

Julia M. Brown, PhD
Bioinformatics Scientist
Bigelow Laboratory for Ocean Sciences
East Boothbay, ME

email: julia@bigelow.org

Appointments

2020-present Bioinformatics Scientist, Bigelow Laboratory for Ocean Sciences
2016-2020 Bioinformatician, Bigelow Laboratory for Ocean Sciences

Education

2015-2016 Post-Doctoral Research Fellow
Albert Einstein College of Medicine, Bronx, NY
Department of Systems and Computational Biology
Postdoctoral advisor: Dr. Libusha Kelly

2015 Ph.D. in Microbiology, concentrations in Genomics and Ecology
Cornell University, Ithaca, NY
Dissertation: *Cyanobacteria-associated bacteriophage communities over scales of spatial, temporal and environmental change*
PhD advisor: Dr. Ian Hewson
Committee Members: Dr. Daniel Buckley, Dr. Nelson Hairston

2008 B.A. Chemistry *cum laude*, conc. Biochemistry
Carleton College, Northfield, MN

Background and Research Interests

Julia Brown is a microbiologist and bioinformatics scientist specializing in microbial and viral genomics. Julia currently works with the Single Cell Genomics Center and the Stepanauskas Group to develop and maintain bioinformatics workflows for the assembly, QC and analysis of single amplified genomes of microbial cells. Julia's research interests lie in understanding ecology and evolution of microbes and viruses using single cell genomes, and other 'omics data as well as emerging technologies and bioinformatics methods.

Peer-Reviewed Publications

Google Scholar: https://scholar.google.com/citations?hl=en&user=rGsro4wAAAAJ&view_op=list_works

Yang, Joy Y, Wenwen Fang, Fabiola Miranda-Sanchez, **Julia M Brown**, Kathryn M Kauffman, Chantel M Acevero, David P Bartel, Martin F Polz, Libusha Kelly (2021) **Degradation of host translational machinery drives tRNA acquisition in viruses** *Cell Systems*

Kim, Woojoo E., Katherine Charov, Mária Džunková, Eric D. Becraft, **Julia Brown**, Frederik Schulz, Tanja Woyke, James J. La Clair, Ramunas Stepanauskas, and Michael D. Burkart (2021) **Synthase-Selective Exploration of a Tunicate Microbiome by Activity-Guided Single-Cell Genomics** *ACS Chemical Biology*

