



E. Maggie Sogin

Curriculum Vitae

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Dr. (Emilia) Maggie Sogin
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RESEARCH BACKGROUND

ECOLOGY AND THE ENVIRONMENT

Investigate the effect of the environment on host-microbial interactions using metabolomics, metagenomics and metatranscriptomics approaches coupled to experimental manipulations

MICROBIOME INTERACTIONS

Integrate metabolic data and incubation studies to determine microbial function

EDUCATION & PROFESSIONAL EXPERIENCE

- Since* 01/2020 **Project Leader**, Department of Symbiosis, Max Planck Institute for Marine Microbiology, Bremen, DE
- Leadership role in Department including student mentorship and lead on major departmental project
- Since* 05/2019 **MarMic Faculty**, Max Planck Research School for Marine Microbiology, Bremen, DE
- Mentorship of Bachelors, Masters and PhD students
 - Developing and teaching graduate course materials, workshops, guest lectures
- 01/2016 to 12/2019 **Post-doctoral Scientist**, Department of Symbiosis, Max Planck Institute for Marine Microbiology, Bremen, DE
- Analytical methods for marine metabolomics
 - Coastal sediment biogeochemistry
 - Mass spectrometry imaging of symbiotic associations
 - Metagenomic and metatranscriptomics of marine rhizospheres
 - Integrative exploratory analysis in 'omics research
- 04/2015 to 12/2015 **Post-doctoral Associate**, Hawaii Institute of Marine Biology, Kaneohe, HI
- Preparation of tag sequencing libraries for Illumina sequencing
- 04/2015 **PhD. University of Hawaii, Manoa, HI**
- Department of Zoology & Hawaii Institute of Marine Biology
Advisor: Dr. Ruth D. Gates
Thesis title: A metabolomic investigation in reef building corals: development and utility of metabolite profiling tools

- 08/2014 **Research Assistant**, Center for Microbial Oceanography, Research and Education,
to University of Hawaii, Manoa, HI
- 04/2015
- Preparation of tag sequencing libraries for Illumina sequencing
 - Integration of metabolomics and tag sequencing data
- 2011 **Hawaii EPSCoR Graduate Fellow**, Hawaii Institute of Marine Biology, Kaneohe, HI
- to
- Developed metabolomic tools for reef-building corals
- 2014
- Performed field and laboratory experiments
- 2009 **Teaching Assistant**, University of Hawaii, Manoa, HI
- to
- Responsible for teaching undergraduate laboratories
- 2011
- 05/2009 **ScB, Honors, Brown University, Providence, RI**
Marine Biology, Department of Ecology and Evolutionary Biology
Advisors: Mark Bertness, Anne Cohen (Woods Hole Oceanographic Institute)
Thesis title: The impacts of ocean acidification on the development of the larval shell
of the New England Bay Scallop (*Argopecten irradians*)
- 2008 **Three Seas Program, Northeastern University, Boston, MA**
- Trained in field and laboratory techniques for marine ecologists
 - AAUS Scientific certification

PUBLICATIONS

Coauthors: ** Undergraduate student ; * Graduate student

[google scholar](#)

9. **Sogin EM**, Puskas E**, Dubilier N, Liebeke M. (2019a) Marine metabolomics: a method for the non-targeted measurement of metabolites in seawater by gas-chromatography mass spectrometry. **mSystems**. <https://doi.org/10.1128/mSystems.00638-19>*

**Article was selected as the Editors' Pick*

Role: I developed a new method for describing metabolite composition in seawater samples using GC-MS techniques that until now were unavailable for seawater samples.

8. Geier B*, **Sogin EM**, Janda M*, Kompauer M, Michellod D*, Dubilier N, Liebeke M. (2019) Spatial metabolomics of in situ, host-microbe interactions. **Nature Microbiology**, <https://doi.org/10.1101/555045>

***Accepted at Nature Microbiology, will be available online February 3, 2020**

Role: I developed the bioinformatic pipeline needed to combine mass spectrometry imaging data with fluorescence in situ microscopy data that is the foundation of metaFISH.

