

Ramunas Stepanauskas

CONTACT INFORMATION

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Job titles Director, Single Cell Genomics Center
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Languages Lithuanian – native
English – fluent
Swedish – fluent
Russian – conversational
Spanish – basic skills

EDUCATION

Postdoc	University of Georgia (Athens, GA, USA)	Oceanography, Ecology	2005
Ph.D.	Lund University (Lund, Sweden)	Limnology, Ecology	2000
M.S.	Lund University (Lund, Sweden)	Limnology	1995
B.S.	Uppsala University (Uppsala, Sweden), Vilnius University (Vilnius, Lithuania)	Biology, Limnology	1993

POSITIONS HELD

2009-present **Director of the Bigelow Laboratory Single Cell Genomics Center.** *Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, USA*

2009-present **Research Faculty.** *Colby College, Waterville, ME, USA.*

2005-present **Senior Research Scientist.** *Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, USA*

2002-2005 **Postdoctoral Associate/ Assistant Research Scientist.** *Savannah River Ecology Laboratory, Aiken, SC, USA.* Advisor: Dr. J V. McArthur

2000-2002 **Postdoctoral Associate.** *Department of Marine Sciences, University of Georgia, Athens, GA, USA.* Advisors: Drs. J.T. Hollibaugh and M.A. Moran

- 1995-2000 **Ph.D. student.** *Department of Ecology/Limnology, Lund University, Lund, Sweden.*
Advisors: Drs. L. Leonardson and L. Tranvik
- 1993-1995 **M.S. student.** *Lund University, Lund, Sweden.* Advisor: Dr. L. Leonardson.
- 1993 **Research Assistant.** *Department of Limnology, Uppsala University, Uppsala, Sweden.*
Supervisor: Dr. I. Ahlgren
- 1992 **Laboratory Assistant.** *Erken Limnological Station, Uppsala University, Norr Malma, Sweden.* Supervisor: Dr. K. Petersson

HONORS AND AWARDS

- 2022 NSF Bioeconomy Distinguished Lecturer
2021 Elected Fellow, American Academy of Microbiology
2018 Elected Fellow, AAAS
2016 Simons Scholar
2014 Achievements in Science Award, Lithuanian Ministry of Science and Education
2014 Next List, 10 People Shaping the Future of Maine's Economy
2012 Illumina MiSeq Award
2012 CIFAR Associate

RESEARCH INTERESTS

Microbial single cell genomics technology and infrastructure. Since the start of my independent research program in 2005, I have been leading the development of methods for microbial single cell separation, DNA amplification, sequencing and computational analyses. This resulted in the first contamination-free recovery of DNA sequences from individual cells; improved methods for genomic DNA amplification, sequencing and *de novo* genome assembly; and integration of single cell genome and phenome analyses. I founded the Bigelow Laboratory Single Cell Genomics Center (SCGC; scgc.bigelow.org), the world's first user facility in this field, with the mission of making single cell genomics accessible to the broad research community and serving as an engine for discoveries in microbial ecology, evolution, bioprospecting and human health. SCGC's unique capabilities have been utilized by over a hundred organizations around the world, including academia, private sector, and even NASA's space missions.

Microbial genome fluidity. The increasing scale of sequencing projects make it clear that microbial genomes are dynamic, with most if not all of their content constantly changing through gene acquisitions and losses. In a recent study, my group employed single cell genomics and a randomized, hypothesis-agnostic cell selection strategy to recover 6,236 partial genomes from a single, 0.4 mL seawater sample. Astonishingly, we found each genome had a unique gene repertoire, implying limited clonality within prokaryoplankton populations. Our other reports also demonstrated extensive microdiversity and recombination among marine cyanobacteria, freshwater bacterioplankton, and bee symbionts. We found that HGT involves both "flexible" and "core" genes, including the broadly used phylogenetic markers. The high rates and blurry phylogenetic boundaries of HGT revealed in our research imply that, despite the small sizes of individual genomes, marine microorganisms access extensive genetic resources in their adaptation to environmental stressors. These findings suggest the importance of HGT in microbially-mediated processes in the ocean and call for a more rigorous accounting for HGT in meta-omics-based microbial studies.

In situ microbial interactions. Single cell sequencing recovers information encoded by all DNA molecules in a cell, including those originating from symbionts, infecting agents and prey items. This creates a technical

challenge in data analysis and a great opportunity for studies of microbial physical interactions, captured directly in microorganism's natural environment. By analyzing thousands of genomes of individual bacterial, archaeal and protistan cells from diverse environments, my group made important contributions to cultivation-independent identification and evolutionary characterization of lytic infections, prophages and their specific hosts in oceans and other environments. We also discovered that Picozoa and Choanozoa – protist lineages that are abundant in coastal ocean – consume viruses, thus forming a “viral link”. This new paradigm may improve our understanding of the carbon flow through the microbial food web and the controls of viral infections in the ocean.

Coding potential of the “microbial dark matter”. In early 2000's, environmental microbiologists knew that cultivation accesses only a tiny fraction of microorganisms found in nature. At that time, the cultivation-independent tools were only capable of discovering individual genes but could not resolve their linkages to other metabolic genes and phylogenetic markers. Solving this major challenge in microbiology was the main motivation behind my focus on single cell genomics technology. My early use of single cell genomics revealed abundant chemoautotrophs among dark ocean bacterioplankton, the lack of photosynthetic capabilities in Picozoa (formerly Picobilliphyta). We obtained first genomic insights into the coding potential of numerous bacterial, archaeal and protistan phyla lacking cultured representatives, discovered new superphyla Patescibacteria (also known as CPR) and DPANN, and found that these superphyla lack genes for electron transport chains and may predate the evolution of respiration.