- Becraft, Eric D., Maggie CY Lau Vetter, Oliver KI Bezuidt, **Julia M. Brown**, Jessica M. Labonté, Kotryna Kauneckaitė-Griguole, Ruta Salkauskaite, Gediminas Alzbutas, Joshua D. Sackett, Brittany R. Kruger, Tigaly Kadnikov, Esta van Heerden, Duane Moser, Nikolai Ravin, Tullis Onstott, Ramunas Stepanauskas (2021) **Evolutionary stasis of a deep subsurface microbial lineage** *The ISME Journal*: 1-13.
- Julia M. Brown**, Jessica Labonté, Joseph Brown, Nicholas R. Record, Nicole J. Poulton, Michael Sieracki, Ramiro Logares, Ramunas Stepanauskas (2020) **Single cell genomics reveals viruses consumed by marine protists.** *Frontiers in Microbiology 11*: 524828
- Jacob P. Beam, Eric D. Becraft, **Julia M. Brown**, Frederik P. Schulz, Jessica K. Jarett, Oliver Bezuidt, Nicole J. Poulton, Kayla Clark, Peter F. Dunfield, Nikolai V. Ravin, John R. Spear, Brian P. Hedlund, Konstantinos A. Kormas, Stefan M. Sievert, Mostafa S. Elshahed, Hazel A. Barton, Matthew B. Stott, Jonathan A. Eisen, Duane P. Moser, Tullis C. Onstott, Tanja Woyke, Ramunas Stepanauskas (2020) **Ancestral absence of electron transport chains in Patescibacteria and DPANN.** *Frontiers in microbiology 11*: 1848
- Michael L. Chen, Eric D. Becraft, Maria Pachiadaki, **Julia M. Brown**, Jessica K. Jarett, Josep M. Gasol, Nikolai V. Ravin, Duane P. Moser, Takuro Nunoura, Gerhard J. Herndl, Tanja Woyke, Ramunas Stepanauskas (2020) **Hiding in Plain Sight: The Globally Distributed Bacterial Candidate Phylum PAUC34f.** *Frontiers in microbiology 11*: 376
- Maria G. Pachiadaki, **Julia M. Brown**, Joseph Brown, Oliver Bezuidt, Paul M. Berube, Steven J. Biller, Nicole J. Poulton, Michael D. Burkart, James J. La Clair, Sallie W. Chisholm, Ramunas Stepanauskas (2019) **Charting the Complexity of the Marine Microbiome through Single-Cell Genomics.** *Cell 7*: 1623-1635
- Julia M. Brown**, Kathryn M. Kauffman, Radley S. Sharma, Dan VanInsbergue, Joseph Elsherbini, Martin Polz, Libusha Kelly (2018) **Viruses of the Nahant Collection, characterization of 251 marine Vibrionaceae viruses.** *Scientific data 5*: 180114.
- Kathryn M. Kauffman, Fatima A. Hussain, Joy Yang, Philip Arevalo, **Julia M. Brown**, William K. Chang, David VanInsberghe, Joseph Elsherbini, Radhey S. Sharma, Michael B. Cutler, Libusha Kelly, Martin F. Polz (2018) "A major lineage of non-tailed dsDNA viruses as unrecognized killers of marine bacteria" *Nature* 25474
- Maria G. Pachiadaki, Eva Sintés, Kristin Bergauer, **Julia M. Brown**, Nicholas R. Record, Brandon K. Swan, Mary Elizabeth Mathyer, Steven J. Hallam, Purificación López-García, Yoshihiro Takaki, Takuro Nunoura, Tanja Woyke, Gerhard J. Herndl, Ramunas Stepanauskas (2017) "**Major role of nitrite-oxidizing bacteria in dark ocean carbon fixation.**" *Science* 358, no. 6366: 1046-1051.
- Eric Daniel Becraft, Tanja Woyke, Jessica Jarett, Natalia Ivanova, Filipa Godoy-Vitorino, Nicole Poulton, **Julia M. Brown**, Joseph Brown, M.C. Y. Lau, Tullis Onstott, Jonathan A. Eisen, Duane Moser, Ramunas Stepanauskas (2017) "**Rokubacteria: genomic giants among the uncultured bacterial phyla.**" *Frontiers in microbiology 8*: 2264.
- Ramunas Stepanauskas, Elizabeth A. Fergusson, Joseph Brown, Nicole J. Poulton, Ben Tupper, Jessica M. Labonté, **Julia M. Brown**, Maria G. Pachiadaki, Tadas Povilaitis, Brian P. Thompson, Corianna J. Mascena, Wendy K. Bellows, Arvydas Lubys (2017) "**Improved genome recovery and**

integrated cell-size analyses of individual uncultured microbial cells and viral particles." *Nature communications* 8, no. 1: 84.

Bryndan Durham, Jana Grote, Kerry Whittaker, Sara Bender, Haiwei Luo, Sharon Grim, **Julia Brown**, John Casey, Antony Dron, Lennis Florez-Leiva, Andreas Krupke, Catherine Luria, Aric Mine, Olivia Nigro, Santhiska Pather, Agathe Talarmin, Emma Wear, Thomas Weber, Jesse Wilson, Matthew Church, Edward DeLong, David Karl, Grieg Steward, John Eppley, Nikos Kyrpides, Stephan Schuster, Michael Rappe (2014) **Draft Genome Sequence of Marine Alphaproteobacterial Strain HIMB11, the First Cultivated Representative of a Unique Lineage within the Roseobacter Clade Possessing an Unusually Small Genome.** *Standards in Genomic Sciences* 9:3

Julia M. Brown, Brenna M. LaBarre, Ian Hewson (2013) **Characterization of Trichodesmium-associated viral communities in the eastern Gulf of Mexico.** *FEMS Microbiology Ecology* 84: 603-613

Rayna C. Bell, Amos Belmaker, **Julia M. Brown**, Courtney Couch, Kainana Francisco, Mark E. Manuel, Katie M. Marchetto, Joseph L. Simonis, R. Quinn Thomas, and Jed P. Sparks (2013) **Effectiveness of bio-control in mediating *Erythrina* gall wasp (*Quadrastichus erythrinae*) infestations of Wiliwili trees (*Erythrina sandwicensis*).** *Journal of the Torrey Botanical Society* 140: 215-224

Ian Hewson, Jorge G. Barbosa, **Julia M. Brown**, Ryan P. Donelan, James Eaglesham, Erin M. Eggleston EM, Brenna LaBarre (2012) **Temporal dynamics and decay of putatively allochthonous and autochthonous viral genotypes in contrasting freshwater lakes.** *Applied and Environmental Microbiology* 78: 6583-91

Julia M. Brown, Nicola R. Felice, Nicolas B. Scalfone, Ian Hewson (2012) **Influence of habitat confluence on aquatic microbial assemblages in experimental mesocosms.** *Aquatic Microbial Ecology* 66: 33-40

