

ALEXANDRA ZOE WORDEN

Senior Scientist

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Unit Website: <https://www.wordenlab.org>

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Parental leaves 2010-2011, 2012

EDUCATION AND POSTDOCTORAL TRAINING

Scripps Institution of Oceanography	Postdoctoral Fellow	2000 – 2003
	Advisors: Farooq Azam, Brian Palenik	
University of Georgia	Ph.D. in Ecology (Odum School of Ecology)	2000
	Mentor: Brian J. Binder	
Wellesley College	B.A. History /concentration	1992
	Earth, Atmospheric & Planetary Sci. (MIT)	
	Mentors: Sallie W. Chisholm, John M. Edmond	

EMPLOYMENT

Full Professor (W3) & Director,	Ocean EcoSystems Biology Unit, Christian-Albrechts-Universität zu Kiel/University of Kiel and GEOMAR	
	Helmholtz Centre for Ocean Research Kiel	2018-2023
Visiting Scholar	Harvard University	2022-pres
Senior Scientist Adjunct	Marine Biological Laboratory (MBL)	2022 – 2023
Fellow	Max Planck Institute for Evolutionary Biology	2021-pres
Senior Scientist Adjunct	Monterey Bay Aquarium Research Institute (MBARI)	2021 – 2022
Professor Adjunct (full academic privileges)	University of California Santa Cruz (UCSC)	
	Ocean Sciences Department	2015 – pres.
Scientist IV, Senior Scientist	MBARI (on leave 2019/2020)	2015 – 2020
Scientist III	MBARI	2011 – 2015
Associate Professor Adjunct	Ocean Sciences Department, UCSC	2011 – 2015
Scientist II	MBARI	2007 – 2010
Assistant Professor Adjunct	Ocean Sciences Department, UCSC	2007 – 2010
Assistant Professor	University of Miami (UM)	2004 – 2007
	Rosenstiel School of Marine & Atmospheric Science	
	Marine Biology and Fisheries Division	
	Secondary Appointment, Department of Biology, UM	
Visiting Scientist	Station Biologique Roscoff, France (7 months)	2004
Research Technician	Massachusetts Institute of Technology	1993 – 1994
Teaching Fellow	Harvard University & HU Extension School	1992 – 1994

HONORS AND FELLOWSHIPS

Visiting Scholar, Dept. of Organismic and Evolutionary Biology, Harvard University	2022 – 2023
Elected to the German National Academy of Sciences Leopoldina	2022
Fellow, Radcliffe Institute for Advanced Study Harvard University	2021 – 2022
Max Planck Fellow, Max Planck Institute for Evolutionary Biology, Plön, DE	2021 – pres.
Visiting Scientist, Woods Hole Oceanographic Institution	2020
Elected Fellow, American Academy of Microbiology	2016
Fellow, Marine and Climate Research, Hanse-Wissenschaftskolleg, DE	2015 – 2016
Investigator, Gordon and Betty Moore Foundation (Marine Microbiology)	2013 – 2021
Senior Fellow, Canadian Institute for Advanced Research (CIFAR) Integrated Microbial Biodiversity Program	2011 – 2017
Scholar, CIFAR Integrated Microbial Biodiversity Program	2009 – 2010
Van Neil Lecturer, Hopkins Marine Station, Stanford University	2009
Gordon and Betty Moore Foundation Young Investigator in Marine Microbiology	2004 – 2008
AAAS Women’s International Science Collaboration Award	2003
NSF Postdoctoral Fellowship in Microbial Biology	2000 – 2002
NASA Earth Systems Science Graduate Student Fellowship	1996 – 1999
Regents Award, University of Georgia	1996 – 1999
Ford Foundation Award for History Studies	1991
Armed Forces Communications and Electronics Association Award	1988
Gold Award, Girl Scouts of the United States of America	1988

PUBLICATIONS (PEER-REVIEWED)

note: Underline indicates Worden lab member. *Corresponding author, *only indicated if not in the senior (last) author position.*

Subm Opher M, Loeb L, Zucker C, Goodman A, Konietzka R, Worden AZ, Economo EP, Jesse Miller J, Alves J, Groner J, Kornbleuth M, Peek JEG. The Passage of Solar System through the Local Bubble. ***In revision.***

Subm Hehenberger E, Guo J, Wilken S, Hoadley K, Sudek L, Poirier C, Dannebaum R, Susko E, & AZ Worden. Reprogramming of the tRNA epitranscriptome and codon usage bias underpin nutrient limitation responses in marine algae. ***In revision.***

2023 Strauss J, Deng L, Gao S, Toseland A, Bachy C, Kirkham A, Hopes A, Utting R, Tagliabue A, Löw C, Worden AZ, Nagel G, Mock T. A cold-adapted xanthorhodopsin proton pump supports growth of diatoms under iron limitation. ***Nature Microbiology.*** In press.

2023 Wilken S, Yung CCM, Poirier C, Massana R, Jimenez V & AZ Worden. Choanoflagellates alongside diverse uncultured predatory protists consume the abundant open-ocean cyanobacterium *Prochlorococcus*. ***Proceedings of the National Academy of Sciences USA.*** In press.

2023 Eckmann CA, Eberle JS, Wittmers F, Wilken S, Bergauer K, Poirier C, Blum M, Makareviciute K, Jimenez V, Bachy V, Vermeij MJ & AZ Worden. Eukaryotic algal community composition of tropical environments from solar salterns to the open sea. ***Frontiers in Marine Microbiology.*** In press.

- 2023 [Strauss J](#), [Choi CJ](#), [Grone J](#), [Wittmers F](#), [Jimenez V](#), [Makareviciute-Fichtner K](#), [Bachy C](#), [Spiro Jaeger G](#), [Poirier C](#), [Eckmann CA](#), [Spezzano R](#), [Löscher CR](#), [Sarma VVSS](#), [Mahadevan A](#) & **AZ Worden**. The Bay of Bengal exposes abundant photosynthetic picoplankton and newfound diversity along salinity-driven gradients. *Environmental Microbiology*. In press.
- 2023 [Min MA](#), [Needham DM](#), [Sudek S](#), [Truelove NK](#), [Pitz K](#), [Chavez GM](#), [Poirier C](#), [Gardeler B](#), [von der Esch E](#), [Ludwig A](#), [Riebesell U](#), **Worden AZ** & [FP Chavez](#). Ecological divergence of a mesocosm in an eastern boundary upwelling system assessed with multi-marker DNA metabarcoding. *Biogeosciences*. <https://doi.org/10.5194/bg-2022-212>.
- 2022 [Needham DM](#), [Poirier C](#), [Bachy C](#), [George EE](#), [Wilken S](#), [Yung CCM](#), [Limardo AJ](#), [Morando M](#), [Sudek L](#), [Malstrom RR](#), [Keeling PJ](#), [Santoro AE](#) & **AZ Worden**. The microbiome of a bacterivorous marine choanoflagellate contains a resource-demanding obligate bacterial associate. *Nature Microbiology*. Vol 7, 1466-1479.
- 2022 [Wittmers F](#), [Needham DM](#), [Hehenberger E](#), [Giovannoni SJ](#) & **AZ Worden**. Genomes from uncultivated pelagiphages reveal multiple phylogenetic clades exhibiting extensive auxiliary metabolic genes and cross-family multigene transfers. *mSystems*. e01522-21.
- 2022 [Bachy C](#), [Sudek L](#), [Choi C-J](#), [Eckmann CA](#), [Nöthig E-M](#), [Metfies K](#) & **AZ Worden**. Phytoplankton surveys in the arctic Fram Strait demonstrate the tiny eukaryotic alga *Micromonas* and other picoprasinophytes contribute to deep sea export. *Microorganisms*. Vol 10, 961 doi.org/10.3390/microorganisms10050961.
- 2022 [Bachy C](#), [Wittmers F](#), [Muschiol J](#), [Hamilton M](#), [Henrissat B](#) & **AZ Worden**. The land-sea connection: insights into the plant lineage from a green algal perspective. *Annual Reviews of Plant Biology*. Vol 73, 585–616.
- 2021 [Hamilton M](#), [Mascioni M](#), [Hehenberger E](#), [Bachy C](#), [Yung C](#), [Vernet M](#) & **AZ Worden**. Spatiotemporal variations in Antarctic protistan communities highlight phytoplankton diversity and seasonal dominance by a novel cryptophyte lineage. *mBio*. Vol 12, Issue 6 e02973-21.
- 2021 [Schön ME](#), [Zlatogursky VV](#), [Singh RP](#), [Poirier C](#), [Wilken S](#), [Mathur V](#), [Strassert JFH](#), [Pinhassi J](#), **Worden AZ**, [Keeling PJ](#), [Ettema TJG](#), [Wideman JG](#) & [F Burki](#). Single cell genomics reveals plastid-lacking Picozoa as close relatives of red algae. *Nature Communications*. Vol 12, 6651. doi.org/10.1038/s41467-021-26918-0
- 2021 [Bachy C](#), [Yung C-M](#), [Needham DM](#), [Gazitua C](#), [Roux S](#), [Limardo AJ](#), [Choi CJ](#), [Sullivan MB](#) & **AZ Worden**. Viruses infecting a warm water picoeukaryote shed light on spatial co-occurrence dynamics of marine viruses and their hosts. *The ISME Journal*. doi.org/10.1038/s41396-021-00989-9.
- 2021 [Hoadley KD](#), [Hamilton M](#), [Poirier CL](#), [Choi CJ](#), [Yung C-M](#) & **AZ Worden**. Selective uptake of pelagic microbial community members by Caribbean reef corals. *Applied and Environmental Microbiology*. Vol 87, e03175-20.
- 2021 [Bolaños LM](#), [Choi CJ](#), **Worden AZ**, [Baetge N](#), [Carlson CA](#) & [SJ Giovannoni](#). Seasonality of the microbial community composition in the North Atlantic. *Frontiers in Marine Science*. Vol 8, doi.org/10.3389/fmars.2021.624164.
- 2020 [Faktorová[‡] D](#), [Nisbet[‡] RER](#), [Fernández[‡] JA](#), [Casacuberta[‡] E](#), [Sudek[‡] L](#), [Allen AE](#), [Ares M](#), [Aresté C](#), [Balestreri C](#), [Barbrook AC](#), [Beardslee B](#), [Bender S](#), [Booth DS](#), [Bouget F-Y](#), [Bowler C](#), [Breglia SA](#), [Brownlee C](#), [Burger G](#), [Cerutti H](#), [Cesaroni R](#), [Chiurillo MA](#), [Clemente T](#), [Coles DB](#), [Collier JL](#), [Cooney EC](#), [Coyne K](#), [Docampo R](#), [Dupont CL](#), [Edgcomb V](#), [Einarsson E](#), [Elustondo PA](#), [Federici F](#), [Freire-](#)