Chemoautotrophy in the dark ocean. The aphotic water column constitutes 90% of the total ocean volume, contains three quarters of ocean's biomass and plays key roles in the global carbon cycle. Yet, due to challenges performing research at depth, very little is known about the composition and ecology of dark ocean prokaryoplankton. In 2011, my group provided the first evidence for sulfur oxidation-based chemoautotrophy in several lineages of Deltaproteobacteria and Gammaproteobacteria, which are abundant in the oxygenated dark ocean. Subsequently, we found that nitrite oxidation by Nitrospina is a major chemoautotrophic process in the mesopelagic of the North Atlantic and, potentially, other parts of the ocean. My group also made important contributions to the understanding of the ecology and evolution of Thaumarchaeota, another major group of dark ocean chemoautotrophs. These findings help reconcile persistent discrepancies in the dark ocean's carbon budget.

Biotechnological potential of uncultured microorganisms. The uncultured microorganisms represent an enormous, largely untapped reservoir of genetic resources for medical, bioenergy, nutritional, and other applications. Single cell genomics, in combination with innovative screening techniques, synthetic biology, and high-throughput cultivation offers a powerful tool to tap into this resource. My group leads the first systematic, cultivation-independent survey of the potential for secondary metabolite synthesis and chemoautotrophy in marine prokaryoplankton. We also develop novel methods for the discovery of enzyme and metabolite producers for biotechnological applications.

LEADERSHIP EXPERIENCE

Founding Director of the Bigelow Laboratory Single Cell Genomics Center

2009-present

Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, USA. SCGC is the world's first research and technology center for microbial single cell genomics. As the founding director, I developed the center's concept and assembled a team with diverse skillsets (laboratory technicians, bioinformaticians, programmers, manager) to bring it to fruition; oversaw the development of key methods and workflows (single cell sorting, DNA amplification, sequencing, bioinformatics); secured grants for instrumentation acquisition and development; oversaw instrumentation and software setup and integration (e.g. DNA sequencers, liquid handling robotics, high-performance computers, Laboratory Information Management Systems); developed long-term business model and plans; oversaw the development of best practices for

laboratory analyses, quality control, project management and customer support; developed a community of SCGC customers on five continents and over 30 countries; created a world-class advisory board.

Senior Research Scientist

2005-present

Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, USA. My research group is composed of a diverse mix of postdoctoral scientists, bioinformaticians and technicians. I am one of a small set of pioneers in microbial single cell genomics and my team performs world-class studies of microbial ecology and evolution, with the primary focus on marine environments. The results of our studies have been published in over 100 peer-reviewed publications, including *Cell*, *Science* and *Nature*. To perform this work, I have secured funding from US federal agencies (NSF, NASA, NOAA, NIH, DOE), states (CALFED, Sea Grant) and private foundations (Simons Foundation, Sloan Foundation, Moore Foundation), corporations and individual philanthropists. Many of my projects involve interdisciplinary, inter-institutional and international collaborations. As part of my Senior Research Scientist responsibilities, I contribute to the governance of the Bigelow Laboratory for Ocean Sciences through service on SRS, Search (chair in 2020), Personnel (chair in 2007), Budget, Facilities, Biosafety, and Commercialization committees and other institutional activities. A chair of the faculty search 2020/2021, I oversaw the development and implementation of best practices for the recruitment and selection of candidates during the COVID-19 pandemic, with the overarching goal of meeting Bigelow Laboratory's high standards in professional excellence, integrity, diversity, equity, and inclusion. This search resulted in 6 hires, 4 of which female and 1 non-white male.

Lead, NSF EPSCOR T2 project: Single cell genome-to-phenome: Integrating genome and phenome analyses of individual microbial cells in complex microbiomes

2018-present

This multi-jurisdictional, multi-investigator project consists of research, technology, and workforce development components with an overarching goal achieving a breakthrough in microbial genome-to-phenome studies at the most fundamental level of biological organization – the single cell.

Founding chair, Global Ocean Reference Genomes (GORG) Consortium

2021-present

The goal of the GORG Consortium is to create an interdisciplinary, innovative and stimulating environment for an international group of scientists engaged in collaborative analyses of GORG datasets. The consortium involves ~20 research groups from North America, South America, Asia and Europe.

National and International Advisory Boards, Committees and other Engagements:

1. Invited member of CANGARU (ChatGPT, Generative Artificial Intelligence, and Natural Large Language Models for Accountable Reporting and Use) Guidelines project.
2. U.S. Department of Energy Joint Genome Institute Advisory Committee for the Prokaryotic Super Program (since 2009; chair 2010-2011).
3. Scientific Advisory Panel for the OceanOmics program, Minderoo Foundation, Australia (since 2021).
4. Founding member of *Futura Scientia*, a non-profit organization focused on the modernization of Lithuania's research and higher education systems (since 2009; president in 2010).
5. Expert panel for the NASA Mars Returned Sample Science Board (2017).
6. Advisory Board of the Hadal Science and Technology Research Center (HAST) of Shanghai Ocean University, Shanghai, China (2016).
7. Institutional representative for the US National Microbiome Initiative Announcement (2016).

Scientific Meetings and Sessions Organized:

1. Organizing committee, conference The Local Pangenome. Alicante, Spain, October 2023.
2. Chair, workshop GORG Consortium Jamboree. East Boothbay, Maine, May 2023.
3. Chair, advanced course Bioinformatics of Microbial Single Cells. East Boothbay, Maine, April 2022.

