leucine. *Appl. Environ. Microbiol.* 54:1934-1939.
- Benner, R., R. E. Hodson, and D. L. Kirchman. 1988. Bacterial abundance and production on mangrove leaves during initial stages of leaching and biodegradation. *Arch. Hydrobiol. Beih.* 31:19-26.
- Kirchman, D. L., Y. Soto, F. Van Wambeek, and M. Bianchi. 1989. Bacterial production in the Rhône River plume: effect of mixing on relationships among microbial assemblages. *Mar. Ecol. Prog. Ser.* 53:267-275.
- Kirchman, D. L., D. L. Henry, and S. Dexter. 1989. Adsorption of proteins to surfaces in seawater. *Mar. Chem.* 27:201-217.
- Kirchman, D. L., R. Keil\*, and P. A. Wheeler. 1989. The effect of amino acids on ammonium utilization and regeneration by heterotrophic bacteria in the subarctic Pacific. *Deep-Sea Res.* 36:1763-1776.
- Wheeler, P. A., D. L. Kirchman, M. R. Landry, and S. A. Kokkinakis. 1989. Diel periodicity in ammonium uptake and regeneration in the oceanic subarctic Pacific: implications for interactions in microbial foodwebs. *Limnol. Oceanogr.* 34:1025-1033.
- Kirchman, D. L. 1990. Limitation of bacterial growth by dissolved organic matter in the subarctic Pacific. *Mar. Ecol. Prog. Ser.* 62:47-54.
- Kirchman, D. L., R. G. Keil\*, and P. A. Wheeler. 1990. Carbon limitation of ammonium uptake by heterotrophic bacteria in the subarctic Pacific. *Limnol. Oceanogr.* 35:1258-1266.
- \*Chin-Leo, G. and D. L. Kirchman. 1990. Unbalanced growth in natural assemblages of marine bacterioplankton. *Mar. Ecol. Prog. Ser.* 63:1-8.
- Logan, B. E. and D. L. Kirchman. 1991. Uptake of dissolved organics by marine bacteria as a function of fluid motion. *Mar. Biol.* 111:175-181.
- \*Montgomery, M. T., N. A. Welschmeyer, and D. L. Kirchman. 1990. A simple assay for chitin: Application to sediment trap samples from the subarctic Pacific. *Mar. Ecol. Prog. Ser.* 64:301-308.
- \*Nagata, T. and D. L. Kirchman. 1990. Filtration-induced release of dissolved free amino acids: application to cultures of marine protozoa. *Mar. Ecol. Prog. Ser.* 68:1-5.
- \*Samuelsson, M-O. and D. L. Kirchman. 1990. Degradation of adsorbed protein by attached bacteria in relationship to surface hydrophobicity. *Appl. Environ. Microbiol.* 56:3643-3648.



- \*Nagata, T. and D. L. Kirchman. 1991. Release of dissolved free and combined amino acids by bacterivorous marine flagellates. *Limnol. Oceanogr.* 36(3):433-443.
- \*Keil, R. G. and D. L. Kirchman. 1991. Dissolved combined amino acids in marine waters as determined by a vapor-phase hydrolysis method. *Mar. Chem.* 33:243-259.
- \*Keil, R. G. and D. L. Kirchman. 1991. Contribution of dissolved free amino acids and ammonium to the nitrogen requirements of heterotrophic bacterioplankton. *Mar. Ecol. Prog. Ser.* 73:1-10.
- Kirchman, D. L., Y. Suzuki, C. Garside, and H. W. Ducklow. 1991. High turnover rates of dissolved organic carbon during a spring phytoplankton bloom. *Nature* 352:612-614.
- Kirchman, D. L. 1992. Incorporation of thymidine and leucine in the subarctic Pacific: application to estimating bacterial production. *Mar. Ecol. Prog. Ser.* 82:301-309.
- Ducklow, H. W., D. L. Kirchman, and H. L. Quinby. 1992. Bacterioplankton cell growth and macromolecular synthesis in seawater cultures during the North Atlantic Spring Phytoplankton Bloom. *Microb. Ecol.* 24:125-144.
- \*Hoch, M. P., M. Fogel, and D. L. Kirchman. 1992. Isotope fractionation associated with ammonium uptake by a marine bacterium. *Limnol. Oceanogr.* 37:1447-1459.
- \*Keil, R. G., and D. L. Kirchman. 1992. Bacterial hydrolysis of protein and methylated protein and its implications for studies of protein degradation in aquatic systems. *Appl. Environ. Microbiol.* 58:1374-1375.
- Nagata, T. \*, and D.L. Kirchman. 1992. Release of macromolecular organic complexes by heterotrophic marine flagellates. *Mar. Ecol. Prog. Ser.* 83:233-240.
- Simon, M., N. A. Welschmeyer, and D. L. Kirchman. 1992. Bacterial production and the sinking flux of particulate organic matter in the subarctic Pacific. *Deep-Sea Res.* 39:1997-2008.
- \*Urban, E. R. Jr., and D. L. Kirchman. 1992. Effect of kaolinite clay on the feeding activity of the eastern oyster *Crassostrea virginica* (Gmelin). *J. Exp. Mar. Biol. Ecol.* 160:47-60.
- Kirchman, D.L., R.G. Keil\*, M. Simon and N.A. Welschmeyer. 1993. Biomass and production of heterotrophic bacterioplankton in the oceanic subarctic Pacific. *Deep-Sea Res.* 40:967-988.
- Ducklow, H.W., D.L. Kirchman, H.L. Quinby, C.A. Carlson, and H.G. Dam. 1993. Stocks and dynamics of bacterioplankton during the spring bloom in the eastern North Atlantic Ocean. *Deep-Sea Res.* 40:245-263.
- \*Hoch, M.P. and D.L. Kirchman. 1993. Seasonal and inter-annual variability in bacterial production and biomass in a temperate estuary. *Mar. Ecol. Prog. Ser.* 98:283-295.
- \*Keil, R. G. and D. L. Kirchman. 1993. Dissolved combined amino acids: chemical form and utilization by marine bacteria. *Limnol. Oceanogr.* 38:1256-1270.
- Landry, M. R., D. J. Gifford, D. L. Kirchman, P. A. Wheeler, and B. C. Monger. 1993. Direct and indirect effects of grazing by *Neocalanus plumchrus* on plankton community dynamics in the subarctic Pacific. *Prog. Oceanogr.* 32:239-258.
- \*Montgomery, M. T., and D. L. Kirchman. 1993. Role of chitin-binding proteins during the specific attachment of the marine bacterium *Vibrio harveyi* to chitin. *Appl. Environ. Microbiol.* 59:373-379.
- \*Vandevivere, P. and D. L. Kirchman. 1993. Attachment stimulates exopolysaccharide synthesis by a bacterium. *Appl. Environ. Microbiol.* 59:3280-3286.
- Kirchman, D. L. 1994. The uptake of inorganic nutrients by heterotrophic bacteria. *Microb. Ecol.* 28:255-271.
- Kirchman, D. L., H. W. Ducklow, J. J. McCarthy, and C. Garside. 1994. Biomass and nitrogen uptake by heterotrophic bacteria during the spring phytoplankton bloom in the North Atlantic Ocean. *Deep-Sea Res.* 41:879-895.