- Beneitez V, Freyria NJ, Fukuda K, García PA, Girguis PR, Goma F, Gornik SG, Guo J, Hampl V, Hanawa Y, Haro-Contreras ER, Hehenberger H, Highfield A, Hirakawa Y, Hopes A, Howe CJ, Hu I, Ibañez J, Irwin NAT, Ishii Y, Janowicz NE, Jones AC, Kachale A, Fujimura-Kamada K, Kaur B, Kaye JZ, Kazana E, Keeling PJ, King N, Klobutcher LA, Lander N, Lassadi I, Li Z, Lin S, Lozano J-C, Luan F, Maruyama S, Matute T, Miceli C, Minagawa J, Moosburner M, Najle SR, Nanjappa D, Nimmo IC, Noble L, Novák Vanclová AMG, Nowacki M, Nuñez I, Pain A, Piersanti A, Pucciarelli S, Pyrih J, Rest JS, Rius M, Robertson D, Ruaud A, Ruiz-Trillo I, Sigg MA, Silver PA, Slamovits CH, Smith GJ, Sprecher BN, Stern R, Swart E, Tsaousis A, Tsy-pin L, Turkewitz A, Turnšek J, Valach M, Vergé V, von Dassow P, von der Haar T, Waller RF, Wang L, Wen X, Wheeler G, Woods A, Zhang H, Mock* T, **Worden* AZ** & J Lukeš*. Genetic tool development in marine protists: Emerging model organisms for experimental cell biology. *Nature Methods*. Vol 17:481–494. †Co-first authors, *Co-correspond.
- 2020 Choi CJ, Jimenez V, Needham DM, Poirier C, Bachy C, Alexander H, Wilken S, Chavez FP, Sudek S, Giovannoni SJ & **AZ Worden**. Seasonal and geographical transitions in eukaryotic phytoplankton community structure in the Atlantic and Pacific Oceans. *Frontiers in Microbiology*. Vol 11, doi.org/10.3389/fmicb.2020.542372.
- 2020 Suffridge CP, Bolaños LM, Bergauer K, **Worden AZ**, Morré J, Behrenfeld MJ & SJ Giovannoni. Exploring Vitamin B1 Cycling and Its Connections to the Microbial Community in the North Atlantic Ocean. *Frontiers in Marine Science*. Vol 7, doi.org/10.3389/fmars.2020.606342.
- 2020 Cooney EC, Okamoto N, Cho A, Hehenberger E, Richards TA, Santoro AE, **Worden AZ**, Leander BS & PJ Keeling. Single cell transcriptomics of *Abedinium* reveals a new early branching dinoflagellate lineage. *Genome Biology and Evolution*. Vol 12:2417-2428.
- 2020 Breusing C, Schultz DT, Sudek S, **Worden AZ** & CR Young. High-contiguity genome assembly of the chemosynthetic gammaproteobacterial endosymbiont of the cold seep tubeworm *Lamellibrachia barhami*. *Molecular Ecology Resources*. DOI: 10.1111/1755-0998.13220.
- 2020 Bolaños LM, Karp-Boss L, Choi C-J, **Worden AZ**, Graff JR, Haëntjens N, Chase AP, Della Penna A, Gaube P, Morison F, Menden-Deuer S, Westberry TK, O'Malley RT, Boss E, Behrenfeld MJ & SJ Giovannoni. Small phytoplankton dominate western North Atlantic biomass. *The ISME Journal*. Vol 14:1663-1674.
- 2020 Wilken S, Choi CJ & **AZ Worden**. Contrasting mixotrophic lifestyles reveal different ecological niches in two closely related marine protists. *Journal of Phycology*. Vol 56:52-67.
- 2020 Zimmerman AE, Howard-Varona C, Needham DM, John S, **Worden AZ**, Sullivan MB, Waldbauer J & ML Coleman. Metabolic and biogeochemical consequences of viral infection in aquatic ecosystems. *Nature Reviews Microbiology*. Vol 18:21-34. (Conceptualized while 1st author in Worden lab, fully written after her move to the Coleman & Waldbauer lab).
- 2020 Rodríguez-Martínez R, Leonard G, Milner DS, Sudek S, Conway M, Moore K, Hudson T, Mahé F, Keeling PJ, Santoro AE, **Worden AZ** & TA Richards. Controlled sampling of ribosomally active protistan diversity in marine sediment-surface layers identifies putative players in the carbon sink. *The ISME Journal*. Vol 14:984-998.
- 2020 Wideman JG, Monier A, Rodríguez-Martínez R, Leonard G, Cook E, Poirier C, Maguire F, Milner D, Irwin NAT, Moore K, Santoro AE, Keeling PJ, **Worden AZ** & TA Richards. Unexpected mitochondrial genome diversity revealed by targeted single-cell genomics of heterotrophic flagellated protists. *Nature Microbiology*. Vol 5:154-165.

- 2020 del Campo J, Heger TJ, Rodríguez-Martínez R, **Worden AZ**, Richards TA, Massana R & PJ Keeling. Assessing the diversity and distribution of apicomplexans in host and free-living environments using high-throughput amplicon data and a phylogenetically informed reference framework. *Frontiers in Microbiology*. <https://doi.org/10.3389/fmicb.2019.02373>
- 2019 Kolody BJ, McCrow J, Zeigler Allen L, Aylward FO, Fontanez KM, Moustafa A, Moniruzzaman M, Chavez FP, Scholin CA, Allen EE, **Worden AZ**, Delong EF & AE Allen. Diel transcriptional response of a California Current plankton microbiome to light, low iron, and enduring viral infection. *The ISME Journal*. Vol 13:2817–2833.
- 2019 Needham DM, Poirier C, Hehenberger E, Jimenez V, Swalwell JE, Santoro AE & **AZ Worden**. Targeted metagenomic recovery of four divergent viruses reveals shared and distinctive characteristics of giant viruses of marine eukaryotes. *Philosophical Transactions of the Royal Society B*. 374: 20190086. <https://doi.org/10.1098/rstb.2019.0086>.
- 2019 Wilken S, Yung C-M, Hamilton M, Hoadley K, Nzongo J, Eckmann C, Corrochano Luque M, Poirier C & **AZ Worden**. The need to account for cell biology in characterizing predatory mixotrophs in aquatic environments. *Philosophical Transactions of the Royal Society B*. Vol 374: 20190090. <http://dx.doi.org/10.1098/rstb.2019.0090>
- 2019 Needham[‡] DM, Yoshizawa[‡] S, Hosaka[‡] T, Poirier C, Choi CJ, Hehenberger E, Irwin NTA, Wilken S, Yung C-M, Bachy C, Kurihara R, Nakajima Y, Kojima K, Kimura-Someya T, Leonard G, Malmstrom RR, Mende D, Olson DK, Sudo Y, Sudek S, Richards TA, DeLong EF, Keeling PJ, Santoro AE, Shirouzu M, Iwasaki W & **AZ Worden**. A distinct lineage of giant viruses brings a rhodopsin photosystem to unicellular marine predators. *Proceedings of the National Academy of Sciences USA*. Vol 116: 20574-20583. [‡]Co-first authors
- 2019 Zimmerman AE, Bachy C, Ma X, Roux S, Jang HB, Sullivan MB, Waldbauer JR & **AZ Worden**. Closely-related viruses of the marine picoeukaryotic alga, *Ostreococcus lucimarinus*, exhibit different ecological strategies. *Environmental Microbiology*. Vol 21:2148-2170.
- 2019 Okamoto N, Gawryluk RMR, del Campo J, Strassert JFH, Lukeš J, Richards TA, **Worden AZ**, Santoro AE & PJ Keeling. A Revised Taxonomy of Diplonemids Including the Eupelagonemidae n. fam. and a Type Species, *Eupelagonema oceanica* n. gen. & sp. *The Journal of Eukaryotic Microbiology*. Vol 66:519-524. <https://doi.org/10.1111/jeu.12679>.
- 2018 Joo S, Wang MH, Lui G, Lee J, Barnas A, Kim E, Sudek S, **Worden AZ** & JH Lee. Common ancestry of heterodimerizing TALE homeobox transcription factors across Metazoa and Archaeplastida. *BMC Biology*. 16:136. doi: 10.1186/s12915-018-0605-5.
- 2018 Guo J, Wilken S, Jimenez V, Choi CJ, Ansong CK, Dannebaum R, Sudek L, Milner D, Bachy C, Reistetter EN, Elrod VA, Klimov D, Purvine SO, Wei C-L, Kunde-Ramamoorthy G, Richards TA, Goodenough U, Smith RD, Callister SJ & **AZ Worden**. Specialized proteomic responses and an ancient photoprotection mechanism sustain marine green algal growth during phosphate limitation. *Nature Microbiology*. Vol 3:781–790.
- 2018 Bachy C, Charlesworth CJ, Chan AM, Finke JF, Wong C-H, Wei C-L, Sudek S, Coleman ML, Suttle CA & **AZ Worden**. Transcriptional responses of the marine green alga *Micromonas pusilla* and an infecting prasinovirus under different phosphate conditions. *Environmental Microbiology*. Vol 20:2898-2912.
- 2018 Strassert JFH, Hehenberger E, del Campo J, Okamoto N, Kolisko M, Richards TA, **Worden AZ**, Santoro AE & PJ Keeling. Phylogeny, evidence for a cryptic plastid, and distribution of