4. Session chair: "Impacts of microbial evolution on the ocean". Aquatic Sciences Meeting (virtual), June 2021.
5. Chair and host of the Fourth Microbial Single Cell Genomics Workshop, Boothbay Harbor ME, September 2019.
6. Chair and host of the Bigelow Laboratory Single Cell Genomics Center Advisory Board Annual Meeting. Boothbay Harbor ME, June 2019.
7. Session chair: "Molecular Ecology Approaches and Cyberinfrastructure for Marine Microbial Omics". Ocean Sciences Meeting; Portland, OR; February 2018.
8. Chair and host of the Bigelow Laboratory Single Cell Genomics Center Advisory Board Annual Meeting. Boothbay Harbor ME, October 2017.
9. Session chair: "Genomics and ecophysiology of single microbial cells". ISME16; Montreal, Canada; August 2016.
10. Chair and host of the Bigelow Laboratory Single Cell Genomics Center Advisory Board Annual Meeting. Boothbay Harbor ME, August 2016.
11. Chair and host of the Third Microbial Single Cell Genomics Workshop, Boothbay Harbor ME, June 2015.
12. Chair and host of the Bigelow Laboratory Single Cell Genomics Center Advisory Board Annual Meeting. Boothbay Harbor ME, June 2015.
13. Meeting steering committee: OCB scoping workshop "Improving predictive biogeochemical models through single cell-based analyses of marine plankton physiological plasticity, genetic diversity and evolutionary processes", East Boothbay ME, May 2014.
14. Chair and host of the Bigelow Laboratory Single Cell Genomics Center Advisory Board Annual Meeting. Boothbay Harbor ME, May 2014.
15. Session chair: "Shedding light on the dark ocean: biogeochemistry and microbial oceanography of the pelagic realm of the deep sea"; 2014 Ocean Sciences Meeting, Honolulu HI, February 2014.
16. Session chair: "Single Cell Microbiology"; ISME14; Copenhagen, Denmark; August 2012.
17. Chair and host of the Second Microbial Single Cell Genomics Workshop, Boothbay Harbor ME, September 2010.
18. Session chair: "Microbial Single Cell Genomics"; 109th General Meeting of the American Society for Microbiology; Philadelphia PA; May 2009.
19. Chair and host of the First Microbial Single Cell Genomics Workshop, Boothbay Harbor ME, September 2007.

RESEARCH PROJECT & GRANT HISTORY

Title	Role	Agency	Period	Budget
Pilot Study: Active-Life Detection Technologies and Lineage-Resolved Microbial Process Rates in an Ocean World Analog Subsurface Ecosystem	Co-I	NASA	2023-2025	\$551,254
eCell Method Development	PI	Minderoo Foundation	2023	\$375,789
EAGER: Microencapsulation-based genomics of individual RNA viruses	PI	NSF	2022-2024	\$299,524
Enabling synthetic biology through single cell functional genomics	Co-I	NIH	2022-2027	\$2,277,528
EAGER: Encapsulation and sequencing of extracellular DNA	PI	NSF	2021-2023	\$299,178

Genomic Map of the Dark Ocean Microbiome	PI	Simons Foundation	2020-2023	\$1,999,160
Sorting out active vs. inactive microbes in subsurface oceanic crust Icy World analogues	Co-I	NASA	2019-2020	\$299,452
RII Track-2 FEC: Single cell genome-to-phenome: Integrating genome and phenome analyses of individual microbial cells in complex microbiomes	PI	NSF	2018-2022	\$6,589,587
Development and validation of an imaging cell sorter for integrated single cell genome and morphology analyses	PI	NSF	2018 - 2021	\$1,396,269
Single cell enzymatic discovery and antibiotic targeting	Co-I	NIH	2017-2020	\$401,403
Large-scale study of the genomic building blocks of marine bacterioplankton	PI	Simons Foundation	2016-2020	\$2,682,203
From genome to mechanism: understanding microbial iron metabolism in situ	Co-I	NASA	2015-2020	\$739,448
CSP: Expanding the dark matter reference catalog by targeting taxonomic blind spots	PI	DOE	2016-2020	DNA sequencing award
Untangling the Deep Genealogy of Microbial Dark Matter	PI	NSF	2014-2019	\$1,836,781
MRI: Acquisition of genome sequencers for Bigelow Laboratory for Ocean Sciences	PI	NSF	2013-2016	\$535,212
Ocean's dark energy: Global inventory of chemoautotrophs in the aphotic realm	PI	NSF	2012-2016	\$900,000
FSML: Bigelow Laboratory Marine Biological and Oceanographic Computational Resources	co-I	NSF	2012-2015	\$349,347
An Integrated Study of Energy Metabolism, Carbon Fixation, and Colonization Mechanisms in Chemosynthetic Microbial Communities at Deep-Sea Vents	co-I	NSF	2011-2017	\$411,652
CSP: Microbial Dark Matter project phase II - stepping deeper into unknown territory	PI	DOE	2014-2017	DNA sequencing
CSP: Enigmatic life underneath us: genomic analysis of deep subsurface microorganisms	PI	DOE	2013-2016	DNA sequencing
Learning how to breathe: what can we learn about antiquity, biological iron oxidation, and respiration on oxygen from modern Fe-oxidizing bacteria	co-I	NASA	2010-2013	\$724,798
Exploratory application of single-molecule real time (SMRT) DNA sequencing in microbial ecology research	co-I	NSF	2011-2013	\$98,918