7. Wilkins LGE, Leray M, Yuen B, Peixoto R, Pereira TJ, Bink HM, Coil DA, Duffy JE, Herre EA, Lessios H, Lucey N, Mejia LC, O'Dea A, Rasher DB, Sharp K, **Sogin EM**, Thacker RW, Vega Thurber R, Wcislo WT, Wilbanks EG, Eisen JA. (2019) Host-associated microbiomes and their roles in marine ecosystem functions. **PloS Biology**. doi: [10.1371/journal.pbio.3000533](https://doi.org/10.1371/journal.pbio.3000533)

6. **Sogin EM**, Putnam HM, Nelson CE, Anderson P, Gates RD (2017). Interspecific congruency of the coral holobiont metabolome with symbiotic bacteria, archaea and *Symbiodinium* communities. ***Environmental Microbiology Reports***. doi: [10.1111/1758-2229.12541](https://doi.org/10.1111/1758-2229.12541)
This work involved integrating microbial community data with metabolomics results using a correlative analytical approach.
5. **Sogin EM**, Putnam HM, Anderson P, Gates RD (2016). Metabolomic signatures of increases in temperature and ocean acidification from the reef-building coral, *Pocillopora damicornis*. ***Metabolomics***. doi: [10.1007/11306-016-0987-8](https://doi.org/10.1007/11306-016-0987-8)
This work involved integrating metabolomics data with physiological metrics of coral health.
4. Claar CD, Fabina NS, Putnam HM, Cunnning R, **Sogin EM**, Baum JK, and Gates RD (2015). Embracing complexity in coral-algal symbiosis. ***Algal Symbioses***. (Book Chapter)
3. **Sogin EM**, Anderson P, Williams P, Chen CS, Gates RD (2014). Application of ¹H-NMR metabolomic profiling for reef-building corals. ***PLoS One***: doi: [10.1371/journal.pone.0111274](https://doi.org/10.1371/journal.pone.0111274)
2. Yost DM, Wang LH, Fan TY, Chen CS, Lee RW, **Sogin EM** and Gates RD (2013). Diversity in skeletal architecture influences biological heterogeneity and *Symbiodinium* habitat in corals. ***Zoology*** 116(5): 262-269
1. Allen JJ, Mäthger LM, Barbosa A, Buresch KC, **Sogin E**, et. al. (2010) Cuttlefish dynamic camouflage: responses to substrate choice and integration of multiple visual cues. ***Proceedings of the Royal Society: Biological Sciences*** 1684:1031-1039

-Pre-prints in preparation for submission-

Sogin EM, Michellod D*, Gruber-Vodicka H, Bourceau P*, Geier B, Meier D*, Seidel M, Hach PF*, Procaccini G, Dubilier N, Liebeke M. (2019b) Seagrasses excrete sugars to their rhizosphere making them the sweet spots in the sea. ***bioRxiv***, <https://doi.org/10.1101/797522>

Role: I am leading a collaborative team of researchers to define the biogeochemistry and microbial communities of seagrass rhizospheres.

Submission pending addition of metatranscriptomics data currently missing in bioRxiv preprint

[Link to outreach article describing our study system](#)

AWARDS

Sign up! Career building workshop for excellent post-docs part of the MPG (2019) (5000 €)

Tom Brock Award for Most Innovative Research by an Early Career Scientist, International Society for Microbial Ecology Symposium, Leipzig, DE (2018)(1000 €) [press release](#)

Best Digital Poster Prize, Hawaii EPSCoR (2013) (\$2000)

Mai Tegner Award, Best paper in applied ecology, Western society of Naturalists, Vancouver, WA (2011)

FELLOWSHIPS

Sogin EM (PI) (2011-2014) University of Hawaii EPSCoR ECOGEM Fellow (\$77,000)

Sogin EM (PI) (2014) University of Hawaii Dai Ho Chun Fellowship (\$1500)

Sogin EM (PI) (2012) NPS George Melendez Wright Climate Change Fellowship (\$19,962)

Sogin EM (PI) (2011) NSF East Asian and Pacific Island Summer Institute Fellow (\$8,100)

GRANTS RECIEVED

Eisen J (PI), Stachowicz J (CO-PI), **Sogin EM (CO-PI)**. (2020–2022) *Zostera marina* as a model systems for marine symbioses, Gordon and Betty Moore Foundation (\$300,000)

Sogin EM (PI). (2014) Graduate student organization travel grant (\$450)

Sogin EM (PI). (2012) Marine Technological Society Graduate Funding (\$2000)

Sogin EM (PI). (2011) Graduate student organization travel grant (\$1600)