- Chytridinium* parasites (Dinophyceae) infecting copepods. **The Journal of Eukaryotic Microbiology**. Vol 66:574-581.
- 2018 Orsi WD, Wilken S, del Campo J, Heger T, James E, Richards TA, Keeling PJ, **Worden AZ** & AE Santoro. Identifying protist consumers of photosynthetic picoeukaryotes in the surface ocean using stable isotope probing. **Environmental Microbiology**. Vol 20:815-827
- 2018 Strassert JFH, Karnkowska A, Hehenberger E, del Campo J, Kolisko M, Okamoto N, Burki F, Janouškovec J, Poirier C, Leonard G, Hallam S, Richards TA, **Worden AZ**, Santoro A & PJ Keeling. Single cell genomics of uncultured Marine Alveolates (MALVs) shows paraphyly of basal dinoflagellates. **The ISME Journal**. Vol 12:304-308.
- 2017 Gutowska MA, Shome B, McRose D, Sudek S, Hamilton M, Giovannoni SJ, Begley TP & **AZ Worden**. Ecologically important marine haptophyte algae use exogenous pyrimidine compounds more efficiently than thiamin. **mBio**. Vol 8: e01459-17. doi: 10.1128/mBio.01459-17.
- 2017 Limardo AJ, Sudek S, Choi CJ, Poirier C, Rii YM, Blum M, Roth R, Goodenough U, Church MJ & **AZ Worden**. Quantitative biogeography of picoprasinophytes establishes differential ecotype distributions and significant contributions to marine phytoplankton. **Environmental Microbiology**. Vol 19:3219-3234.
- 2017 Cuvelier ML, Guo J, Ortiz AC, van Baren MJ, Tariq MA, Partensky F & **AZ Worden**. Responses of the picoprasinophyte *Micromonas commoda* to light and ultraviolet stress. **PLoS One**. 27 pgs. doi:10.1371/journal.pone.0172135.
- 2017 Choi[†] CJ, Bachy[†] C, Jaeger GS, Poirier C, Sudek L, Sarma VVSS, Mahadevan A, Giovannoni SJ & **AZ Worden**. Newly discovered deep-branching marine plastid lineages are numerically rare but globally distributed. **Current Biology**. Vol 27:R17–R18. [†]Co-first authors.
- 2017 Caron DA, Alexander H, Allen AE, Archibald JM, Armbrust EV, Bachy C, Bharti A, Dyhrman ST, Guida S, Heidelberg KB, Kaye JZ, Metzner J, Smith SR & **AZ Worden**. Probing the evolution, ecology and physiology of marine protists using transcriptomics. **Nature Reviews Microbiology**. Vol 15:6-20. (not corresponding)
- 2017 Mock T, Otilar RP, Strauss J, Allen AE, Dupont CL, Frickenhaus S, Maumus F, McMullan M, Salamov A, Sanges R, Schmutz J, Toseland A, Veluchamy A, Ward BJ, Wu T, Barry KW, Falciatore A, Ferrante MI, Fortunato AE, Glöckner G, Gruber A, Hipkin R, Janech MG, Kroth P, Leese F, Lindquist EA, Lyon BR, Martin J, Mayer C, Parker M, Quesneville H, Raymond JA, Uhlig C, Valas RE, Valentin KU, **Worden AZ**, Armbrust EV, Bowler C, Green BR, Moulton V, van Oosterhout C & IV Grigoriev. Evolutionary genomics of a cold-adapted diatom, *Fragilariopsis cylindrus*. **Nature**. 541:536-540.
- 2017 Clayton SC, Lin Y-C, Follows MJ & **AZ Worden**. Co-existence of distinct *Ostreococcus* ecotypes at an oceanic front. **Limnology & Oceanography**. Vol 62:75–88.
- 2016 Gawryluk R, del Campo J, Okamoto N, Strassert JFH, Lukes J, Richards TA, **Worden AZ**, Santoro AE & PJ Keeling. Morphological identification and single-cell genomics of marine diplomonads. **Current Biology**. Vol 26:3053–3059.
- 2016 Gregory AC, Solonenko S, LaButti K, Copeland A, Sudek S, Maitland A, Chittick L, dos Santos F, Weitz JS, **Worden AZ**, Woyke T & MB Sullivan. Genomic differentiation amongst wild cyanophages despite widespread horizontal gene transfer. **BMC Genomics**. 17:930 (13 pgs). doi:10.1186/s12864-016-3286-x

- 2016 Orsi WD, Smith JM, Liu S, Liu Z, Sakamoto CM, Wilken S, Poirier C, Richards TA, Keeling PJ, **Worden AZ** & AE Santoro. Diverse, uncultivated bacteria and archaea underlying the cycling of dissolved protein in the ocean. *The ISME Journal*. Vol 10:2158-2173.
- 2016 Monier A, **Worden AZ** & TA Richards. Phylogenetic diversity and biogeography of the Mamiellophyceae lineage of eukaryotic marine phytoplankton across the oceans. *Environmental Microbiology Reports*. Vol 8:461-469. doi: 10.1111/1758-2229.12390
- 2016 Simmons MP, Sudek S, Monier A, Limardo AJ, Jimenez V, Perle C, Elrod VA, Pennington JT & **AZ Worden**. Abundance and biogeography of picoprasinophyte ecotypes and other phytoplankton in the Eastern North Pacific Ocean. *Applied & Environmental Microbiology*. Vol 82:1693-1705.
- 2016 van Baren MJ, Bachy C, Reistetter EN, Purvine SO, Grimwood J, Sudek S, Yu H, Poirier C, Kuo A, Grigoriev IV, Wong C-H, Smith RD, Schmutz J, Wei C-L, Callister SJ & **AZ Worden**. Evidence-based green algal genomics reveals marine diversity and ancestral characteristics of land plants. *BMC Genomics*. 17:267 (22 pgs). doi: 10.1186/s12864-016-2585-6
- 2016 Waltman PH, Guo J, Reistetter EN, Purvine S, Ansong CK, van Baren MJ, Wong C-H, Wei C-H, Smith RD, Callister SJ, Stuart JM & **AZ Worden**. Identifying aspects of the post-transcriptional program governing the proteome of the green alga *Micromonas pusilla*. *PLoS One*. doi:10.1371/journal.pone.0155839
- 2015 Ribalet F, Swalwell JE, Clayton S, Jimenez V, Sudek S, Lin Y, Johnson ZI, **Worden AZ** & EV Armbrust. Light-driven synchrony of *Prochlorococcus* growth and mortality in the North Pacific gyre. *Proceedings of the National Academy of Sciences USA*. Vol 112:8008–8012.
- 2015 **Worden* AZ**, Follows MJ, Giovannoni SJ, Wilken S, Zimmerman AE & PJ Keeling. Rethinking the marine carbon cycle: factoring in multifarious lifestyles of microbes. *Science*. Vol 347. doi: 10.1126/science.1257594 (12 pages). *Corresponding author.
- 2015 Simmons MP, Bachy C, Sudek S, Baren MJ, Sudek L, Ares M & **AZ Worden**. Intron invasions trace algal speciation and reveal nearly identical Arctic and Antarctic *Micromonas* populations. *Molecular Biology and Evolution*. Vol 32:2219-2235.
- 2015 Derelle E, Monier A, Cooke R, **Worden AZ**, Grimsey NH & H Moreau. Diversity of viruses infecting the green micro-alga *Ostreococcus lucimarinus*. *Journal of Virology*. Vol 89:5812-21.
- 2015 Orsi WD, Smith JM, Wilcox HM, Swalwell JE, Carini P, **Worden AZ** & AE Santoro. Ecophysiology of uncultivated marine euryarchaea is linked to particulate organic matter. *The ISME Journal*. Vol 9: 1747-1763.
- 2015 Sudek S, Everroad RC, Gehman A, Smith JM, Poirier C, Chavez FP & **AZ Worden**. Cyanobacterial distributions along a physico-chemical gradient in the northeastern Pacific Ocean. *Environmental Microbiology*. Vol 17:3692-3707.
- 2015 Ševčíková T, Horák A, Klimeš V, Zbránková V, Demir-Hilton E, Sudek S, Jenkins J, Schmutz J, Přibyl P, Fousek J, Vlček C, Lang BF, Oborník M, **Worden* AZ** & M Eliáš*. Updating algal evolutionary relationships through plastid genome sequencing: did alveolate plastids emerge through endosymbiosis of an ochrophyte? *Scientific Reports*. 5:doi: 10.1038/srep10134. *co-corresponding.
- 2014 Duanmu[‡] D, Bachy[‡] C, Sudek S, Wong CH, Jimenez V, Rockwell NC, Martin SS, Ngan CY, Reistetter E, van Baren MJ, Price DC, Wei CL, Reyes-Prieto A, Lagarias JC* & **AZ Worden***. Marine algae and land plants share conserved phytochrome signaling systems. *Proceedings of the National Academy of Sciences USA*. Vol 111:15827–15832. [‡]Co-first authors. *co-corresponding.