Ian Hewson, **Julia M. Brown**, Colleen A. Burge, Courtney S. Couch, Brenna A. LaBarre, Morgan E. Mouchka, Mizue Naito, C. Drew Harvell (2012) **Viral assemblages associated with healthy and aspergillosis-affected tissues of the *Gorgonia ventalina* holobiont.** *Coral Reefs* 31: 487-491

Ian Hewson, Shari Gitlin, **Julia M. Brown**, Devin Doud (2011) **Nucleopolyhedrovirus detection and distribution in terrestrial, freshwater, and marine habitats of Appledore Island, Gulf of Maine.** *Microbial Ecology* 62: 33-40

Julia M. Brown, Ian Hewson (2010) **Ecophysiology of a common unannotated gene transcript in surface water microbial assemblages of the oligotrophic open ocean.** *Aquatic Microbial Ecology* 60: 289-297

In Prep Publications

Jacqueline Goordial, Timothy D'Angelo, Jessica Labonté, Nicole Poulton, **Julia M Brown**, Ramunas Stepanauskas, Gretchen Früh-Green, Beth Orcutt (In press) **Microbial diversity and function in the subsurface sediment and oceanic lithosphere of the Atlantis Massif** *Mbio*

Kathryn Kauffman, William Chang, **Julia Brown**, Fatima Hussain, Martin Polz, Libusha Kelly (In review) **Resolving the structure of phage-bacteria interactions in the context of natural diversity** *Nature Microbiology*

Posters and Presentations

- Julia M. Brown** (June 24, 2021) Oral Presentation: “Observing virus sequences in thousands of uncultivated host cells using large scale single cell genomics.” 2021 ASLO Aquatic Sciences Virtual Meeting
- Julia M. Brown** (March 31, 2021) Invited Seminar: “An unexpected snack for the ocean’s tiniest eukaryotes.” Maine Maritime Academy Cell Biology Seminar
- Julia M. Brown** (September 24, 2020) Seminar: “Caught in the Act: What viruses within cellular SAGs can tell us about ecology and evolution.” Internal Bigelow Seminar, East Boothbay, ME
- Julia M. Brown**, Jessica M. Labonté, Joe Brown, Ramunas Stepanauskas (August 14, 2019) Poster Presentation: “Grazing on viruses? Accumulation of non-infecting viral DNA within picoeukaryote cells.” ISME17, Leipzig, Germany
- Julia M. Brown**, Joe Brown, Jessica Labonté, Ramunas Stepanauskas (February 2, 2018) Oral Presentation: “Accumulation of viral DNA in marine picoeukaryote cells suggests the importance of viral ingestion in microbial trophic interactions.” 2018 Ocean Sciences Meeting, AGU Portland, OR
- Julia M. Brown**, Ian Hewson (May 18, 2014) Poster Presentation: “Evidence of Water Column Virus DNA Preserved in the Varved Sediments of Fayetteville Green Lake.” American Society for Microbiology General Meeting, Boston, MA
- Julia M. Brown** (November 18, 2013) Invited Presentation: “My Graduate Research and Graduate School Experience.” Cornell University Chapter of The American Indian Science and Engineering Society (AISES)
- Julia M. Brown** (November 8, 2013) Invited Seminar: “A Viral Graveyard? Comparative Analysis of Viral Metagenomes from the Sediment and Watercolumn of Fayetteville Green Lake.” State University of New York at Geneseo, Geneseo, NY
- Julia M. Brown**, Ian Hewson (February 21, 2013) Poster Presentation: “Investigation of Mutation and Migration as Factors influencing cyanophage diversity within two neighboring meromictic lakes” American Society of Limnology and Oceanography Aquatic Sciences Conference, New Orleans, LA
- Julia M. Brown**, Ian Hewson (June 30, 2012) Poster Presentation: “Dynamics of Picocyanobacteria and Viruses in Fayetteville Green Lake”, Northeastern Microbiologists: Physiology, Ecology and Taxonomy (NEMPET) Conference, Blue Mountain Lake, NY
- Julia M. Brown**, Ian Hewson (February 17, 2011) Poster Presentation: “Metaviromic Insights into the Phage Ecology during a *Trichodesmium* lysis event” American Society of Limnology and Oceanography (ASLO) Conference, San Juan, Puerto Rico

Teaching and Mentorship

Bigelow Laboratory for Ocean Sciences

2021 Data Carpentry Workshop Organizer and Instructor at Bigelow Laboratory
2020 Co-mentor for undergraduate REU intern
2019 Data Carpentry Workshop Organizer and Instructor at Bigelow Laboratory
2018 Data Carpentry Workshop Instructor for New England Tribes, USGS, Augusta, ME
2018-Present Certified Carpentries Instructor