Deep Life I: Microbial Carbon Transformations in Rock-Hosted Deep Subsurface Habitats	co-I	Sloan Foundation	2012-2014	\$148,960
CSP: Dark ocean microbial single cell genomics	PI	DOE	2012-2015	DNA sequencing
Diversity of marine protists: single cell genomics and imaging for Tara Oceans	co-I	NSF	2010-2012	\$331,603
Decoding Virus Leviathans	co-I	NSF	2009-2012	\$338,950
Identification of photoheterotrophic microorganisms in temperate freshwater lakes	PI	NSF	2009-2012	\$650,000
MRI: Acquisition of equipment for microbial single cell genomics research	PI	NSF	2008-2011	\$494,045
Single cell genome sequencing of uncultured prokaryotes from the South Atlantic mesopelagic	PI	NSF	2008-2011	\$976,747
CSP: Generating reference genomes for marine ecosystem research: Single cell sequencing of ubiquitous, uncultured bacterioplankton clades	PI	DOE	2010-2013	DNA sequencing
Functional genomics of phosphate acquisition during virus infection of <i>Emiliana huxleyi</i>	co-I	NSF	2008-2010	\$808,750
CSP: Shotgun sequencing of single amplified genomes of proteorhodopsin-containing uncultured marine Flavobacteria	PI	DOE	2006-2009	DNA sequencing
Bacterial dormancy, bacterivory, and bacterioplankton diversity in the ocean	PI	NSF	2006-2010	\$659,835
SGER: Single-cell genomics of marine bacterioplankton	PI	NSF	2006-2007	\$147,412
The role of metal contamination in the proliferation of antibiotic resistance	PI	NOAA	2005-2008	\$534,000
Improving Delta drinking water quality: managing sources of disinfection byproduct-forming material in the State Water Project	co-I	CALFED	2002-2006	\$1,369,000
Multiple grants for studies of nitrogen biogeochemistry in freshwater and coastal environments	co-I	multiple Swedish agencies	1993-2000	\$275,000

TEACHING EXPERIENCE

Mentored 15 postdoctoral scientists, 2 Ph.D. students, 2 M.S. students and 10 undergraduate students.	1998-present
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Chair and lecturer, workshop <i>GORG Consortium Jamboree</i>	2023
Chair and lecturer, advanced course <i>Bioinformatics of Microbial Single Cells</i>	2022
Lecturer, advanced course <i>Introduction to Aquatic Flow Cytometry. Bigelow Laboratory for Ocean Sciences, ME, USA.</i>	2016-present
Lecturer, <i>Aquatic Ecology</i> undergraduate course, Vilnius University, Lithuania.	2022
Lecturer, Workshop on Genomics. <i>Cesky Krumlov, Czech Republic.</i>	2017
External Graduate Faculty Member. <i>University of Maine, Orono, ME, USA.</i>	2016
Lecturer, Short Course in Limnology. <i>Vilnius University, Lithuania</i>	1995

MENTORING

Year	Trainee	Level	Role	Affiliation
2023-present	Keir Macartney	Postdoctoral	advisor	Bigelow Laboratory
2023-present	Alaina Weinheimer	Postdoctoral	advisor	Bigelow Laboratory
2021-present	Tianyi Chang	Postdoctoral	advisor	Bigelow Laboratory
2021	Paige Tomko	Undergraduate	co-advisor	Purdue University
2019-2023	Jacob Munson-McGee	Postdoctoral	advisor	Bigelow Laboratory
2018-2020	Jacob Beam	Postdoctoral	advisor	Bigelow Laboratory
2018-2020	Oliver Bezuidt	Postdoctoral	advisor	Bigelow Laboratory
2019	Kayla Clark	Undergraduate	co-advisor	U. Mississippi
2017-2018	Michael Chen	Undergraduate	co-advisor	Williams College
2016	Charlotte Royer	Ph.D.	co-advisor	University of Maine
2016	Johanna Holman	Undergraduate	co-advisor	Husson U.
2015-2017	Jarrold Scott	Postdoctoral	co-advisor	Bigelow Laboratory
2015-2018	Maria Pachiadaki	Postdoctoral	advisor	Bigelow Laboratory
2015-2018	Eric Becraft	Postdoctoral	advisor	Bigelow Laboratory
2012-2016	Jessica Labonté	Postdoctoral	advisor	Bigelow Laboratory
2011-2014	Erin Field	Postdoctoral	advisor	Bigelow Laboratory
2009-2014	Brandon Swan	Postdoctoral	advisor	Bigelow Laboratory
2009-2011	Manuel G. Martinez	Postdoctoral	advisor	Bigelow Laboratory
2007-2009	Jane L. Heywood	Postdoctoral	advisor	Bigelow Laboratory
2014	Cody Funkhouser	Undergraduate	co-advisor	Colby College
2013	Mary Mathyer	Undergraduate	co-advisor	Kalamazoo College
2011	Mark Chaffin	Undergraduate	co-advisor	Colby College
2009, 2010	David Brazel	Undergraduate	co-advisor	Colby College
2007	Casey Doucette	Undergraduate	co-advisor	U. New Hampshire
2005-2008	Craig Baker-Austin	Postdoctoral	co-advisor	SREL
2003-2007	Meredith Wright	Ph.D.	co-advisor	SREL

2003	Janet Hart	Undergraduate	co-advisor	SREL
2003	William Drayton	Undergraduate	co-advisor	SREL
1998-1999	Per Bengtsson	M.S.	co-advisor	Lund U.
1998-2000	Benny Brämberg	M.S.	co-advisor	Lund U.

PROFESSIONAL SERVICE

Proposal Reviewer History: NSF, NIH, DOE, Harvard University's Office of Research Strategy and Development, CALFED, US-Israel Binational Science Foundation, National Geographic, Lithuanian National Research Program (Lithuania), Velux Foundation (Denmark), Knut and Alice Wallenbergs Foundation (Sweden), NWO (Netherlands), NERC (UK), Austrian Science Foundation (Austria), Marius Jakulis Jason Foundation (Lithuania).

Manuscript Reviewer History: Applied and Environmental Microbiology; Aquatic Microbial Ecology; Aquatic Sciences; Archives of Environmental Contamination and Toxicology; Archiv für Hydrobiologi; Bioinformatics; Biotechniques, ISME Journal; Environmental Microbiology; Estuaries, Estuarine, Coastal and Shelf Science; Hydrobiologia; Limnology and Oceanography; Marine Drugs; Microbial Ecology; Microbiome; Nature, Nature Microbiology; Nature Biotechnology; Nature Communications; Nucleic Acids Research; Oikos; PLoS ONE; PNAS; Water Research, Science, Frontiers in Microbiology.