- 2014 McRose[†] D, Guo[†] J, Monier[†] A, Sudek S, Wilken S, Yan S, Mock T, Archibald JM, Begley TP, Reyes-Prieto A & **AZ Worden**. Alternatives to Vitamin B₁ uptake revealed with discovery of riboswitches in multiple marine unicellular eukaryotes. *The ISME Journal*. Vol 17:3692-3707. [†]Co-first authors.
- 2014 Keeling* PJ, Burki F, Wilcox HM, Allam B, Allen EE, 75 others & **AZ Worden***. The Marine Microbial Eukaryote Transcriptome Sequencing Project (MMETSP): Illuminating the Functional Diversity of Eukaryotic Life in the Oceans through Transcriptome Sequencing. *PLoS Biology*. 12(6): e1001889. *co-corresponding.
- 2014 Rockwell, NC, Duanmu D, Martin SS, Bachy C, Price DC, Bhattacharya D, **Worden AZ** & JC Lagarias. Eukaryotic algal phytochromes span the visible spectrum. *Proceedings of the National Academy of Sciences USA*. Vol 111:3871-3876.
- 2013 Read BA[†], Kegel J, Klute MJ, Kuo A, Lefebvre SC, Maumus F, Mayer C, Miller J, Monier A, Salamov A, *Emiliania huxleyi* Annotation Consortium, Dacks JB[†], Delwiche CF[†], Dyhrman ST[†], Glöckner G[†], John U[†], Richards TA[†], **Worden AZ[†]**, Zhang X[†] and IV Grigoriev[†]. *Emiliania's* pan genome drives the phytoplankton's global distribution. *Nature*. Vol 499:209-213. [†]Co-senior authors.
- 2013 Monier A, Sudek S, Fast N & **AZ Worden**. Gene invasion in distant eukaryotic lineages: discovery of mutually exclusive genetic elements reveal marine biodiversity. *The ISME Journal*. Vol 7:1764–1774.
- 2013 Santoro AE, Sakamoto CM, Smith JM, Plant JN, Gehman AL, **Worden AZ**, Johnson KS, Francis CA & KL Casciotti. Measurements of nitrite production and nitrite-producing organisms in and around the primary nitrite maximum in the central California Current. *Biogeosciences*. Vol 10:5803-5840.
- 2013 Vergin KL, Beszteri B, Monier A, Thrash JC, Treusch AH, Kilpert F, **Worden AZ** & SJ Giovannoni. High resolution SAR11 ecotype dynamics at the Bermuda Atlantic Time-series Study site as determined by phylogenetic placement of pyrosequences. *The ISME Journal*. Vol 7:1322-1332.
- 2012 **Worden* AZ**, Janouskovec J, McRose D, Engman A, Welsh RM, Malfatti S, Tringe SG & PJ Keeling. Global distribution of a wild alga revealed by targeted metagenomics. *Current Biology*. Vol 22:R675-R677. *Corresponding author.
- 2012 Curtis BA, and 72 others (including McRose D & **AZ Worden**). Algal genomes reveal evolutionary mosaicism and the fate of nucleomorphs. *Nature*. Vol 492:59–65.
- 2012 Lin YC, Campbell T, Chung CC, Gong G, Chiang KP & **AZ Worden**. Distribution patterns and phylogeny of novel marine stramenopiles (MAST) in the North Pacific Ocean. *Applied & Environmental Microbiology*. Vol 78:3387-3399.
- 2012 Monier A, Welsh RM, Gentemann C, Weinstock G, Sodergren E, Armbrust EV, Eisen JA & **AZ Worden**. Phosphate transport in marine phytoplankton and their viruses: cross-domain commonalities in viral-host gene exchanges. *Environmental Microbiology*. Vol 14:162–176.
- 2012 Treusch AH, Demir-Hilton E, Vergin KL, **Worden AZ**, Carlson CA & SJ Giovannoni. Phytoplankton distribution patterns in the northwestern Sargasso Sea revealed by small subunit rRNA genes from plastids. *The ISME Journal*. Vol 6:481-492.
- 2011 Paerl RW, Johnson KS, Welsh RM, **Worden AZ**, Chavez FP & JP Zehr. Differential distributions of *Synechococcus* subgroups across the California Current System. *Frontiers in Microbiology*. doi: 10.3389/fmicb.2011.00059.
- 2011 Demir-Hilton E, Sudek S, Cuvelier ML, Gentemann C, Zehr JP & **AZ Worden**. Global distribution patterns of distinct clades of the photosynthetic picoeukaryote *Ostreococcus*. *The ISME Journal*.

Vol 5:1095–1107.

- 2011 Kim E, Harrison J, Sudek S, Jones MDM, Wilcox HM, Richards T*, **Worden AZ*** & JM Archibald*. Newly identified and diverse plastid-bearing branch on the eukaryotic tree of life. *Proceedings of the National Academy of Sciences USA*. Vol 108:1496-1500. *co-corresponding.
- 2010 Cuvelier ML, Allen AE, Monier A, McCrow JP, Messié M, Tringe SG, Woyke T, Welsh RM, Ishoey T, Lee JH, Binder BJ, DuPont CL, Latasa M, Guigand C, Buck KR, Hilton J, Thiagarajan M, Caler E, Read B, Lasken RS, Chavez FP & **AZ Worden**. Targeted metagenomics and ecology of globally important uncultured eukaryotic phytoplankton. *Proceedings of the National Academy of Sciences USA*. Vol 107:14679-14684.
- 2010 McDonald SM, Plant JN & **AZ Worden**. The mixed lineage nature of nitrogen transport and assimilation in marine eukaryotic phytoplankton: a case study of *Micromonas*. *Molecular Biology and Evolution*. Vol 27:2268-2283.
- 2009 Caron DA, **Worden AZ**, Countway PD, Demir E & KB Heidelberg. Protists are microbes too: a perspective. *The ISME Journal*. Vol 3:4-12.
- 2009 **Worden* AZ**, Lee⁺ JH, Mock⁺ T, Rouze⁺ P, Simmons⁺ MP, Aerts AL, Allen AE, Cuvelier ML, Derelle E, Everett MV, Foulon E, Grimwood J, Gundlach H, Henrissat B, Napoli C, McDonald SM, Parker MS, Rombauts S, Salamov A, Von Dassow P, Badger JH, Coutinho PM, Demir E, Dubchak I, Gentemann C, Eikrem W, Gready JE, John U, Lanier W, Lindquist EA, Lucas S, Mayer KFX, Moreau H, Not F, Otiillar R, Panaud O, Pangilinan J, Paulsen I, Piegue B, Poliakov S, Robbens S, Schmutz J, Toulza E, Wyss T, Zelensky A, Zhou K, Armbrust EV, Bhattacharya D, Goodenough UW, Van de Peer Y & IV Grigoriev. Green evolution and dynamic adaptations revealed by genomes of the marine picoeukaryote *Micromonas*. *Science*. Vol 324:268-272. ⁺Co-second. *Corresponding author.
- 2008 Guillou L, Viprey M, Chambouvet A, Welsh RM, Kirkham AR, Massana R, Scanlan DJ & **AZ Worden**. Widespread occurrence and genetic diversity of marine parasitoids belonging to Syndiniales (Alveolata). *Environmental Microbiology*. Vol 10:3349-3365.
- 2008 Deschamps P, Moreau H, **Worden AZ**, Dauvillée D & SG Ball. Early gene duplication within chloroplastida and its correspondence with relocation of starch metabolism to chloroplasts. *Genetics* 178:2373-2387.
- 2008 Cuvelier ML, Ortiz A, Kim E, Moehlig H, Richardson DE, Heidelberg JF, Archibald JM & **AZ Worden**. Widespread distribution of a unique marine protistan lineage. *Environmental Microbiology*. Vol 10:1621–1634.
- 2007 Robbens S, Rouze P, Cock JM, Spring J, **Worden* AZ** & Y Van de Peer*. The FTO gene, implicated in human obesity, is found only in vertebrates and marine algae. *Journal of Molecular Evolution*. Vol 66:80-84. *co-corresponding.
- 2007 Not F, Gausling R, Azam F, Heidelberg, JF & **AZ Worden**. Vertical distribution of picoeukaryotic diversity in the Sargasso Sea. *Environmental Microbiology*. Vol 9:1233-1252.
- 2007 Sherr BF, Sherr EB, Caron DA, Vaultot D & **AZ Worden**. Oceanic protists. *Oceanography*. Vol 20:130-134. (not corresponding)
- 2006 Derelle⁺ E, Ferraz⁺ C, Rombauts⁺ S, Rouzé⁺ P, **Worden AZ**, Robbens S, Partensky F, Degroeve S, Echeynié S, Cooke R, Wuyts J, Saey Y, Jabbari K, Bowler C, Ball S, Ral JP, Bouget FY, Piganeau G, De Baets B, Picard A, Delseny M, Demaille J, Van de Peer Y & H Moreau (2006). Genome analysis of the smallest free-living eukaryote *Ostreococcus tauri* unveils many unique features.

- Proceedings of the National Academy of Sciences USA*. Vol 103:11647-11652. *Co-first.
- 2006 **Worden AZ**. Picoeukaryote diversity in coastal waters of the Pacific Ocean. *Aquatic Microbial Ecology*. Vol 43:165-175.
- 2006 **Worden* AZ**, Seidel M, Smriga S, Wick A, Malfatti F, Bartlett D & F Azam. Trophic regulation of *Vibrio cholerae* in coastal marine waters. *Environmental Microbiology*. Vol 8:21-29.
*Corresponding author.
- 2005 Six[†] C, **Worden[†] AZ**, Rodriguez F, Moreau H & F Partensky. New insights into the nature and phylogeny of prasinophyte antennae proteins: *Ostreococcus tauri*, a case study. *Molecular Biology and Evolution*. Vol 22:2217-2230. *Co-first authors.
- 2004 Azam F & **AZ Worden**. Microbes, molecules and marine ecosystems. *Science*. Vol 303:1622-1624.
- 2004 **Worden* AZ**, Nolan JK & B Palenik. Assessing the dynamics and ecology of marine picophytoplankton: the importance of the eukaryotic component. *Limnology & Oceanography*. Vol 49:168-179. *Corresponding author.
- 2003 Mouriño RR, **Worden AZ** & F Azam. Growth of *Vibrio cholerae* in Red Tide waters off California. *Applied and Environmental Microbiology*. Vol 69:6923-6931.
- 2003 **Worden* AZ** & BJ Binder. Growth regulation of rRNA content of *Prochlorococcus* and *Synechococcus* (marine cyanobacteria) measured by whole-cell hybridization of rRNA targeted peptide nucleic acids. *Journal of Phycology*. Vol 39:527-534. *Corresponding author.
- 2003 **Worden* AZ** & BJ Binder. Application of dilution experiments for measuring growth and mortality rates among *Prochlorococcus* and *Synechococcus* populations in oligotrophic environments. *Aquatic Microbial Ecology*. Vol 30:159-174. *Corresponding author.
- 2000 **Worden* AZ**, Chisholm SW & BJ Binder. *In situ* hybridization of *Prochlorococcus* and *Synechococcus* (Marine Cyanobacteria) with rRNA-targeted Peptide Nucleic Acid Probes. *Applied and Environmental Microbiology*. Vol 66:284-289. *Corresponding author.
- 1996 Binder BJ, Chisholm SW, Olson RJ, Frankel SL & **AZ Worden**. Dynamics of pico-phytoplankton, ultra-phytoplankton, and bacteria in the central equatorial Pacific. *Deep-Sea Research Part II*. Vol 43:907-931. (not corresponding)

INVITED PERSPECTIVES, BOOK CHAPTERS AND OTHER PUBLICATIONS

- 2022 **Worden AZ** & C Poirier. A divergent bacterium lives in association with bacterivorous protists in the ocean. *Nature Microbiology*. 7, 1335–1336. <https://doi.org/10.1038/s41564-022-01199-5>
- 2022 **Bachy C, Hehenberger H, Ling Y-C, Needham DM, Strauss J, Wilken* S & AZ Worden***. A hitchhiker's guide to marine protists and their microbiome roles. In: The Marine Microbiome, Second Edition, Eds. LJ Stal & MS Cretoiu. Pp. 159-241. *Co-corresponding authors.
- 2016 **Worden* AZ** & S Wilken. Perspective: A plankton bloom shifts as the ocean warms. *Science*. Vol 354:287-288. doi: 10.1126/science.aaj1751. *Corresponding author.
- 2015 **Limardo AJ & AZ Worden***. News and Views, Microbiology: Exclusive networks in the sea. *Nature*. Vol 522:36–37. doi: 10.1038/nature14530. *Corresponding author.
- 2014 **AZ Worden**. Women in Oceanography – A Decade Later. Autobiographical Sketches – Alexandra Z. Worden. *TOS Oceanography* Vol. 27, No. 4 Supplement, pg. 251.