Sogin EM (PI). (2011) Graduate student organization travel grant (\$400)

Sogin EM (PI). (2011) Graduate student organization travel grant (\$688)

Sogin EM (PI). (2010) Edmonson Foundation Grant in Aid of Research (\$750)

STUDENT MENTORSHIP

09/2018 - current	Caroline Zeidler, Masters and PhD Student Thesis: <i>Bioplastic-eating animals: PHA-degrading enzymes in a chemosymbiotic worm</i>
03/2019	Miriam Sternel, Bachelors Student Thesis: <i>Exocellular metabolomics of three spring blooms in the North Sea</i> Currently a Masters student at the University of Oldenburg
2017	David Benito, MarMic Student <i>Lab rotation, Mass spectrometry imaging of gutless oligochaetes</i> Currently a PhD student at the Max Planck Institute for Marine Microbiology
2017	Matthew Schechter, MarMic Student Lab rotation, Integrating metagenomics and metabolomics data from a deep-sea mussel Currently a PhD student at the University of Chicago
2015	Jennifer Pendleton, High School Student St Joseph's Academy for girls, St. Louis MO Virtual mentorship
2014	Rene Francolini, Undergraduate Student Carnegie Mellon University Currently a researcher at Woods Hole Oceanographic Institute
2013	Laura Michenfelder, High School Student St Joseph's Academy for girls, St. Louis MO Virtual mentorship

- 2013 **Kelly Anderson**, Marine Science Coordinator
 Coordinator for American Samoa Community College
**I mentored Kelly in laboratory techniques so she could share them with her students in American Samoa*
- 2012 **Daniel K. Jennings-Kam**, Undergraduate student
 Native Hawaiian student at University of Hawaii at Hilo

TEACHING EXPERIENCE

- 2020 **Symbiosis Practical Laboratory: Metabolomics**
 Max Planck Institute for Marine Microbiology
 Masters students
Co-developed & taught course material for a practical laboratory for MarMic masters students
- 2018-2020 **Making plots with ggplot2**
 Max Planck Institute for Marine Microbiology
 Masters and PhD student workshop
Developed and taught course material for making publication quality figures in R
- 2014 **Omics Data workshop**
 Hawaii Institute for Marine Biology
 Masters and PhD student workshop (3-days)
Co-developed and taught course material for multivariate data analysis in R
- 2014 **Principles of Genetics Laboratory**
 University of Hawaii at Manoa
 Undergraduate laboratory course
 Lead laboratory course for Biology majors in Genetics
- 2010 **Zoology for Non-majors, writing intensive**
 University of Hawaii at Manoa
 Undergraduate laboratory course for non-majors
 Head teaching assistant for non-major course; responsible for organizing and teaching other graduate assistants course material; responsible for teaching writing intensive section
- 2009-2010 **Zoology for Non-majors**
 University of Hawaii at Manoa
 Undergraduate laboratory course for non-majors
 Teaching assistant for non-major course
- 2009 **Principles of Ecology**
 Brown University
 Undergraduate upper division course in ecology
 Teaching assistant, lead discussion sections

COMMUNITY SERVICE & OUTREACH ACTIVITIES

- 2020 Co-editor for upcoming Special Frontiers Issue In Marine Science: Applying metabolomics to questions in marine ecology and ecophysiology
- 2020 Co-convenor for upcoming Early Career Scientist session at International Society for Microbial Ecology (ISME-18), Cape Town, South Africa
- 2020 Co-chair for upcoming symposium session at International Coral Reef Symposium (ICRS-14), Bremen, Germany
Theme 3- How do metabolic processes underpin the health and function of reef ecosystems?
- 2014, 2012 Volunteer, Testers Symposium, Honolulu, HI
- 2013 Public presentation, "Together forever, I can never escape you!", Nerd Night Honolulu, HI
- 2012 Volunteer, Center for Ocean of Science Education and Excellence (Ocean Exposition), Honolulu, HI
- 2012 Volunteer, Regional Science Fair Judge, Honolulu, HI
- 2010- 2011 Graduate Student Representative, University of Hawaii at Manoa, Zoology Department, Honolulu, HI

Invited Peer review for following journals:

ISME, Scientific Reports, Marine Chemistry, Coral Reefs, Comparative biochemistry and physiology, Metabolomics