- \*Hoch, M. P., M. L. Fogel, and D. L. Kirchman. 1994. Isotope fractionation during ammonium uptake by marine microbial assemblages. *Geomicrobiol. J.* 12:113-127.
- \*Keil, R. G., and D. L. Kirchman. 1994. Abiotic transformation of labile protein to refractory protein in sea water. *Mar. Chem.* 45:187-196.
- \*Montgomery, M. T., and D. L. Kirchman. 1994. Induction of chitin-binding proteins in the specific attachment of the marine bacterium *Vibrio harveyi* to chitin. *Appl. Environ. Microbiol.* 60:4284-4288.
- \*Vandevivere, P., S. A. Welch, W. J. Ullman, and D. L. Kirchman. 1994. Enhanced dissolution of silicate minerals by bacteria at near-neutral pH. *Microb. Ecol.* 27:241-251.
- Kirchman, D. L., J. H. Rich\*, and R. T. Barber. 1995. Biomass and biomass production of heterotrophic bacteria along 140° W in the equatorial Pacific: Effect of temperature on the microbial loop. *Deep-Sea Res. II* 42:603-619.
- Confer, D. R., B. E. Logan, B. S. Aiken, and D. L. Kirchman. 1995. Measurement of dissolved free and combined amino acids in unconcentrated wastewaters using high performance liquid chromatography. *Water Environ. Res.* 67(1):18-125.
- \*Hoch, M., and D. L. Kirchman. 1995. Ammonium uptake by heterotrophic bacteria in the Delaware estuary and adjacent coastal waters. *Limnol. Oceanogr.* 40:886-897.
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\* Students, postdocs, or research faculty in Kirchman's lab.

### Articles commissioned by the journal for a general scientific community

- Kirchman, D. L. 1996 Microbial ferrous wheel. *Nature* 383: 303-04.
- Kirchman, D. L. 1997. Microbial breathing lessons. *Nature* 385:121-122.
- Kirchman, D. L. 1999. Phytoplankton death in the sea. *Nature* 398:293-294.
- Kirchman, D. L. 2008. New light on an important microbe in the ocean. *Proc. Natl. Acad. Sci.* 105:8487-8488.
- Kirchman, D. L. 2012. Marine archaea take a short cut in the nitrogen cycle. *Proc. Natl. Acad. Sci.*

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- Kirchman, D. L. 2017. Marine microbial ecology: Life after volcanic destruction. *Nature Ecology & Evolution* 1: 0157.
- Kirchman, D. L. 2018. Microbial proteins for organic material degradation in the deep ocean. *Proc. Natl. Acad. Sci. USA* 115: 445-447.
- Kirchman, D.L. 2020. A marine virus as friend and foe. *Nature Microbiology* 5: 982-983.
- Kirchman, D. L. 2020. Editorial: Metagenomics in Limnology and Oceanography. *Limnology and Oceanography*: S1.