- 2014 Bachy C & **AZ Worden***. Microbial ecology: Finding structure in the rare biosphere. *Current Biology*. Vol 24:R315–R317. *Corresponding author.
- 2011 **Worden* AZ**, Dupont C & AE Allen. Genomics of uncultured eukaryotes: sorting FACS from fiction. *Genome Biology*. 12:117. (3 pages). *Corresponding author.
- 2010 **Worden* AZ** & AE Allen. The voyage of the microbial eukaryote. *Current Opinion in Microbiology*. Vol 13:652-660. *Corresponding author.
- 2009 **Worden* AZ** & D McRose. The otherness of the oceans. *Nature*. Vol 459:166-167. *Corresponding author.
- 2008 **Worden* AZ** & F Not. Ecology and diversity of picoeukaryotes. In: Microbial Ecology of the Ocean, 2nd Edition. Ed. D Kirchman. Wiley. *Corresponding author.
- 2006 **Worden* AZ**, Cuvelier ML & DH Bartlett. In depth marine microbial community genomics. *Trends in Microbiology*. Vol 14:331-336. *Corresponding author.
- Worden AZ**, Brock Biology of Microorganisms 10th, 11th, 12th, 13th, 14th & 15th Editions. Selected protist and cyanobacteria images.

TEACHING AND MENTORING (Mentees in Worden Lab only)

Ph.D. advisor (Committee Chair):

Marie L Cuvelier, Ph.D. (current, Adjunct Professor, Nova Southeastern University, FL USA)	Marine Biology & Fisheries, RSMAS, UM	2004-2010
Melinda P Simmons, Ph.D. (current, Associate Professor, Jacksonville University, FL USA)	Ocean Sciences, UCSC	2007-2014
Valeria Jimenez, Ph.D. Fulbright Scholar (current, Postdoctoral Fellow, Station Biologique de Roscoff, FR)	Ocean Sciences, UCSC	2010-2016
Rachel Harbeitner, Ph.D. (current, Santa Cruz BioTech)	DoD Fellow/UC Chancellor's Fellow; Ocean Sciences, UCSC	2014-2019
Maria Hamilton (current, Postdoctoral Fellow, Moran Lab, University of Georgia)	Ocean Sciences, UCSC	2015-2021
Charlotte Eckmann, Robles Fellow	Ocean Sciences, UCSC	2016-pres
Fabian Wittmers	GEOMAR/Christian-Albrechts University	2021-pres

M.S. advisor:

Joran Paap	GEOMAR/Christian-Albrechts University	2022-pres
Theo Kruger	GEOMAR/Christian-Albrechts University	2022-pres
Jonathan Grone	GEOMAR/Christian-Albrechts University	2020-pres
Jessica Eberle	GEOMAR/Christian-Albrechts University	2019-2022
Fabian Wittmers (current, Ph.D. candidate, Worden Lab, CAU)	GEOMAR/Christian-Albrechts University	2019-2020
Darcy McRose (current, Assistant Professor, Massachusetts Institute of Technology)	Stanford University	2010-2011
Alexander J Limardo (current, Associate Scientist, Sequencing Operations at Ultima Genomics)	Ocean Sciences, UCSC	2012-2016

Undergraduate honors thesis advisor: e.g. Jason Hilton (UM class of 2006, took UCSC Ph.D. position), Harriet Alexander (Wellesley class of 2010, took MIT/WHOI Ph.D. position; now WHOI faculty)

Postdoctoral Fellows Advised Currently:

Ilya Pozdnyakov (at MPI)	2022-pres
Olga Matantseva (at MPI)	2022-pres
Yu-Chen Ling (at GEOMAR)	2020-pres
Yu Wang (at GEOMAR)	2023-pres

Postdoctoral Fellows Advised (Past):

Fabrice Not (current, CNRS Director of Research, Station Biologique, Roscoff, FR)	2004-2005
Heike Moehlig (current, Project Manager, Biotech Institut Virion\Serion GmbH, DE)	2006-2007
Sarah McDonald (current, Scientist, Celdara Medical, USA)	2007-2008
Elif Demir-Hilton (moved to Research Associate, Environmental Sample Processor (ESP) Group, MBARI, USA)	2007-2010
Adam Monier (current, Royal Society University Research Fellow, University of Exeter, UK)	2009-2012
Shuangchun "Jeremy" Yan, Ph.D., MBA (current, Associate, Innosight Strategy and Innovation Consulting, USA)	2011-2012
Jian Guo (current, Research Scientist, University of British Columbia, CA)	2013-2015
Amy E Zimmerman (current, Research Scientist, Pacific Northwest National Laboratory, USA)	2014-2016
Charles Bachy (moved to Marie Curie Fellow at Station Biologique de Roscoff, FR; now curator Roscoff)	2013-2016
Magdalena Gutowska (current, Adjunct Professor, Middlebury Institute of International Studies at Monterey, USA)	2014-2016
Yun-Chi Lin (current, Assistant Professor, National Taiwan Ocean University)	2016-2017
Susanne Wilken (current, Assistant Professor, University of Amsterdam, NL)	2013-2017
Mohammad Moniruzzaman (current, Assistant Professor, RSMAS, University of Miami, USA)	2017-2018
Chang Jae Choi (moved to Research Professor, Marine Science Institute, University of Texas, USA)	2014-2019
Cheuk Man "Charmaine" Yung (current, Assistant Professor, Hong Kong University of Science and Technology, HK)	2016-2019
Kenneth Hoadley (current, Assistant Professor, Dept. Biological Sciences, University of Alabama, USA)	2016-2019
Elisabeth Hehenberger (current, Principal Investigator Czech Academy of Sciences Award, Institute of Parasitology, CZ)	2017-2021
David M Needham (current, Assistant Professor, University of Kiel, DE)	2017-2021
Maria Hamilton (current, Postdoctoral Fellow, Moran Lab, University of Georgia, USA)	2021-2022
Kristin Bergauer (Group Lead, Marine Ecology Division, GEOMAR)	2018-2022
Jan Strauss (current, Think Tank Scientist, Deutsches Maritimes Zentrum, DE)	2020-2023

Undergraduate (longer term), Visiting Scholar and other longer term mentoring (last updated 2016):

Aleja Ortiz (took Ph.D. position at WHOI/MIT), Harriet Alexander (took Ph.D. position at WHOI/MIT),

Hank Yu (took Ph.D. position at CalTech), Yun-Chi Lin (visiting Ph.D. student, took postdoc at National Taiwan Ocean University), Rory Welsh (took Ph.D. position at Oregon State University), Alyssa Gehman (took Ph.D. position at Odum School of Ecology, University of Georgia). Ellie Handler (Yale). See website for other interns, international scholars and high school students see website.

Courses

2019-pres B.S. Biological Oceanography, CAU (Lead Prof., ~150 students); M.S. Practical Field Program Curacao, GEOMAR (CAU, Uni Kiel); M.S. Winter Practical on Marine Microbiology (2020, 2021); M.S. Advanced Biological Oceanography (Lead organizer (2021), co-teacher (2020, 2019))

2019 Marine Biological Laboratories Summer Course Physiology: Modern Cell Biology Using Microscopic, Biochemical and Computational Approaches, Lecturer

2017 International GeoBiology Course, California Institute of Technology (CalTech)/Wrigley Institute, Lecturer

2011, 2008, 2007 Biodiversity & evolution of microbial physiology, CMORE-Agouon Microbial Oceanography Summer Course, Lecturer
Student scoring by year, rating spans from 0=poor to 5=excellent: 4.7, 4.6, 4.7

2011 Marine Microbial Ecology Course, UCSC (Guest Lecturer)

2010, 2009 Hopkins Microbiology Summer Course, Stanford University (Guest Lecturer)

2007 Marine Microbial Ecology: Genomic Approaches (graduate & upper level undergraduate lecture and lab course designed and taught by AZW), University of Miami

2002 Microbial Ecology (graduate level), Lecturer, SIO/UCSD

1994 Fundamentals of Ecology, Teaching Assistant, MIT

1992-1994 Inorganic Chem. I & II, Teaching Fellow, Harvard University (3 semesters w/lab)

EXTERNALLY FUNDED RESEARCH

Helmholtz, EMS Fore Co-PI Worden. German-Israeli International Laboratory: The Early-Warning Model-System for Our Future Oceans. Research Field Region: Eastern Mediterranean. 1 Nov 2021 – 30 Oct 2026, €6,200,000 (shared over multiple co-Is).

Max-Planck Fellowship. Max Planck Institute for Evolutionary Biology, 1 May 2021 – 30 April 2026, €500,000.

Simons Foundation International, BIOS-SCOPE, Investigator (with multiple others), 2020-2025, Worden portion ~250,000 USD/year.

Gordon and Betty Moore Foundation Marine Microbiology Investigator Award, 1 Apr 2019 – 15 Oct 2022, \$827,856; (Residual of Initial \$1,852,400 with 10% extra performance-based funds added).

National Science Foundation, Dimensions: Collaborative Research: Functional and genomic diversity in vitamin B₁ metabolism and impacts on plankton networks and productivity; PI AZ Worden, Co-PI SJ Giovannoni (OSU), 01 Aug 2016-31 Jul 2021, \$1,647,549 (Worden portion \$848,663).

Gordon and Betty Moore Foundation Marine Microbiology Investigator Award, 1 Oct 13-30 Jul 2020 (terminated and moved on 31 Mar 2019 due to move to GEOMAR), \$1,852,400.

Canadian Institute of Advanced Research Fellow Award, 07/01/2009-2018, \$25,000/year.