Professional Societies: American Association for the Advancement of Science; International Society for Microbial Ecology; American Society of Microbiology; American Society of Limnology and Oceanography; Society for Industrial Microbiology & Biotechnology; Lithuanians Abroad Science Forum.

SCIENTIFIC PUBLICATIONS

- Booker AE, D'Angelo T, Adams-Beyea A, Brown JM, Nigro O, Rappé MS, Stepanauskas R, Orcutt BN (2023) Life strategies for Aminicenantia in subseafloor oceanic crust. *ISME Journal*
- D'Angelo T, Goordial J, Lindsay MR, McGonigle J, Booker A, Moser D, Stepanauskas R, Orcutt BN (2023) Replicated life-history patterns and subsurface origins of the bacterial sister phyla Nitrospirota and Nitrospinota. *ISME J*
- Anstett J, Plominsky AM, DeLong EF, Kiesser A, Jürgens K, Morgan-Lang C, Stepanauskas R, Stewart FJ, Ulloa O, Woyke T, Malmstrom R, Hallam SJ (2023) A compendium of bacterial and archaeal single-cell amplified genomes from oxygen deficient marine waters. *Scientific Data* 10
- Džunková M, La Clair JJ, Tysl T, Doud D, Schulz F, Piquer-Esteban S, Porcel Sanchis D, Osborn A, Robinson D, Louie KB, Bowen BP, Bowers RM, Lee J, Arnau V, Díaz-Villanueva W, Stepanauskas R, Gosliner T, Date SV, Northen TR, Cheng JF, Burkart MD, Woyke T (2023) Synthase-selected sorting approach identifies a beta-lactone synthase in a nudibranch symbiotic bacterium. *Microbiome* 11
- Hackl T, Laurenceau R, Ankenbrand MJ, Bliem C, Cariani Z, Thomas E, Dooley KD, Arellano AA, Hogle SL, Berube P, Leventhal GE, Luo E, Eppley JM, Zayed AA, Beaulaurier J, Stepanauskas R, Sullivan MB, DeLong EF, Biller SJ, Chisholm SW (2023) Novel integrative elements and genomic plasticity in ocean ecosystems. *Cell* 186:47-62.e16
- Haro-Moreno JM, López-Pérez M, Alekseev A, Podoliak E, Kovalev K, Gordeliy V, Stepanauskas R, Rodriguez-Valera F (2023) Flotillin-associated rhodopsin (FARhodopsin), a widespread paralog of proteorhodopsin in aquatic bacteria with streamlined genomes. *mSystems* 8
- Pavlopoulos GA, Baltoumas FA, Liu S, Selvitopi O, Camargo AP, Nayfach S, Azad A, Roux S, Call L, Ivanova NN, Chen IM, Paez-Espino D, Karatzas E, Acinas SG, Ahlgren N, Attwood G, Baldrian P, Berry T, Bhatnagar JM, Bhaya D, Bidle KD, Blanchard JL, Boyd ES, Bowen JL, Bowman J, Brawley SH, Brodie EL, Brune A, Bryant DA, Buchan A, Cadillo-Quiroz H, Campbell BJ, Cavicchioli R,

- Chuckran PF, Coleman M, Crowe S, Colman DR, Currie CR, Dangl J, Delherbe N, Denev VJ, Dijkstra P, Distel DD, Eloë-Fadrosh E, Fisher K, Francis C, Garoutte A, Gaudin A, Gerwick L, Godoy-Vitorino F, Guerra P, Guo J, Habteselassie MY, Hallam SJ, Hatzepichler R, Hentschel U, Hess M, Hirsch AM, Hug LA, Hultman J, Hunt DE, Huntemann M, Inskeep WP, James TY, Jansson J, Johnston ER, Kalyuzhnaya M, Kelly CN, Kelly RM, Klassen JL, Nüsslein K, Kostka JE, Lindow S, Lilleskov E, Lynes M, Mackelprang R, Martin FM, Mason OU, McKay RM, McMahon K, Mead DA, Medina M, Meredith LK, Mock T, Mohn WW, Moran MA, Murray A, Neufeld JD, Neumann R, Norton JM, Partida-Martinez LP, Pietrasiak N, Pelletier D, Reddy TBK, Reese BK, Reichart NJ, Reiss R, Saito MA, Schachtman DP, Seshadri R, Shade A, Sherman D, Simister R, Simon H, Stegen J, Stepanauskas R, Sullivan M, Sumner DY, Teeling H, Thamtracoln K, Treseder K, Tringe S, Vaishampayan P, Valentine DL, Waldo NB, Waldrop MP, Walsh DA, Ward DM, Wilkins M, Whitman T, Woollet J, Woyke T, Iliopoulos I, Konstantinidis K, Tiedje JM, Pett-Ridge J, Baker D, Visel A, Ouzounis CA, Ovchinnikov S, Buluç A, Kyrpides NC (2023) Unraveling the functional dark matter through global metagenomics. *Nature* 622:594-602
8. Seymour CO, Palmer M, Becraft ED, Stepanauskas R, Friel AD, Schulz F, Woyke T, Eloë-Fadrosh E, Lai D, Jiao J-Y, Hua Z-S, Liu L, Lian Z-H, Li W-J, Chuvochina M, Finley BK, Koch BJ, Schwartz E, Dijkstra P, Moser DP, Hungate BA, Hedlund BP (2023) Hyperactive nanobacteria with host-dependent traits pervade Omnitrophota. *Nature Microbiology*
 9. Srivastava A, De Corte D, Garcia JAL, Swan BK, Stepanauskas R, Herndl GJ, Sintes E (2023) Interplay between autotrophic and heterotrophic prokaryotic metabolism in the bathypelagic realm revealed by metatranscriptomic analyses. *Microbiome* 11:239
 10. Munson-McGee JH, Lindsay MR, Sintes E, Brown JM, D'Angelo T, Brown J, Lubelczyk LC, Tomko P, Emerson D, Orcutt BN, Poulton NJ, Herndl GJ, **Stepanauskas R** (2022) Decoupling of respiration rates and abundance in marine prokaryoplankton. *Nature* 612:764-770
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SCIENTIFIC PRESENTATIONS (SINCE 2007)