## Books

- Kirchman, D.L. (Editor). 2000. *Microbial Ecology of the Oceans*. Wiley-Liss.
- Kirchman, D.L. (Editor). 2008. *Microbial Ecology of the Oceans, Second Edition*, Wiley-Liss.
- Gasol, J. and D.L. Kirchman (editors). 2018. *Microbial Ecology of the Oceans*. Third edition, Wiley Blackwell.
- Kirchman, D.L. 2012. *Processes in Microbial Ecology*. Oxford University Press.
- Kirchman, D.L. 2018. *Processes in Microbial Ecology, Second edition*. Oxford University Press.
- Kirchman, D.L. 2021. *Dead zones: the loss of oxygen from rivers, lakes, seas, and the ocean*. Oxford University Press.

## Book Chapters

- Kirchman, D.L. 1993. Bacteria and particulate detritus in the oceans. *In Aquatic Microbiology: An Ecological Approach*. Edited by T.E. Ford, Blackwell Sci. Publ. pp. 321-341.
- Kirchman, D.L. and H.W. Ducklow. 1993. Estimating conversion factors for the thymidine and leucine method for measuring bacterial production. *In Current Methods in Aquatic Microbial Ecology*, P.F. Kemp, B.F. Sherr, E.B. Sherr, and J.J. Cole (eds.), Lewis Publishers, New York. pgs. 513-519.
- Kirchman, D.L. 1993. Statistical analysis of direct counts of microbial abundance. *In Current Methods in Aquatic Microbial Ecology*, P.F. Kemp, B.F. Sherr, E.B. Sherr, and J.J. Cole (eds.), Lewis Publishers, New York. pgs. 117-120.
- Kirchman, D.L. 1993. Leucine incorporation as a measure of biomass production by heterotrophic bacteria. *In Current Methods in Aquatic Microbial Ecology*, P.F. Kemp, B.F. Sherr, E.B. Sherr, and J.J. Cole (eds.), Lewis Publishers, New York. pgs. 509-512.
- Montgomery, M.T. and D.L. Kirchman. 1993. Chitin concentrations and degradation in marine environments. *In Current Methods in Aquatic Microbial Ecology*, P.F. Kemp, B.F. Sherr, E.B. Sherr, and J.J. Cole (eds.), Lewis Publishers, New York. pgs. 597-600.
- Kirchman, D.L. 2000. Uptake and regeneration of inorganic nutrients by marine heterotrophic bacteria. *In Microbial Ecology of the Oceans*, D.L. Kirchman, (ed.). Wiley-Liss. pgs. 261-288.
- Kirchman, D.L. and P. J. leB. Williams. 2000. Introduction. *In Microbial Ecology of the Oceans*, D.L. Kirchman, (ed.). Wiley-Liss. pgs. 1-11.
- Kirchman, D.L. 2001. Measuring bacterial biomass production and growth rates from leucine incorporation in natural aquatic environments. *In Methods in Microbiology (Vol 30)*:

- Marine Microbiology, J.H. Paul (ed.), Academic Press. pgs. 227-238.
- Kirchman, D.L. 2002. Inorganic nutrient use by marine microorganisms. *In Encyclopedia of Environmental Microbiology*, D. Capone (section editor), Wiley. pgs. 1697-1709.
- Kirchman, D.L. 2003. The contribution of monomers and other low-molecular weight compounds to the flux of dissolved organic material in aquatic ecosystems. *In Aquatic Ecosystems: Interactivity of Dissolved Organic Matter*, S. E.G. Findlay and R.L. Sinsabaugh (eds.), Elsevier Science. pgs. 217-241.
- Kirchman, D.L. 2008. Introduction and Overview. *In Microbial Ecology of the Oceans*, 2<sup>nd</sup> edition. D.L. Kirchman, (ed.), Wiley-Liss.
- Nelson, R. J., C. Ashjian, B. Bluhm, K. Conlan, R. Gradinger, J. Grebmeier, V. Hill, R. Hopcroft, B. V. Hunt, H. Joo, D. Kirchman, K. Kosobokova, S. Lee, W. W. Li, C. Lovejoy, M. Poulin, E. Sherr, and K. Young. 2014. Biodiversity and Biogeography of the Lower Trophic Taxa of the Pacific Arctic Region: Sensitivities to Climate Change, p. 269-336. *In J. M. Grebmeier and W. Maslowski [eds.]*, The Pacific Arctic Region. Springer Netherlands.
- Mathis, J., J. Grebmeier, D. Hansell, R. Hopcroft, D. Kirchman, S. Lee, S. B. Moran, N. Bates, S. Vanlaningham, J. Cross, and W.-J. Cai. 2014. Carbon Biogeochemistry of the Western Arctic: Primary Production, Carbon Export and the Controls on Ocean Acidification, p. 223-268. *In J. M. Grebmeier and W. Maslowski [eds.]*, The Pacific Arctic Region. Springer Netherlands.
- Gasol, J. M., and D. L. Kirchman. 2018. Introduction: the evolution of Microbial Ecology of the Ocean, p. 1-46. *In J. M. Gasol and D. L. Kirchman [eds.]*, Microbial Ecology of the Oceans. 3rd ed. Wiley Blackwell.
- Kirchman, D. L. 2020. Ocean deoxygenation and its ecological and biogeochemical consequences. *In P. A. Maurice [ed.]*, Encyclopedia of Water: Science, Technology, and Society. Wiley.