Gordon & Betty Moore Foundation, Life on the dark side: Complex trophic interactions of marine microbial eukaryotes; PI P Keeling (UBC), Co-PIs AZ Worden, TA Richards, (NHL, UK), A Santuro (UM), 25 Aug 12-24 Aug 15, \$1,461,571 (Worden portion \$466,934).

Gordon & Betty Moore Foundation, Beyond top-down and bottom-up: Quantifying nutrient-virus-phytoplankton interactions and their impact on marine biogeochemistry. PI M Coleman (UC), Co-PIs AZ Worden, MB Sullivan Co-PI (UA), J Waldbauer (UC), S John (USC); 08/01/12-7/31/16, \$2,453,121 (Worden portion \$543,903).

National Science Foundation, Collaborative Research: Development of sexual life cycles in the marine

picoprasinophytes based on molecular homologies with *Chlamydomonas*; with Co-PI U Goodenough (WUSTL); 8/1/09-09/30/15, (Worden portion \$299,714).

US Department of Energy, Connecting genomes to physiology and response in marine photosynthetic eukaryotes: Systems biology of the green alga *Micromonas*; PI AZ Worden, Co-PIs J Stuart, S Callister, RD Smith; 07/01/10-06/30/13 (NCE to 6/30/14), \$2,945,286 (Worden portion \$1,353,800).

Gordon and Betty Moore Foundation, Frontiers in metagenomics, transcriptomics and ocean ecology; PI AZ Worden, Co-PIs G Weinstock (WUSTL), V Armbrust (UW); 12/07-10/10, \$950,351.

National Science Foundation, Unveiling the contributions and regulation of picoeukaryotic phytoplankton in oceanic environments; 09/15/06 -08/31/09 (NCE until 8/31/10), \$321,209.

Gordon and Betty Moore Foundation, Marine Microbiology Young Investigator Award; 9/1/04-8/31/08, \$875,000.

National Science Foundation, Ecophysiology of marine picoeukaryotic primary producers; 11/1/04-10/31/05, \$50,000.

National Science Foundation, Diversity and ecology of extremely small eukaryotic algae, Microbial Biology Postdoctoral Program, 7/1/00-6/30/02, \$100,000.

National Aeronautics and Space Administration (NASA), Measurement of *in situ* growth rates of two important oceanic primary producers using flow cytometry and rRNA-targeted probes, Earth Systems Science Graduate Fellowship, 1996-1999, \$66,000.

Georgia Sea Grant, Peptide nucleic acid probing of marine cyanobacteria, 1997-1998, \$9,980.

Major genome, metagenome, transcriptome and metatranscriptome sequencing expenses through Joint Genome Institute Community Sequencing Program grants (Worden PI) in 2004 (completed), 2006 (completed), 2009 (completed), 2010 (completed), and Technology Development Program grants in 2012 (Worden PI, completed) and 2013 (Worden co-PI, completed).

PROFESSIONAL SOCIETIES

American Association for the Advancement of Science (AAAS); American Geophysical Union (AGU); American Society of Microbiology (ASM); Association for the Sciences of Limnology & Oceanography (ASLO); International Society for Microbial Ecology (ISME); Phycological Society of America (PSA); International Society of Protistologists (ISOP), Microbiology Society (UK and Ireland).

PROFESSIONAL ACTIVITIES AND SERVICE

2020-pres GEOMAR 2030 Strategy Development group.

2020-pres GEOMAR Diversity Task Force.

2020-pres Organizing Committee for EMBO workshop on Comparative genomics of unicellular eukaryotes (held every other year and approved for a 6 year span).

2019-2020 Invited Session Chair/Organizer for International Symposium for Microbial Ecology (ISME2020), Cape Town, South Africa (~2000 attendees). Cancelled due to COVID.

2017-2018 Organizing Committee for International Society of Photosynthesis Research meeting (2018).

2016-2017 General Meeting Program Committee, 117th American Society for Microbiology Meeting (~8000 attendees).

2016-2017 Scientific Committee, 2017 Symposium on Aquatic Microbial Ecology (SAME).

2015-2017 Scientific Advisory Board, 16th Congress of the International Union of Microbiological Societies.

2015-2019 Advisory Council, International Consortium for a Unified Taxonomy of Eukaryotes (UniEuk).

2015-pres Editorial Board, *Protist*.

2015 Session Co-chair w/graduate student V Jimenez and postdoc S Wilken, ASLO Aquatic Sciences Meeting, Granada, Spain.

- 2014 Session Co-chair w/postdoc C Bachy, ASLO/AGU Ocean Sciences Meeting, Honolulu, Hawaii.
- 2013-2017 Senior Editor, *The ISME Journal*, Nature Publishing.
- 2012 Plenary Session Chair, 112th American Society of Microbiology General Meeting, 'Biogeochemical Cycles: Past, Present, Future'.
- 2011-pres Scientific Advisory Committee, ENIGMA Project, a multi-institutional consortium funded by the US Department of Energy, managed by Berkeley National Laboratory.
- 2011-2014 Scientific Planning Committee, 2014 Joint Aquatic Science Meeting ASLO/PSA/WSA/SFS (~3500 attendees).
- 2011 General Meeting Planning Committee, 112th American Society of Microbiology Meeting.
- 2011 Session Co-chair, 111th American Society of Microbiology General Meeting.
- 2011 Award Nominating Committee, International Society for Microbiology.
- 2011 Invited Session Chair, 20th Western Photosynthesis Conference. Asilomar, California.
- 2010-2015 Scientific Advisory Committee, DOE Joint Genome Institute.
- 2010-2014 Elected Board Member, International Society for Microbial Ecology.
- 2010-2013 D.C. White Award Nominating Committee, American Society of Microbiology.
- 2010-2013 Editorial Board, *The ISME Journal*, Nature Publishing.
- 2010 Workshop Co-chair, Eukaryotic Genome Annotation Workshop, Canadian Institute for Advanced Research, Halifax, Canada.
- 2010 Session Co-chair w/postdoc E Demir-Hilton, ASLO/AGU Ocean Sciences Meeting, Portland, OR.
- 2010 Invited Participant, Microbiological Targets for Ocean Observing Laboratories (Micro-TOOLS) 2010 Workshop, Moore Foundation, Palo Alto, CA.
- 2010 Colloquium Advisory Committee, American Society of Microbiology.
- 2009-2011 Scientific Steering Committee, American Academy of Microbiology Colloquium on Climate Change.
- 2009 Invited Participant, American Academy of Microbiology Colloquium on the Rare Biosphere, San Francisco, CA.
- 2009 Session Co-Chair, ASLO Aquatic Sciences Meeting, Nice, France (w/former postdoc F Not).
- 2008 Invited Participant, National Academies Keck Future Initiatives Conference on Complex Systems. Newport Beach, CA.
- 2008 Invited Participant, US DOE Genomes to Life Roadmap Knowledgebase development workshop, Bethesda, MD.
- 2008 Member, Review Committee for DoE review of the Joint Genome Institute.
- 2008 Invited Participant, US Department of Energy (DOE) Carbon Cycling Workshop, Denver, CO.
- 2007-2011 Scientific Advisory Board, Integrated Microbial Genomics-Educational site.
- 2006-2007 Scientific Committee, Metagenomics 2007, San Diego, CA
- 2004-2006 Elected Co-Chair, Gordon Research Conference Series: Marine Microbes.
- 2006-2012 Scientific Advisory Board, Community Cyberinfrastructure for Advanced Marine Microbial Ecology Research and Analysis (CAMERA).
- 2006 Session Co-Chair, Linking Ecology and Diversity of Aquatic Protists: Advances and Methodologies. ASLO/AGU Ocean Sciences Mtg. Honolulu, HI (w/postdoc F Not)
- 2005 Invited Participant, International Census of Marine Microbes Informatics and Data Management Working Group, Woods Hole, Massachusetts.
- 2005 Session Co-Chair, Ecology of Aquatic Pathogens in a Changing Environment, ASLO Summer Meeting, Spain.
- 2005 Invited Panelist, Women in Science Symposium, Rosenstiel School of Marine and Atmospheric Science. Miami, FL.
- 2005 Invited Participant, International Census of Marine Microbes Open Oceans and Coastal

Systems Workshop. Honolulu, HI.
2004 Invited Participant, Horizontal Gene Flow in Microbial Communities; Sponsored by NSF & DOE, Airlie, VA.

Ad Hoc Reviewer for: Applied and Environmental Microbiology; Aquatic Microbial Ecology; Current Biology; Environmental Microbiology; FEMS Microbiology; Gene; Journal of Experimental Marine Biology and Ecology; Journal of Phycology; Journal of Plankton Research; Limnology and Oceanography; Limnology and Oceanography: Methods; Microbiology; Molecular Biology and Evolution; Nature; Polar Biology; Proceeding of the National Academy of Sciences, USA; Protist; Science; ISME J, Trends in Microbiology.

Panelist for: National Academy of Sciences (NAS, US), National Science Foundation (NSF, US), Department of Energy (DOE, US), European Research Council (ERC) Advanced Panel 2017, 2019 (EU).

Reviewer for: National Academy of Sciences (US), NSF (US), DOE (US), NERC (UK), NOW (NL), GENOSCOPE (FR), DFG (DE).

OCEANOGRAPHIC CRUISES AND FIELD PROGRAMS

Worden Lab Cruises (Worden Principal Investigator [funded to Worden], Led at sea by Worden Lab group Members; Last updated 2019):

R/V Western Flyer, DVM, North Pacific, 2019 (postdoc Kristin Bergauer, Chief Scientist); R/V Western Flyer, MMV, North Pacific, 2019 (postdoc David Needham, Chief Scientist); R/V Western Flyer, FSEL18, North Pacific, Aug 2018 (research specialist S Sudek, Chief Scientist); R/V Western Flyer, ESEL18, North Pacific, May 2018 (S Sudek, Chief Scientist); R/V Western Flyer, DSEL18, North Pacific, Jan-Feb 2018 (S Sudek, Chief Scientist); R/V Western Flyer, IRC17, North Pacific, Nov 2017 (graduate student Rachel Harbeitner & S Sudek, Co-Chief Scientists); R/V Paragon, DICH017, Monterey Bay, intermittent day cruises Sep 2017 (Wilken/Worden Co-Chief Scientists); R/V Western Flyer, DSEL17 (Deep Sea Eukaryotic Life), North Pacific, 2017 (postdoc Charmaine Yung, Chief Scientist); R/V Western Flyer, WFIV16, North Pacific, Sep 2016 (postdoc Susanne Wilken, Chief Scientist); R/V Western Flyer, CN13ID, North Pacific, Oct 2013 (graduate student Valeria Jimenez, Co-Chief Scientist). R/V Western Flyer, CANON11; North Pacific, Oct 2011 (S Sudek, Chief Scientist).