1. Seminar, MIT Microbiome Club, Cambridge, MA, December 2023.

2. Seminar, University of Copenhagen, Copenhagen, Denmark, October 2023.
3. Presentation at The Local Pangenome conference. Alicante, Spain, October 2023.
4. Presentation at Rytas Middle School, Marijampole, Lithuania, October 2023.
5. Presentation at Atrandi Biosciences, Vilnius, Lithuania, October 2023.
6. Seminar, University of Western Australia, Perth, Australia, September 2023.
7. Presentation at the Minderoo Foundation, Perth, Australia, September 2023.
8. Presentation at the ASLO Aquatic Sciences Meeting, Palma, Spain, June 2023.
9. Presentation to NSF C-CoMP all-Center meeting, virtual, May 2023.
10. Seminar, Northeastern University, Boston, MA, February 2023.
11. Bigelow Science Symposium, East Boothbay, ME, February 2023.
12. Presentation on patent application process, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, January 2023.
13. Seminar, Nature Research Center, Vilnius, Lithuania, December 2022.
14. Seminar, Vilnius University, Vilnius, Lithuania, December 2022.
15. Seminar, Vienna University, Vienna, Austria, December 2022.
16. Presentation at the conference Emerging Applications of Microbes, Leuven, Belgium, December 2022.
17. Lecture at Vilnius University, Lithuania (virtual), March 2022.
18. Distinguished Lecture Bioeconomy series for the NSF BIO and QIA Bioeconomy Coordination Committee (virtual), January 2022.
19. Bigelow Science Symposium, East Boothbay, ME, October 2021.
20. Presentation at the ASLO Aquatic Sciences Meeting (virtual), June 2021.
21. Presentation to a Bigelow Laboratory's Board Committee, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, June 2021.
22. Presentation to Bigelow Laboratory's major donors, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, April 2021.
23. Seminar, Spencer Fund Showcase, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine, April 2021.
24. Seminar, University of British Columbia, Vancouver, BC, Canada, March 2021.
25. Seminar, Massachusetts Institute of Technology, Cambridge, MA, March 2021.
26. Seminar, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, September 2020.
27. Seminar, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, July 2020.
28. Bigelow Science Symposium, East Boothbay, ME, October 2019.
29. Fourth Microbial Single Cell Genomics Workshop, Boothbay Harbor, Maine, September 2019.
30. Café Scientifique presentation, East Boothbay, ME, July 2019.
31. Annual meeting presentation to the Bigelow Laboratory Single Cell Genomics Center Advisory Board, East Boothbay, ME, June 2019.
32. Invited presentation, The Crafoord Prize Symposium in Biosciences, Lund, Sweden, May 2019.
33. Seminar, Thermo Fisher Scientific Baltics Corporation, Vilnius, Lithuania, May 2019.
34. Seminar, Vilnius University, Vilnius, Lithuania, May 2019.
35. Webinar, Dupont Corporation, March 2019.
36. Seminar, University of Maryland, College Park, MD, February 2019.
37. Seminar, CosmosID, Rockville, MD, February 2019.
38. Seminar, Department of Energy, Germantown, MD, January 2019.
39. Seminar, Genoscope, Paris, France, December 2018.
40. Invited presentation, Single Cell Ecology Discussion Meeting, The Royal Society, London, UK, December 2018.
41. Invited presentation, SIMB 2018 RAMC and Microbiome Meeting, Clearwater Beach, FL, November 2018.
42. Invited presentation, EPSCoR RII Track-2 2018 Kickoff Meeting, National Science Foundation, Alexandria, VA, November 2018.

43. Invited presentation, Gloucester Marine Genomics Institute Science Forum, Gloucester, MA, October 2018.
44. Seminar, University of Wisconsin, Madison, WI, October 2018.
45. Invited presentation, workshop “The New Age of Ocean Discovery: Opportunities from Tara Oceans”, Harvard University, Cambridge, MA, October 2018.
46. Lecture, Introduction to Aquatic Cytometry Course, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine, September 2018.
47. Contributing presentation, ISME17, Leipzig, Germany, August 2018.
48. Contributing presentation, GRC Marine Microbes meeting, Lucca, Italy, July 2018
49. Seminar, Spencer Fund Showcase, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine, March 2018.
50. Seminar, Second Genome Corporation, South San Francisco, CA, March 2018.
51. Seminar, Chan Zuckerberg Biohub, San Francisco, CA, March 2018.
52. Contributed presentation, Aquatic Sciences Meeting, Portland, OR, February 2018.
53. Seminar, Pacific Northwest National Laboratory, Richland, WA, February 2018.
54. Seminar, Simons Foundation Flatiron Institute, New York, NY, December 2017.
55. Seminar, Rutgers University, New Brunswick, NJ, December 2017.
56. Bigelow Laboratory Annual Meeting, East Boothbay, ME, October 2017.
57. Bigelow Science Symposium, East Boothbay, ME, September 2017.
58. Lecture, Introduction to Aquatic Cytometry Course, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine, September 2017.
59. Invited presentation, Gordon Research Conference in Microbial Population Biology, Proctor Academy, Andover, NH, July 2017.
60. Invited presentation, Radcliffe Exploratory Seminar “Advancing Genomic Biology Through Novel Method Development”, Harvard University, Cambridge, MA, June 2017.
61. Seminar, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, May 2017.
62. Invited presentation Bio-Rad Corporation, Pleasanton, CA, May 2017.
63. Seminar, University of Southern California, Los Angeles, CA, April 2017.
64. Invited presentation, Jet Propulsion Laboratory, Pasadena, CA, April 2017.
65. Invited presentation, NeLLi 2017: From new lineages of life to new functions, Walnut Creek, CA, April 2017.
66. Invited lecturer, 2017 Workshop on Genomics, Cesky Krumlov, Czech Republic, January 2017.
67. Seminar, Thermo Fisher Scientific Baltics Corporation, Vilnius, Lithuania, January 2017.
68. Seminar, Vilnius University, Vilnius, Lithuania, January 2017.
69. Invited presentation, Changing Microbiomes for Health Symposium, San Diego, CA, December 2016.
70. Seminar, Jet Propulsion Laboratory, Pasadena, CA, December 2016.
71. Seminar, Illumina Corporation, San Diego, CA, December 2016.
72. Invited presentation, Single-Cell Sequencing Expert Panel 2016 (by Illumina Corporation), Boston, MA, October 2016.
73. Invited presentation, 2nd Annual USA Congress in Next Generation Sequencing & Single Cell Analysis (by Oxford Global Marketing), Boston, MA, October 2016.
74. Lecture, Introduction to Aquatic Cytometry Course, Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine, September 2016.
75. Seminar, Universidade Federal do Rio Grande do Norte, Natal, RN, Brazil, September 2016.
76. Invited presentation, XV International Symposium on Marine Natural Products, Cumbuco Beach, Brazil, September 2016.
77. Invited presentation and session chair, ISME16, Montreal, Canada, August 2016.
78. Keynote presentation, The First International Summit on Hadal Zone Exploration: Opportunities and Challenges, Shanghai, China, June 2016.
79. Invited presentation, ASM Conference on The Individual Microbe: Single-cell Analysis and Agent-based Modeling, Washington, DC, March 2016.