### Invited Reviews and Symposium Proceedings

- Kirchman, D.L. and R. Mitchell. 1981. A biochemical mechanism for marine biofouling. Proceedings of Oceans Conference.
- Kirchman, D.L. and R. Mitchell. 1983. Biochemical interactions between micro-organisms and marine fouling invertebrates. *In Biodeterioration 5*. P.A. Oxley and S. Barry (eds.) John Wiley and Sons, Ltd.
- Kirchman, D.L. and R. Mitchell. 1984. Possible role of lectins in the settlement and metamorphosis of marine invertebrate larvae on surface coated with bacteria. *Bacteriologie Marinae*, Marseille (17-19 May 1982). pp. 173-177.
- Mitchell, R. and D.L. Kirchman. 1984. The microbial ecology of marine surfaces. *In Marine Biodeterioration: an interdisciplinary study*. J. D. Costlow and R.C. Tipper (eds.) Naval Institute Press, Annapolis, Maryland.
- Pomeroy, L.R., R.B. Hanson, P.A. McGillivray, B.F. Sherr, D.L. Kirchman, and D. Deibel. 1984. Microbiology and chemistry of fecal products of pelagic tunicates: rates and fates. *Bull. Mar. Sci.* 35:426-439.
- Kirchman, D.L., R.E. Murray, and R.E. Hodson. 1986. Rates of DNA and protein synthesis by heterotrophic bacteria in aquatic environments: a comparison between the thymidine and leucine approaches. Proceedings of the Fourth International Symposium on Microbial Ecology, Ljubljana, Yugoslavia. pgs. 631-637.
- Kirchman, D.L. and H.W. Ducklow. 1987. Trophic dynamics of particle-bound bacteria in pelagic ecosystems: a review. *In Detrital Systems for Aquaculture*, D.J.W. Moriarty and R.S.V. Pullin (eds.), International Center for Living Aquatic Resources Management, Manila, Philippines.

- Kirchman, D.L. 1989. Regulation of ammonium uptake by heterotrophic bacteria in the oceanic subarctic Pacific. Proceedings of the Fifth International Symposium on Microbial Ecology, Kyoto, Japan, pgs. 383-387. Japan Scientific Societies Press.
- Hoch, M.P., D.L. Kirchman, and M.L. Fogel. 1989. Nitrogen isotope fractionation in the uptake of ammonium by a marine bacterium. *In* Annual Report of the Director of the Geophysical Laboratory, Carnegie Inst., Washington, 1988-1989, Geophysical Laboratory, Washington, DC. pgs. 117-122.
- Nagata, T. and D.L. Kirchman. 1992. Release of dissolved organic matter by heterotrophic protozoa: implications for microbial food webs. *Archiv. für Hydrobiologie* 35:99-109.
- Kirchman, D.L., J. Moss, and R.G. Keil. 1992. Nitrate uptake by heterotrophic bacteria: does it change the f-ratio? *Arch. Hydrobiol.* 37:129-138.
- Kirchman, D.L., et al. 1993. Dissolved organic matter in biogeochemical models of the ocean. *In* Towards a model of biogeochemical ocean processes, G. T. Evans and M.J.R. Fasham (eds.), Springer-Verlag, Berlin.
- Kirchman, D.L. 2003. The contribution of monomers and other low molecular weight compounds to the flux of DOM in aquatic ecosystems. *In* S. Findlay and R. L. Sinsabaugh [eds.], *Aquatic Ecosystems - Dissolved Organic Matter*. Academic Press. pp. 217-241.

### Book Reviews

- Kirchman, D.L. 1987. Review of "Microbial Lectins and Agglutinins: Properties and Biological Activities", D. Mirelman (ed.). *Quarterly Review of Biology* 62:88-89.
- Kirchman, D.L. 1988. Review of "Microbes in the Sea", M.A. Sleigh (ed.). *Limnol. Oceanogr.* 33 (6, part 2):1649-1650.
- Kirchman, D.L. 1998. Review of "Scholarly Publishing" R.P. Peek and G.B. Newby (eds.). *Limnol. Oceanogr.* 43:1017-1018
- Kirchman, D.L. 1999. Review of "Bacterial Biogeochemistry", T. Fenchel, G.M. King, and T.H. Blackburn. *Limnol. Oceanogr.* 44: 233-234.
- Kirchman, D.L. 2010. Review of "Environmental Molecular Microbiology" Wen-Tso Liu and Janet K. Jansson (ed). *The Quarterly Review of Biology* 85:367-368.
- Kirchman, D.L. 2012. Review of "The Universe in Zero Words", Dana Mackenzie (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/184.html>)
- Kirchman, D.L. 2013. Review of "A World in One Cubic Foot", David Liittschwager (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/444.html>)
- Kirchman, D.L. 2013. Review of "A Story of Six Rivers: History, Culture and Ecology", Peter Coates (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/825.html>)
- Kirchman, D.L. 2013. Review of "The Attacking Ocean: The Past, Present, and Future of Rising Sea Levels", Brian Fagan (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/749.html>)
- Kirchman, D.L. 2013. Review of "The Mortal Sea: Fishing the Atlantic in the Age of Sail", W. Jeffrey Bolster (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/550.html>)
- Kirchman, D.L. 2014. Review of "Telling Our Way to the Sea: A Voyage of Discovery in the Sea of Cortez", Aaron Hirsh (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/879.html>)
- Kirchman, D.L. 2014. Review of "Oxygen: A Four Billion Year History", Donald Canfield (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/1106.html>)
- Kirchman, D.L. 2015. Review of "Ancestors in our Genome: The New Science of Human Evolution, Eugene E. Harris (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/1685.html>)