Cruises / field research with my own participation at sea (funded to Worden for all as Chief Scientist; Last updated 2019):

Curaçao Single-Cell Ecology Project 2018, CARMABI Field Station, Lead; R/V Western Flyer, DSEL16, North Pacific, May 2016, Chief Scientist; R/V Western Flyer, DSEL15, North Pacific, Sept 2015, Chief Scientist; R/V Western Flyer, WFAD09, North Pacific, Sep 2009, Chief Scientist; R/V Walton Smith, WS0610 / WS0705 / WS0722, Straits of Florida, 2007/2006, Chief Scientist (on all three); R/V Oceanus, OC374, Sargasso Sea, Mar 2002; R/V Endeavor, EN360 Sargasso Sea, Sep 2001; R/V Endeavor, EN351, Sargasso Sea, Mar-Apr 2001; R/V New Horizon, Southern California Bight, Sep 1998; R/V Oceanus, Sargasso Sea, Jun-Jul 1998; R/V Oceanus, Sargasso Sea, Feb-Mar 1998; R/V Oceanus, Sargasso Sea, 1997.

Other cruises with Worden Lab participation (Last updated 2019):

R/V Atlantic Explorer, AE1916, Sargasso Sea, Jul 2019 (postdoc Kristin Bergauer); R/V Tommy Thompson, MISO-BOB, Bay of Bengal, Jun 2018 (support scientist Camille Poirier); R/V Atlantic Explorer, AE1819, Sargasso Sea, Jun 2018 (postdoc Kristin Bergauer, S Sudek); R/V Atlantic Explorer, AE1703, Sargasso Sea, May 2017 (Camille Poirier, S Sudek); KOSMOS Program, Peruvian Upwelling Mesocosms, Spring 2017 (postdoc David Needham, Camille Poirier), R/V Rachel Carson, Monterey Bay Time-Series (multiple dates), Jan 2014 to 2016 (multiple lab members); R/V Western Flyer, CANON16, North Pacific, Sep-Oct 2016 (Camille Poirier, Maria Hamilton, Susanne Wilken); R/V Atlantic Explorer, AE1406, Sargasso Sea,

Apr 2014 (postdoc Amy Zimmerman); *R/V Rachel Carson*, CANON14, Monterey Bay, Sep 2014 (multiple lab members); *R/V Western Flyer*, CO912, North Pacific, Sep 2012 (multiple lab members); *R/V Western Flyer*, GOC2012, Gulf of California, Feb 2012 (masters student AJ Limardo); *R/V Western Flyer*, S410, North Pacific, Sep 2010 (multiple lab members); *R/V Kilo Moana*, KM0703, South Pacific, 2007 (technician Rory Welsh); *R/V Western Flyer*, CN207, North Pacific, Oct 2007 (multiple lab members); *R/V Western Flyer*, CN107, North Pacific, Jul 2007 (multiple lab members); *R/V Seward Johnson*, SJ0609, Florida-Cape Verde-Barbados Tropical Atlantic Transect, 2006 (graduate student Marie Cuvelier, undergrad. G Engman, technician Rory Welsh); *R/V Oceanus*, OC413, Sargasso Sea, May-Jun 2005 (graduate student Marie Cuvelier); *R/V Walton Smith*, WS0815, Straits of Florida, 2008 (postdoc Elif Demir, graduate student Marie Cuvelier, undergrad. J Hilton); *R/V Walton Smith*, WS0503 / WS0510 / WS0515 / WS0518 / WS0523 / WS0528, Straits of Florida, 2005 (postdoc F Not, undergrad. J Hilton, Worden participants).

Other field project participation:

Moorea Biodiversity Project (KB with G Herndl and others), SeaFar Curaçao Biodiversity, CARMABI Field Station, 2015, 2016, 2017, 2018, 2019 (SW, CP, KH, MH, AZWorden with F Rohwer, SDSU, P Keeling, UBC and others); RR1513, Bay of Bengal, 2015 (collaboration with A Mahadevan, WHOI), Antarctica, 2015-2016 (collaboration with M Vernet, SIO), Arctic Water Column and Deep Sea, 2015 (collaboration with K Metfies, AWI, DE).

WHITE PAPER PARTICIPATION

- 2012 “DOE JGI Strategic Planning for the Genomic Sciences: Workshop Report” (<http://genomicscience.energy.gov/userfacilities/jgi/futuredirections/index.shtml>)
- 2012 “Incorporating Microbial Processes into Climate Change Models” Report, American Academy of Microbiology (http://academy.asm.org/images/stories/documents/Incorporating_Microbial_Processes_Into_Climate_Models.pdf)
- 2011 “The Rare Biosphere”, The American Academy of Microbiology, (http://academy.asm.org/images/stories/documents/Rare_Biosphere.pdf)
- 2010 “Microbiological Targets for Ocean Observing Laboratories”, MicroTools Workshop sponsored by Moore Foundation (<https://sites.google.com/site/microtoolsii/workshopI>)
- 2009 “DOE Systems Biology Knowledgebase for a New Era in Biology”, US DoE (http://genomicscience.energy.gov/compbio/workshop08/GTLKnowledgebase_03-06-09Final_200dpi.pdf)
- 2008 “Carbon Cycling and Biosequestration Integrating Biology and Climate through Systems Science”, US Department of Energy, (<http://genomicscience.energy.gov/carboncycle/report/CarbonCycle012609LR.pdf>)
- 2005 “Open Ocean and Coastal Systems Report”, International Census of Marine, Microbes (http://icomm.mbl.edu/oocs_summaries/OOCSReportAug18_2005.pdf)

INVITED TALKS, INTERNATIONAL MEETINGS

- 2023 Invited Speaker, Virtual Conference: Advances in analysis of marine protists and non-model algae.
- 2022 Invited Speaker, EMBO Workshop: Comparative genomics of unicellular eukaryotes: Interactions and symbioses, Sant Feliu de Guixols, ES.
- 2022 *Plenary Speaker*, UK Society for General Microbiology Annual Conference, Belfast, UK.
- 2021 *Plenary Speaker*, 3rd International Meeting on Community Ecology, Digital/Budapest, HU.
- 2021 *Plenary Speaker*, 19th International Conference on Harmful Algae, Digital/La Paz, MX.
- 2021 Invited Speaker, UK Society for General Microbiology Annual Conference, Digital Meeting.
- 2021 *Keynote Speaker*, Ifremer, Tara Oceans, EMBL Marine Environmental DNA Workshop. Digital Meeting.

- 2020 Invited Speaker, ESOP - the Electronic Symposium on Protistology, Digital Meeting.
- 2019 *Keynote Speaker*, 4th Ringberg Symposium on Giant Virus Biology, Castle Ringberg, DE.
- 2019 *Keynote Speaker*, 4th International Workshop on Trait Based Approaches to Ocean Life, Chicheley Hall, UK.
- 2019 Invited Speaker, Crafoord Symposium in Biosciences (*honoring the 2019 Prize Laureate*), Sweden
- 2018 Invited Speaker, Single Cell Ecology Meeting of the Royal Society, London, UK.
- 2018 *Plenary Speaker*, International Society for Photosynthesis Research Conference on Microbial Photosynthesis, Vancouver, CA.
- 2018 Invited Speaker, EMBO Conference on New Shores in Land Plant Evolution, Lisbon, PT.
- 2017 Invited Speaker, Annual Meeting of the Phycological Society of America, Monterey, California, USA.
- 2017 *Morning Plenary*, International Congress of Protistology, Prague, CZ.
- 2017 Invited Speaker, 26th Western Photosynthesis Conference, Marconi Conference Center, USA.
- 2017 Invited Speaker, EMBO Conference on Comparative genomics of eukaryotic microbes: Dissecting sources of evolutionary diversity, Sant Feliu de Guixols, ES.
- 2017 *Opening Keynote Lecture*, International Choanoflagellate Workshop, Berkeley, CA, USA.
- 2017 Invited Speaker, Society for General Microbiology Annual Conference, Edinburgh, UK.
- 2016 Invited Speaker, 10th Annual Retreat of the Centre for Microbial Diversity and Evolution, Victoria, CA.
- 2016 Invited Speaker, 16th International Symposium on Microbial Ecology (ISME), Montreal, CA.
- 2015 Invited Speaker, American Geophysical Union Fall Meeting, San Francisco, CA, USA.
- 2015 Invited Speaker, European Molecular Biology Organization (EMBO) Exploring the Genomic Complexity and Diversity of Eukaryotes Conference, Sant Feliu de Guixols, ES.
- 2015 Invited Speaker, Jacques Monod Conference on Ecosystems Biology, Roscoff, FR.
- 2015 Invited Seminar Speaker, Alfred Wegener Institute for Polar & Marine Research, Bremerhaven, DE.
- 2015 Invited Seminar Speaker, University of Oldenburg, Oldenburg, Germany.
- 2015 Invited Speaker, American Association for the Advancement of Science, Annual Meeting, San Jose, California, USA.
- 2014 Invited Speaker, American Geophysical Union Fall Meeting, San Francisco, CA, USA.
- 2014 Invited Speaker, Joint Aquatic Sciences Meeting (ASLO/PSA/SFS/SWS), Portland, Oregon, USA.
- 2014 Invited Speaker, 15th International Symposium on Microbial Ecology, Seoul, Korea. With post-doc Dr. Charles Bachy.
- 2014 *Keynote Speaker*, Congress of the International Union of Microbiological Societies, Montreal, Canada. With postdoc Dr. Susanne Wilken.
- 2013 Invited Speaker, Comparative Genomics of Eukaryotic Microorganisms, European Molecular Biology Organization (EMBO) Conference, Sant Feliu de Guixols, ES.
- 2013 Invited Speaker, International Congress of Protistology XIV, Vancouver B.C., Canada.
- 2013 *Keynote Speaker*, Annual Meeting of the Environmental Mutagenesis and Genomics Society, Monterey, California, USA.
- 2013 Invited Speaker, Joint Genome Institute Genomic Technologies Workshop/Genomics of Energy and the Environment Meeting. Walnut Creek, California, USA.
- 2013 Invited Speaker, Integrated Microbial Diversity Meeting, Whistler B.C., Canada.
- 2012 Invited Speaker, 14th International Symposium on Microbial Ecology, Copenhagen, Denmark.
- 2012 *Keynote Lecture*, 8th International Chrysophyte Symposium, Prague, Czech Republic.
- 2012 Invited Speaker, American Association for the Advancement of Science, Annual Meeting, Vancouver B.C., CA.
- 2011 Invited Speaker, Comparative Genomics of Eukaryotic Microorganisms, EMBO Conference, Sant Feliu de Guixols, ES.
- 2011 Invited Speaker, Plant Genomes and Biotechnology: From Genes to Networks Meeting, Cold Spring Harbor Laboratory, New York, USA.
- 2011 *Plenary Speaker*, Phycological Society of America Annual Meeting, Seattle, Washington.