80. Invited presentation, US-UK Microbiome Workshop, La Jolla, CA, March 2016.
81. Seminar, Scripps Institution of Oceanography, La Jolla, CA, March 2016.
82. Invited presentation, Ocean Sciences Meeting, New Orleans, LA, February 2016.
83. Seminar, WaferGen Corporation, Fremont, CA, December 2015.
84. Seminar, Radiant Genomics Corporation, Berkeley, CA, December 2015.
85. Seminar, Fluidigm Corporation, South San Francisco, CA, December 2015.
86. Invited presentation, AGU Fall Meeting, San Francisco, CA, December 2015.
87. Seminar, School of Marine Sciences, Orono, ME, November 2015.
88. Seminar, Department of Microbiology and Molecular Genetics, East Lansing, MI, October 2015.
89. Invited presentation, 7th Annual Argonne Soil Metagenomics Meeting; Chicago, IL; October 2015.
90. Seminar, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, September 2015.
91. Café Scientifique presentation, Boothbay Harbor, ME, August 2015.
92. Contributing presentation, Annual Meeting of the Society for Industrial Microbiology and Biotechnology, Philadelphia, PA, August 2015.
93. Invited presentation, Third Microbial Single Cell Genomics Workshop, Boothbay Harbor, ME, June 2015.
94. Contributing presentation, 10th Annual DOE Joint Genome Institute Meeting, Walnut Creek, CA, March 2015.
95. Seminar, Thermal Biology Institute, Montana State University, Bozeman, MT, February 2015
96. Invited presentation, 2015 Aquatic Sciences Meeting, Granada, Spain, February 2015.
97. Seminar, Institute of Ecology and Evolutionary Biology, University of Oregon, Eugene, Oregon, December 2014
98. Seminar, Institute of Microbiology, Swiss Federal Institute of Technology, Zurich, Switzerland, November 2014
99. Invited Presentation, Symposium Diversity of Microbial Symbiosis: From Genomes to Molecules, Lausanne, Switzerland, November 2014
100. Invited, national awardee presentation, Institute of Botany, Vilnius, Lithuania, November 2014
101. Invited presentation, Boston Illumina User Group Meeting, Cambridge, MA, September 2014
102. Invited presentation, Gordon Marine Microbes Conference, Waltham, MA, June 2014
103. Steering Committee, OCB scoping workshop "Improving predictive biogeochemical models through single cell-based analyses of marine plankton physiological plasticity, genetic diversity and evolutionary processes", East Boothbay, ME, May 2014
104. Seminar, Stazione Zoologica Anton Dohrn, Naples, Italy, April 2014
105. Seminar, University of British Columbia, Vancouver, BC, Canada, March 2014
106. Contributing presentation, 2014 Ocean Sciences Meeting, Honolulu, HI, February 2014
107. Seminar, JC Venter Institute, Rockville, MD, February 2014
108. Keynote speaker, conference Vita Scientia, Vilnius, Lithuania, January 2014
109. Invited presentation, C-DEBI "Activity" Theme Team 2013 Workshop, East Boothbay, ME, September 2013
110. Seminar, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, August 2013
111. Seminar, Oregon State University, Corvallis, OR, May 2013
112. Seminar, Bigelow Laboratory for Ocean Sciences, East Boothbay, ME, May 2013
113. Seminar, Warp Drive Bio LLC, Cambridge, MA, May 2013
114. Seminar, Boston College, Chestnut Hill, MA, April 2013
115. Seminar, Proctor & Gamble, Cincinnati, OH, April 2013
116. Seminar, Vienna University, Vienna, Austria, March 2013
117. Invited presentation, Annual Conference of the Association for General and Applied Microbiology (VAAM), Bremen, Germany, March 2013.
118. Contributing presentation, Deep Carbon Observatory International Science Meeting, D.C., March 2013.
119. Invited presentation, AGU fall meeting, San Francisco, CA, December 2012.
120. Seminar, Massachusetts Institute of Technology, Cambridge, MA, November 2012