- Kirchman, D.L. 2015. Review of “Environmental Microbiology: Fundamentals and Applications”, Jean-Claude Bertrand and others (editors), ASLO Bulletin 24 (3): 97-98.
- Kirchman, D.L. 2016. Review of “Water: Nature and Culture”, Veronica Strang (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/1769.html>)
- Kirchman, D.L. 2017. Review of “The Serengeti Rules: The Quest to Discover How Life Works and Why It Matters”, Sean B. Carroll (<http://www.keyreporter.org/BookReviews/LifeOfTheMind/Details/2341.html>).

### **L&O Bulletin articles and other publications**

- Kirchman, D.L. 1993. Message from the editor: What's so special about an L&O paper? ASLO Bulletin. 2:2-3.
- Kirchman, D.L. 1994. Editorial comment: Natural history of a manuscript, revisited. Limnol. Oceanogr. 39:739-741.
- Kirchman, D.L. 1994. Repeating history. ASLO Bulletin. 3(1):8.
- Kirchman, D.L. 1994. News and not-so new info about L&O. ASLO Bulletin. 3(3):3. Kirchman, D.L. 1995. Publication speed. ASLO Bulletin. 4(3):5.
- Kirchman, D.L. 1996. Changing Guard at L&O. ASLO Bulletin. 5(3):4.
- Kirchman, D.L. 1996. Wanted: Volunteers for the L&O: Help with English List. ASLO Bulletin. 5(3):6.
- Kirchman, D. L. 2005. An oceanographer's reflections on 49 volumes and 50 years of L&O. ASLO Bulletin 14: 2-6.
- Kirchman, D. L. 2009. Mysteries of metagenomics revealed ASLO Bulletin 18: 2-6.
- Kirchman, D. L. 2020. The First “Dead Zone”. Limnology and Oceanography Bulletin 10.1002/lob.10402.
- Kirchman, D.L. 2021. Dead zones: growing areas of aquatic hypoxia are threatening our oceans and rivers. [OUPblog](#)

### **Invited Presentations at National and International Meetings**

- “The Activity of Attached and Unattached Bacteria in Marine Systems”, American Society of Limnology and Oceanography, Annual Meeting, 1983.
- “Trophic Dynamics of Particle-bound Bacteria in Pelagic Ecosystems”, International Symposium on Detritus in Aquaculture, Bellagio, Italy, 1985.
- “Amino Acid Incorporation Versus Biosynthesis: Implication for Measuring Rates of Bacterial Production in Marine Systems”, American Geophysical Union-American Society for Limnology and Oceanography, 1986.
- “Immunological Methods to Examine Adsorbed Proteins in Marine Waters”, conference on Basic Research in Marine Biodeterioration, University of Southern California, Los Angeles, CA, 1987.
- “Control of Bacterial Production in Marine Ecosystems”, American Society for Limnology and Oceanography-American Geophysical Union, 1988.
- “Control of Bacterial Production and Nitrogen Use in Marine Ecosystems”, Fifth International Symposium on Microbial Ecology, Kyoto, Japan, 1989.
- “Proteins and Growth of Attached Bacteria”, American Society for Microbiology, 1990.
- “Bacterial Production and Nitrogen Uptake in the Delaware Estuary”, American Chemical Society, 1990.
- “Roles of Heterotrophic Protozoa in the Matter Cycling Within Aquatic Ecosystems”, V International Congress of Ecology, Yokohama, Japan, 1990.