Cornell University

2014 BioG 1140: Foundations of Biology Teaching Assistant (1 semester)
2014 BioMi 2910, 2911: Introduction to Microbiology Lab Co-Instructor, Lecture Teaching Assistant (1 semester)
2013 BioMi 3910: Advanced Laboratory in Microbiology Teaching Assistant (1 semester)
2009, 2013 BioMi 2910, 2911: Introduction to Microbiology Teaching Assistant (3 semesters)
2011, 2012 Graduate mentor to summer undergraduate research assistants
2008-2014 Introduction to Microbiology small group section instructor (11 semesters)

Carleton College

2008 Introduction to Chemistry Tutor
2006-2008 Organic Chemistry 1 and Chemical Equilibrium and Analysis lab teaching assistant

Grants, Honors and Awards

2020 NSF EAGER: Encapsulation and sequencing of extracellular DNA (\$299,178)
2014 CALS Microbiology TA of the Year ("The Golden Apple")
2010 Small Grant, Cornell Biogeochemistry and Environmental Biocomplexity (\$3450.00)

Volunteer and Service

Reviewer: Geobiology, Molecular Ecology, FEMS Microbial Ecology, Frontiers in Microbiology, Microbiome, Science Advances

2018-2020 Facilitator for mid-coast Maine Girls Who Code
2017 BLOOM Chaperone, Bigelow open house activities coordinator
2016 BLOOM Program field volunteer, Bigelow Laboratory Open House Science Activities Coordinator
2013 Invited Speaker at Homer Junior High School Career Day
2012 Co-host and speaker at Field of Microbiology Students Bioinformatics Symposium
2012 Social Media Coordinator for Frontiers in the Life Sciences Symposium, Cornell University
2011-2012 Co-President of the Field of Microbiology Students
2011, 2009 Expand Your Horizons workshop volunteer

Computational Experience

Github: <https://github.com/juliambrosman>

Developed Software Packages:

- SAG-MG-Recruit: <https://github.com/BigelowLab/sag-mg-recruit>
- batch-virusCope: <https://github.com/BigelowLab/viruscope>

HPCC Computing:

- Bigelow Laboratory for Ocean Sciences HPCC; Linux CentOS
- Job scheduling with PBS-Pro, SLURM

NGS data experience:

- Single cell genomics, viral genomics
- Assembly workflow development, assembly curation
- Metagenomic read recruitment to single cell genomes
- Virus sequence identification within single cell genomes
- Comparative analyses of viral metagenomes

Computing experience:

- Languages: python (primary), R, bash, git, sqlite, XML
- Workflow management: snakemake
- Laboratory Information Management System “Basespace Clarity LIMS” (Illumina): workflow development, scripting and maintenance
- Data Science Tools: conda, Jupyter Notebook, Cytoscape, networkx, scipy, RStudio
- Other Software: Adobe Illustrator
- Operating Systems: Linux CentOS, MacOS

Laboratory Training, Research and Field Experience

2018	Field collection of marine sponges and tunicates in West Boothbay Harbor, ME
2011-2014	Field sample collection at Green Lakes State Park, Fayetteville, NY for Dissertation Research
2011	Summer Course in Microbial Oceanography at University of Hawaii Center for Microbial Oceanography: Research and Education (C-MORE)
2010	Bermuda Institute of Ocean Sciences (BIOS) Summer Course in Microbial Oceanography
2010	Research Expedition in the Eastern Tropical South Pacific on the R/V Atlantis; Chief Scientist: Dr. Doug Capone
2009, 2010	Summer Field Research at Shoals Marine Lab, Appledore Island, Gulf of Maine
2008-2009	Graduate rotation projects: <i>Exploring the Metabolic Potential of <u>Dehalococcoides ethenogenes</u> and Characterizing Transcription of Reductively Dehalogenating Enzymes of <u>Dehalococcoides ethenogenes</u></i> ; Advised by Dr. Ruth Richardson and Dr. Stephen Zinder
2007	Student research project aboard the SSV Seamans with SEA Semester: <i>The Virus to Bacteria Ratio in Changing Nutrient Environments of the Eastern Tropical Pacific</i> ; Advised by Chief Scientist Dr. Kara Lavendar Law
2007	Carleton College Chemistry Department undergraduate research assistant; <i>Development of ³²P assays to Characterize tRNA Structure and tRNA Synthetase Activity</i> ; Advised by Dr. Joe Chihade
2006	Department of Environmental Engineering undergraduate research assistant at Manhattan College: <i>Toxicity of As(V) on Estuarine Sediment Amphipods</i> ; Advised by Dr. John Mahoney and Dr. Michael Judge