- 2011 Invited Speaker, 111th American Society of Microbiology General Meeting, New Orleans, LA, USA.
- 2010 Invited Speaker, 13th International Society for Microbial Ecology Congress, Seattle, WA, USA.
- 2010 Invited Speaker, Gordon Research Conference on Marine Microbes, Tilton, New Hampshire, USA.
- 2010 Invited Speaker, 14th International Conference on the cell and molecular biology of *Chlamydomonas*, Norton, Massachusetts, USA.
- 2010 *XXV Celebration Lecture* (Opening Plenary Speaker), XXV Congress of the International Society for Advanced Cytometry, Seattle, Washington, USA.
- 2010 Invited Speaker, Society for General Microbiology, Edinburgh, United Kingdom. – British Airways strike resulted in not making it to meeting.
- 2010 Invited Speaker, ASLO/AGU Ocean Sciences Meeting, Portland, Oregon, USA.
- 2009 Invited Speaker, Integrated Microbial Biodiversity Annual meeting CIFAR, California, USA.
- 2009 Invited Seminar Speaker, Centre for Microbial Diversity and Evolution, University of British Columbia, Vancouver, CA.
- 2009 Invited Speaker, 18th Western Photosynthesis Conference, Pacific Grove, California, USA.
- 2008 Invited Speaker, Metagenomics 2008, San Diego, California, USA.
- 2008 Invited Speaker, American Society of Microbiology General Meeting, Boston, Massachusetts, USA.
- 2008 Invited Speaker, Canadian Institute For Advanced Research (CIFAR), Quebec, CA.
- 2008 *Plenary Speaker*, Annual Meeting of the German Protozoology Society, Rostok, DE.
- 2006 Invited Speaker, Gordon Research Conference on Marine Microbes, Biddeford, Maine, USA.
- 2005 Invited Speaker, Association for the Sciences of Limnology and Oceanography Aquatic Sciences Meeting, Salt Lake City, Utah, USA.
- 2005 Invited Speaker, Marine Microbial Communities Diversity Symposium, Renessee, NL.
- 2002 Invited Speaker, PICODIV Workshop, Station Biologique, Roscoff, FR.

INVITED SEMINARS & SELECTED OUTREACH

- 2023 Invited Talk, Conference on: Biotic interactions and their role in ecosystem-climate feedbacks, University of Hamburg, Hamburg, DE.
- 2021 Invited Seminar, Department of Molecular and Cellular Biology, Harvard University, Cambridge, MA, USA.
- 2021 Invited Seminar, Department of Geophysical Sciences, University of Chicago, Chicago IL, USA.
- 2021 Invited Talk, GENECO Summer Meeting, SE.
- 2021 Invited Seminar, Marine Biological Laboratory, USA
- 2020 Invited Seminar, Department of Microbiology, University of Massachusetts Amherst, MA, USA.
- 2020 Invited Seminar, Max-Planck Institute for Evolutionary Biology, Plön, DE.
- 2020 Invited Seminar, School for Ocean and Earth Sciences, University of Southampton, Southampton, UK.
- 2020 Invited Speaker, BIOS-SCOPE Meeting, San Diego, CA, USA.
- 2020 Invited Speaker, Azam Symposium, Scripps Institution of Oceanography, San Diego, CA, USA.
- 2018 Invited Speaker, Living Systems Symposium, Tübingen, DE.
- 2018 Invited Speaker, Science Philanthropy Alliance, San Francisco, CA, USA.
- 2017 Invited Seminar Speaker, Ecology Sem. Series, Scripps Institution of Oceanography, San Diego, CA, USA.
- 2017 Invited Seminar Speaker, Max Planck Institute for Developmental Biology, Tübingen, DE.
- 2017 Invited Seminar Speaker, Dept. of Genetics, University of Seville, Seville, ES.
- 2017 Invited Seminar Speaker, Netherlands Institute for Sea Research (NIOZ), Texel, NL.
- 2016 Invited Seminar Speaker, Moss Landing Marine Labs, California State Universities, USA.
- 2016 Invited Seminar Speaker, GEOMAR Helmholtz Centre for Ocean Research, Kiel, DE.
- 2016 Invited Speaker, 11th Annual Science and Technology Week, Los Altos High School, CA, USA.
- 2016 Invited Speaker, Department of Civil and Environmental Engineering, MIT, Cambridge, MA, USA.

- 2016 Invited Seminar Speaker, Department of Ecology and Evolutionary Biology, Yale University, New Haven, Connecticut, USA.
- 2016 Invited Seminar Speaker, Earth System Science Department, Stanford University, CA, USA.
- 2015 Invited Seminar Speaker, Earth, Atmospheric and Planetary Sciences Department, MIT, Cambridge, Massachusetts, USA.
- 2015 Invited Speaker, Invitational Seminar Series, Max Planck Institute for Marine Microbiology, Bremen, DE.
- 2014 Invited Seminar Speaker, Ecology Department, University of California Santa Barbara, Santa Barbara, California, USA.
- 2014 Invited Seminar Speaker, SciLifeLab and University of Stockholm, Stockholm, Sweden.
- 2014 Invited Seminar Speaker, University of Copenhagen, Copenhagen, Denmark.
- 2014 Invited Seminar Speaker, Department of Biological Sciences, University of Southern California, Los Angeles, California, USA.
- 2013 Invited Seminar Speaker, Stazione Zoologica di Napoli, Italy.
- 2013 Invited Speaker, Department of Energy Genomic Science Meeting, Bethesda, Maryland, USA.
- 2013 Invited Seminar Speaker, Department of Microbiology, Oregon State University, Oregon, USA.
- 2012 Invited Speaker, Bay Area Biosystematists Meeting, San Jose, California, USA.
- 2012 Invited Speaker, Plant Sciences Seminar Series, UC Davis, Davis, California, USA.
- 2011 Invited Speaker, Microbial Diversity Institute Winter Symposium, Yale University, New Haven, Connecticut, USA.
- 2011 Invited Seminar Speaker, UCSC Ocean Science Seminar Series, Santa Cruz, California, USA.
- 2011 Invited Speaker, C-MORE Symposium, University of Hawaii, Honolulu, Hawaii, USA.
- 2010 Invited Speaker, Joint Genome Institute Annual User Meeting, Walnut Creek, California, USA.
- 2010 Invited Seminar Speaker, Moss Landing Marine Labs, Moss Landing, California, USA.
- 2010 *22nd CB Van Niel Lecture*, Hopkins Marine Station, Stanford University, Monterey, California, USA.
- 2009 Invited Seminar Speaker, Pacific North-West National Labs, Richland, Washington, USA.
- 2009 Invited Speaker, Genomics: GTL Contractor-Grantee Workshop VII and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop, N. Bethesda, Maryland, USA.
- 2008 Invited Speaker, Marine Biology Seminar Series, Scripps Institution of Oceanography. La Jolla, CA, USA.
- 2008 Invited Speaker, Human Microbiome Meeting, Banbury Center, Cold Spring Harbor, New York, USA.
- 2007 Invited Seminar Speaker, Ocean Sciences, University of California Santa Cruz, California, USA.
- 2007 Invited Speaker, Single Cell Alternatives to Metagenomics in Environmental Microbiology Workshop, Boothbay Harbor, Maine, USA.
- 2007 Invited Seminar Speaker, Institut de Ciències del Mar, CSIC, Barcelona, ES.
- 2007 Invited Seminar Speaker, University of Madras, Chennai, India.
- 2006 Invited Seminar, Monterey Bay Aquarium Research Institute, Moss Landing, California, USA.
- 2006 Invited Seminar, Department of Biology. University of Miami, Coral Gables, Florida, USA.
- 2006 Invited Seminar Speaker, Netherlands Institute of Ecology (NIOO), Yerseke, NL.
- 2006 Invited Seminar Speaker, Institute of Biodiversity and Ecosystem Dynamics, University of Amsterdam, Amsterdam, NL.
- 2006 Invited Talk, Azam Symposium: Status of Bacterioplankton Ecology, Scripps Institution of Oceanography, La Jolla, California, USA.
- 2006 Invited Lecturer, National Tropical Botanical Garden Physicians' Course, Florida, USA.
- 2005 Invited Speaker, Beckman Coulter BioPharma Invited Seminar Series, Kendall, Florida, USA.
- 2005 Invited Speaker, Oceans and Human Health Center 1st Annual Science Symposium, Miami, FL, USA.
- 2003 Invited Seminar Speaker, University of Southern California, Los Angeles, California, USA.
- 2003 Invited Seminar Speaker, University of Massachusetts, Boston, Massachusetts, USA.
- 2003 Invited Seminar Speaker, Rosenstiel School of Marine Science, Univ. of Miami, Miami, Florida, USA.
- 2003 Invited Seminar Speaker, Department of Microbiology, Univ. Tennessee, Knoxville, Tennessee, USA.

- 2002 Invited Seminar Speaker, Department of Microbiology, University of Hawaii, Honolulu, Hawaii, USA.
- 2002 Plenary Talk, Azam F & AZ Worden, Center for Marine Biodiversity and Conservation Annual Meeting, San Diego, California, USA.
- 2002 Invited Seminar, University of Georgia, Athens, Georgia, USA.