- “Organic and Inorganic Nitrogen Uptake by Heterotrophic Bacteria in Pelagic Ecosystems”, V International Workshop on Carbon Cycle, Copenhagen, Denmark, 1991.
- “Heterotrophic Growth of Bacteria”, Symposium of the Marine Biology Ph.D. Program, Haren, The Netherlands, 1992.
- “Coupling of C and N Uptake by Heterotrophic Bacteria”, XV International Botanical Congress, Yokohama, Japan, 1993.
- “Bacterial Degradation of Polymeric Organic Matter in the Ocean”, DOM Dynamics and Microbial Processes in Marine Environments Workshop, Hakone, Japan, 1996.
- “Marine Bacteria and Dissolved Organic Material in Global Carbon Budget's, First Mid-Atlantic Microbiology Educators Conference, Hood College, Frederick, Maryland, 1996.
- “The Role of Exopolymers in Natural Microbial Communities”, American Society for Microbiology”, 1996.
- “Degradation of Natural Dissolved Organic Material by Marine Bacteria: Global Carbon Cycles from a Molecular Level”, Gordon Conference in Applied Microbiology, 1997.
- “Hydrolysis and Solubilization of Particulate Detritus to DOM by Marine Bacteria: Chitin as a Model System”, AGU-ASLO, 1998.
- “Uptake of Specific DOM Components by Bacterial Groups in the Oceans”, Biocomplexity of Carbon Cycling in the Oceans, Kyoto, Japan, 2001.
- “Bacteria and DOM”, Three Lectures at a NATO ASI, “Modeling Global Carbon Cycles”, Ankara, Turkey, 2002.
- “Lessons from Molecular Microbial Ecology for Understanding Organic Material in Aquatic Ecosystems” Organic Geochemistry Gordon Conference, August 8-12, 2004.
- “Marine Microbial Ecology”, Mini-course at Hong Kong Science and Technology University, July 4-17, 2005
- “Regulation of Bacterial Communities by DOM in Aquatic Ecosystems”, Symposium on Microbial Ecology (SAME), Helsinki, Finland, August 22-26, 2005
- “Activity and Abundance of Specific Bacterial Groups in the Western Arctic Ocean”, BASICS, Banyuls, France, October 20-21, 2005.
- Hong Kong Science and Technology University, Lectures in microbial ecology. Month-long special course, co-taught with Curtis Suttle, University of British Columbia, July 2005.
- “Abundance and Activity of Prokaryotes in the Western Arctic Ocean: Black Boxes to Single Cells”, Keynote lecture, Gordon Conference in Marine Microbial Ecology, July 23-28, 2006
- “Marine Microbes and Global Climate Change”, Keynote lecture, Pioneering Studies by Young Scientists on Chemical Pollution and Environmental Change, Matsuyama, Japan, November 17-19, 2006.
- University of Hawaii, Several lectures in microbial oceanography as part of a special course sponsored by C-More and the Agouron Institute, July 2006.
- “Cold Microbes: From Global Cycles to Genomes”, National Science Teachers Association, March 30, 2007.
- “The Response of Microbes and Lower Trophic Level Dynamics to Climate Change in the Arctic Ocean”, Keynote lecture, International Symposium on Polar and Alpine Microbiology, Banff, Alberta (Canada), May 2008.
- “Arctic Microbial Ecology”, Several lectures as part of a special course in arctic microbiology, held at Svalbard (Norway), July 2008.
- “Community structure and function of heterotrophic bacteria in the oceanic carbon cycle” Keynote lecture: The microbial view of marine biogeochemical cycles, Banyuls (France) May 2010.

- “Photoheterotrophy and the processing of dissolved organic material in coastal oceans” 12<sup>th</sup> Symposium in Microbial Ecology, Rostock (Germany), September 2011.
- “A molecular view of bacterial communities and dissolved organic material in the Delaware estuary,” ASLO Aquatic Sciences, February 2013.
- “Microbial genomics and the functioning of aquatic ecosystems,” Polo Naval fair, Rio Grande do Sur, Brazil, March 2014.
- “Microbial growth rates in the oceans”, International Symposium in Marine Microbiology, Qingdao, China, May 2015
- “Phytoplankton and dissolved organic matter as drivers of bacterial diversity in the Delaware estuary”, CERF, November 2015
- “Control of the composition and diversity of bacterial communities in an estuary”, Ramon Margalef Summer Colloquium, 2016

### Invited Seminars

- Massachusetts Institute of Technology, “Contribution of Particle-bound Bacteria to Heterotrophic Activity”, 1980.
- Marine Biological Laboratory (Woods Hole, MA), “The Ecological Significance of Attached Bacteria in Aquatic Systems”, 1981.
- Stanford University, “Production and Activity of Particle-bound Bacteria in Aquatic Ecosystems”, 1982.
- University of Southern California, “The Roles of Heterotrophic Bacteria in Ecosystems”, 1982.
- University of Georgia, “Uptake of Combined Amino Acids by Bacterial Assemblages in Marine Waters”, 1983.
- Skidaway Institute of Oceanography, “Uptake of Amino Acids and Oligopeptides by Bacteria in Aquatic Systems”, 1983.
- University of Wisconsin-Milwaukee, “The Significance of Heterotrophic Bacteria in Aquatic Systems”, 1984.
- University of Delaware, “Roles of Heterotrophic Bacteria in Aquatic Systems”, 1985.
- Max Planck Institute for Limnology (Plön, F.R.G.), “Regulation of Amino Acid Uptake by Natural Bacterial Assemblages”, 1985.
- University of Constance (Constance, F.R.G.), “Regulation of Amino Acid Uptake by Natural Bacterial Assemblages”, 1985.
- Hopkins Marine Station, Stanford University, “Epiphytic Bacteria and Other Relationships with Algae”, 1986.
- Horn Point Environmental Laboratory, University of Maryland, “Uptake of Organic and Inorganic Nitrogen by Heterotrophic Bacteria”, 1986.
- Université de Provence (Marseille, France), “Uptake of Organic and Inorganic Nitrogen by Heterotrophic Marine Bacteria”, 1987.
- Horn Point Environmental Laboratory, University of Maryland, “Heterotrophic Bacteria in the North Pacific”, 1988.
- University of North Carolina, Beaufort Marine Laboratory, “Regulation of Nitrogen and Carbon Uptake by Heterotrophic Bacteria”, 1988.
- Texas A&M University, “Control of Nitrogen Uptake and Regeneration by Marine Heterotrophic Bacterioplankton in the Subarctic North Pacific”, 1988.
- SUNY-Stony Brook, “Nitrogen Uptake by Heterotrophic Bacteria in Marine Systems”, 1989.
- University of Washington, “Bacterial Processes in the Subarctic North Pacific”, 1990. University of