121. Invited presentation and session chair, ISME14, Copenhagen, Denmark, August 2012.
122. Invited presentation, American Society for Microbiology 112th General Meeting, San Francisco, CA, June 2012.
123. Invited presentation, Canadian Institute for Advanced Research Integrated Biodiversity Program Meeting, Quebec City, Quebec, May 2012.
124. Seminar, National Institute of Standards and Technology, Gaithersburg, MD, April 2012
125. Seminar, Jackson Laboratory, Bar Harbor, ME, March 2012
126. Invited presentation, Department of Energy Joint Genome Institute Annual User Meeting, Walnut Creek, CA, March 2012
127. Invited presentation, NASA Life Detection Workshop, San Diego, CA, February 2012
128. Invited presentation, Department of Energy Joint Genome Institute Metagenomics Informatics Challenge, Walnut Creek, CA, October 2011
129. Invited presentation, 12th Symposium on Aquatic Microbial Ecology, Warnemunde, Germany, October 2011
130. Contributing presentation, Gordon Applied and Environmental Microbiology Conference, South Hadley, MA, July 2011
131. Seminar, Sigma-Aldrich, St Louis, MO, June 2011
132. Seminar, Nestle, St Louis, MO, June 2011
133. Seminar, Woods Hole Oceanographic Institution, Woods Hole, MA, June 2011
134. Invited presentation, Sequencing, Finishing and Analysis in the Future Meeting, Santa Fe, NM, June 2011
135. Seminar, Geophysical Laboratory, Carnegie Institution of Washington, Washington, DC, May 2011
136. Seminar, University of Maryland, College Park, MD, May 2011
137. Seminar, National Aeronautics and Space Administration, Washington, DC, May 2011
138. Seminar, Department of Energy, Rockville, MD, May 2011
139. Seminar, National Science Foundation, Washington, DC, May 2011
140. Contributing presentation, CYTO 2011, Baltimore, MD, May 2011
141. Invited presentation, Workshop: New Horizons for International Investigations into Carbon Cycling in the Deep Crustal Biosphere, Bloemfontein, South Africa, January 2011
142. Seminar, Marine Biological Laboratory, Woods Hole, MA, November 2010
143. Seminar, Vilnius University, Vilnius, Lithuania, October 2010
144. Invited presentation, Workshop: Comparative Genomics and Metagenomics, Impacts on Health and Environment, Granada, Spain, October 2010
145. Workshop organizer and oral presentation, Workshop: Redefining Microbial Genomics: The Power of Sequencing Individual Cells, Boothbay Harbor, ME, September 2010
146. Contributing presentation, ISME Meeting, Seattle, WA, August 2010
147. Café Scientifique presentation, Boothbay Harbor, ME, July 2010
148. Contributing presentation, Gordon Marine Microbes Conference, Tilton, NH, July 2010
149. Invited presentation, Southeast Flow Cytometry Interest Group Conference, Athens, GA, June 2010
150. Seminar, University of Tennessee, Knoxville, TN, April 2010
151. Contributing presentation, Department of Energy Joint Genome Institute User Meeting, Walnut Creek, CA, March 2010
152. Seminar, Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, ME, February 2010
153. Seminar, Yale University, New Haven, CT, February 2010
154. Seminar, Broad Institute, Cambridge, MA, December 2009
155. Seminar, Oak Ridge National Laboratory, Oak Ridge, TN, November 2009
156. Seminar, University of Georgia, Athens, GA, November 2009
157. Seminar, Joint Genome Institute, Walnut Creek, CA, October 2009
158. Seminar, Colby College, Waterville, ME, October 2009
159. Contributing presentation, Workshop on DUSEL science and development, Lead, SD, October 2009
160. Contributing presentation, Maine Microtechnology in Biology and Medicine Workshop, August 2009

161. Seminar at the Marine Biological Laboratory, Woods Hole, MA, June 2009
162. Invited presentation, BAGECO Meeting, Uppsala, Sweden, June 2009
163. Invited presentation and session chair, Annual ASM Meeting, Philadelphia, PA, May 2009
164. Invited presentation, AAAS Annual meeting, Chicago, IL, February 2009
165. Seminar, University of Southern Maine, Portland, ME, January 2009
166. Seminar, JC Venter Institute, San Diego, CA, January 2009
167. Contributing presentation, Plant and Animal Genome Conference, San Diego, CA, January 2009
168. Contributing presentation, Microbial Expert Group for Gulf of Maine Area Census of Marine Life, Portland, ME, December 2008
169. Seminar, Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, ME, October 2008
170. Invited presentation, US-EC Task Force on Biotechnology Research conference, Monaco, October 2008
171. Poster, ISME annual meeting, Cairns, Australia, August 2008
172. Café Scientifique presentation, Boothbay Harbor, ME, July 2008
173. Invited presentation, Finishing in the Future meeting, Santa Fe, NM, May 2008
174. Invited presentation, advanced course Diversity and Function of Microorganisms in Nature, Uppsala, Sweden, 2008
175. Contributing presentation, American Society for Limnology and Oceanography Meeting, Santa Fe, NM, February 2008
176. Seminar, Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, ME, October 2007
177. Invited presentation, Oceans and Human Health Principal Investigator Meeting, Muskegon, MI, October 2007
178. Workshop organizer and oral presentation, Workshop: Single Cell Alternatives to Metagenomics in Environmental Microbiology, Boothbay Harbor, ME, September 2007
179. Contributing presentation, Metagenomics 2007 workshop, San Diego, CA, July 2007
180. Seminar, University of Massachusetts, Lowell, MA, April 2007
181. Contributing presentation, Department of Energy Joint Genome Institute Annual User Meeting, Walnut Creek, CA, March 2007
182. Contributing presentation, American Society for Limnology and Oceanography Meeting, Santa Fe, NM, February 2007
183. Seminar, Los Alamos National Laboratory, Los Alamos, NM, February 2007