- Oslo, Norway, "Role of Bacteria in Global Carbon Cycles", 1991.
- University of Bergen, Norway, "Nitrogen Uptake and the Greenhouse Problem", 1991.
- Uppsala University, Sweden, "The Greenhouse Problem and Marine Microorganisms", 1991.
- Delaware State College, "Oceans and the Greenhouse Problem", 1991.
- Uppsala University, Sweden, "Fatty Fecal Pellets from Protozoa", 1991.
- University of Delaware (Biotech. Seminar Series), "Marine Microbiology, Biotechnology and the Greenhouse Problem", 1991.
- University of Delaware (Marine Associates), "Marine Microbes", 1991.
- Mary Cary Arboretum, New York, "Dissolved Organic Matter: Composition and Degradation by Heterotrophic Bacteria", 1993.
- Tokyo Bay Research Group (Tokyo, Japan), "Degradation of Dissolved Organic Matter", 1993.
- JGOFS-EqPac Workshop (Scottsdale, AZ), "Microbial Processes in the Equatorial Pacific," 1994.
- Montana State University, "Attached Bacteria: Ecology and Molecular Mechanism", 1995.
- Gesellschaft fuer Biotechnologishche Forschung (Braunschweig, Germany) "Degradation of Colloidal Organic Matter by Marine Bacteria," 1995.
- Florida State University, "Controlling the Microbial Loop", 1995.
- Virginia Institute Of Marine Science, "Controlling the Microbial Loop", 1995.
- University of Georgia, "Bacteria in Carbon Cycles: Degradation of DOM at the Molecular Level", 1996.
- Boston University Marine Program, Woods Hole, MA, "Degradation of DOM at the Molecular Level", 1996.
- University of Delaware (Summer Intern Program), "Microbes in Global Carbon Cycles", 1997. Lincoln University, "Molecular Biology in Marine Biology and Oceanography", 1998.
- University of Delaware (Department of Civil and Environmental Engineering), "Marine Microbes: Bioremediation to Global Carbon Cycling", 1998.
- University of Delaware (Department of Biology), "Bacteria in the Oceans: Degradation of DOM at the Molecular Level", 1998.
- University of Oldenburg (Germany), "Bacteria in Carbon Cycles: Degradation of DOM at the Molecular Level", 1999.
- Max Planck Institute for Marine Microbiology (Bremen, Germany), "Bacteria in Oceanic Carbon Cycles: Who is using DOM?" 1999.
- Plymouth Marine Labs (England), "Bacteria in Oceanic Carbon Cycles: Who is using DOM?" 1999.
- Hanse Institute for Advanced Study (Germany), "Marine Microbes--Dead or Alive?", 1999.
- Gesellschaft fuer Biotechnologishche Forschung (Braunschweig, Germany), "Who is using DOM? Windows into the Activity of Uncultured Bacteria", 1999.
- Helgoland Marine Biological Lab, "Bacteria in Oceanic Carbon Cycles: Who is using DOM?", 1999.
- Alfred Wegner Institute for Polar and Marine Research, "Bacteria in the Oceans: Degradation of DOM at the Molecular Level", 1999.
- University of Washington (invited by the students), "Molecular Microbial Ecology Meets Molecular Organic Geochemistry: What do we Need to Model DOC and Bacteria?", 2000.
- Horn Point Environmental Laboratory, University of Maryland, "Molecular Microbial Ecology Meets Molecular Organic Geochemistry: What do we Need to Model DOC and Bacteria?", 2000.
- Lincoln University, "Microbes in Global Carbon Cycles", 2001.
- University of Georgia, "Microbes in Aquatic Carbon Cycles: How Many Bacteria do we Really Need?", 2001.
- University of Tennessee, "Microbes in Aquatic Carbon Cycles: How Many Bacteria do we Really Need?", 2001.



- Temple University, “Microbes in Global Carbon Cycles: How Many Bacteria do we Really Need?”, 2002.
- Old Dominion University, “Microbes in Global Carbon Cycles: How Many Bacteria do we Really Need?”, 2002.
- Tulane University, “Microbial Phylogeny Meets Biogeochemistry: Role of Specific Microbial Groups in Organic Matter Processes”, 2004
- University of Delaware Wildlife and Conservation Club, “Introduction to the Biology of the Arctic Ocean”, 2004
- Republican Women’s Club of Sussex County, “Overview of the College of Marine Studies”, 2004
- Center for Marine Biotechnology, University of Maryland-Baltimore “Metagenomics and the Role of Microbes in the Global Carbon Cycle”, 2005
- Uppsala University (Sweden), “Activity and Abundance of Specific Bacterial Groups in the Oceans, 2005
- Kalmar University (Sweden), “Metagenomics and the Role of Microbes in the Global Carbon Cycle”, 2005
- West Point Military Academy, “Microbes in the Oceans and in the Global Carbon Cycle: Some Like it Cold?”, 2005
- University of Bergen (Norway), “Abundance and Activity of Prokaryotes in the Western Arctic Ocean: Black Boxes to Single Cells”, 2006
- Bigelow Laboratory Boothbay Harbor, ME, “Role of Photoheterotrophic Microbes in the Oceanic Carbon Cycle”, 2007.
- University de Quebec, Montreal “Microbes in the Carbon Cycle of the Arctic Ocean: From Black Boxes to Metagenomes, 2007
- Laval University, Quebec City “Microbes in the carbon cycle of the Arctic Ocean: From Black Boxes to Metagenomes, 2007
- National Science Teachers Association Annual Meeting, “Cold Microbes: From Global Cycles to Genomes”, 2007
- Web seminar, National Science Teachers Association, “Cold Microbes: From Global Cycles to Genomes”, 2007
- Institut de Ciències del Mar, Barcelona, Spain “Role of Photoheterotrophic Microbes in the Oceanic Carbon Cycle”, 2007
- University of North Carolina, Chapel Hill (Gussenhoven lecturer, invited by the students), “A Bipolar View of Microbes and the Oceanic Carbon Cycle”, 2008
- Old Dominion University, Norfolk, VA. “Regulation of Microbial Growth in the Polar Oceans and Potential Impacts of Climate Change”, 2008
- Barrow, AK community, “The Unseen World: Microbes in the Arctic Ocean”, as part of the National Science Foundation Schoolyard Project, 2008
- Academy of Lifelong Learning, Wilmington, DE “Global Change in Antarctica”, 2008.
- Universidad de Costa Rica, “Thirty Years of Microbial Oceanography and the CIMAR Delaware Connection”, 2009
- National Oceanography Institute, Goa, India. Several seminars and workshops in microbial ecology, 2009
- Institut de Ciències del Mar, Barcelona, Spain “Diversity and Carbon Flow in Coastal Oceans: From the Delaware Bay to the Arctic Ocean (and Elsewhere)”, 2010
- Universidad de Granada, Spain “Microbial Diversity and Carbon Fluxes in Coastal Oceans”, 2010
- Duke Marine Laboratory, “Photoheterotrophic microbes in the oceanic carbon cycle”, 2011

Princeton University, “The Meaning of Diversity for Biogeochemical Processes in the Oceans”, 2011  
University of Texas at Austin (Port Aransas), “The Meaning of Diversity for Biogeochemical Processes in the Oceans”, 2012.  
University of Texas at Austin (Port Aransas), the Laura Randal Schweppe Lecture, “A Journey into an Unseen World: Why Marine Microbes Matter”, 2012.  
University of North Carolina, Chapel Hill, “Anaerobic Degradation of Organic Material in Methane-Rich Sediments of the Arctic Ocean as Revealed by Metagenomics”, 2012.  
University of Massachusetts-Amherst, “Carbon Cycle Processes and Microbial Diversity in Aquatic and Terrestrial Ecosystems: From Genomes to Biomes”, 2013  
Universidade Federal do Rio Grande (Brazil), “Linking structure and function (activity) of bacterial communities in the oceans”, 2014  
Clemson University, “Carbon Cycle Processes and Microbial Diversity in Aquatic and Terrestrial Ecosystems: From Genomes to Biomes”, 2014  
Uppsala University (Sweden), “Microbial growth rates in the oceans”, 2015  
Xiamen University (China), “Microbial growth rates in the oceans”, 2015  
Johns Hopkins University, “Microbial Diversity and Carbon Fluxes in the Delaware Estuary”, 2015  
Old Dominion University, “Control of the microbial loop by phytoplankton and DOM in the Delaware estuary”, 2016  
Hampton University, “Microbial oceanography: A journey into an unseen world”, 2016  
Institut de Ciències del Mar, Barcelona, Spain, “Growth rates of marine microbes: Back to the future”, March 2017  
University of Oldenburg, Germany, “Growth rates of marine microbes: Back to the future”, April 2017.  
Institut de Ciències del Mar, Barcelona, Spain, “Five secrets for writing a successful paper in the sciences”, May 2017  
University of Bergen, Norway, “One secret for writing a successful paper in the sciences”, November 2017.  
Old Dominion University, “Dead Zones Rising: Loss of oxygen from rivers, estuaries and the oceans”, April 2019

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