AD Hoc reviewer for NSF: OCE-BIO (2017)

RECENT INVITED TALKS

- 2020 *Metabolites shape host-microbial interactions in the sea.* Invited speaker at UC Merced, California.
- 2019 *Seagrasses secrete sugars to their rhizospheres making them the sweet spots in the sea.* Invited speaker for the Isthmobiome Workshop, Bocas del Toro, Panama
- 2019 *Exploring the metabolite interface of host-microbe interactions in the sea.* Guest lecture for master's course Current trends in Ecology and Evolution at Universiteit van Amsterdam.
- 2018 *From a gutless worm to sweetening of the seas.* Invited seminar for the Department of Fundamental Microbiology, Université de Lausanne

SELECT PRESENTATIONS

† Oral Presentation; ‡Poster Presentation

† **Sogin EM**, Meier D, Gruber-Vodicka H, Seidel M, Michellod D, Hach PF, Dittmar T, Dubilier N, Liebeke M (2018). Sweetening the sea: sugars excreted by seagrass stimulate a marine rhizosphere. *17th International Symposium on Microbial Ecology*. Leipzig, Germany.

**Awarded Tom Brock Award for most innovative research by an early career scientist*

Sogin EM, Wippler J, Michellod D, Geier B, Dubilier N, Liebeke M (2017) Leveraging metabolomics to explore nutrient acquisition in a gutless marine worm. *GRC: Animal-Microbe Symbiosis*. Mount Snow, VT, USA

† **Sogin EM**, Putnam HM, Nelson CE, Anderson P, Gates RD (2016). Interspecific congruency of the coral holobiont metabolome with symbiotic bacteria, archaea and *Symbiodinium* communities. 13th *International Coral Reef Symposium*, Honolulu, HI, USA

† **Sogin EM**, Putnam H and Gates RD (2014) Variation in coral metabolite production after exposure to global climate change stressors is species specific. *Ocean Sciences Meeting*, Honolulu, HI, USA

Sogin EM, Anderson P, Williams P, Horgen FD and Gates RD (2013) Betaine expression links to coral performance. *EPSCoR State Wide Meeting*, Knoxville, TN, USA

† **Sogin EM** and RD Gates (2013) Linking coral holobiont communities to metabolite production. *Moorea Coral Reef Long Term Ecological Research All Investigators Meeting*, Santa Barbra, CA

† **Sogin EM**, Anderson PA, Chen T, Wang LH, Fan TY, Chen CSC, Horgen D, Gates RD (2012) Using metabolomics to investigate coral-*Symbiodinium* unions. 12th *International Coral Reef Symposium*, Cairns, Australia

WORKSHOPS

2019	Signup! Career Steps for Excellent Female Post-docs part of the Max Planck Society, Germany
12/2019	Invited Participant in Marine Animal-Microbiome workshop funded by The Gordon and Betty Moore Foundation, Bocas Del Toro, Panama
08/2019	Leadership workshop, Max Planck Institute, Bremen, Germany
12/2018	Invited Participant in Marine Animal-Microbiome workshop funded by The Gordon and Betty Moore Foundation, Bocas Del Toro, Panama
02/2014	Light and Photosynthesis, Universidad Nacional Autónoma de México, Puerto Morelos, Mexico (competitive selection)
06/2013	MBI-NIMBioS-CAMBAM summer graduate workshop on connecting biological data with mathematical models. Knoxville, TN, USA (competitive selection)

RESEARCH SKILLS

Acquired during my postdoc at the MPI-Bremen (2016 to present)

- Advanced experience in sample preparation for gas chromatography-mass spectrometry based metabolomics
- Advanced experience in the analysis of metagenomics and metatranscriptomics of marine sediments
- Advanced scripting experience and using the bash shell
- Advanced experience in matrix assisted laser desorption/ionization (MALDI)-mass spectrometry imaging, including cryo-sectioning, sample preparation and data analysis
- Data processing of large mass spectrometry datasets and comparison of isotope patterns in metabolite composition
- Performed manipulative isotope incubation studies
- Analysis of dissolved organic carbon measurements from sediment porewater profiles
- Exposure to histology methods
- Exposure to nanoSIMS techniques

Acquired during my PhD (2009-2015)

- Advanced data analysis and visualization techniques in R
- Analysis of small molecules using nuclear magnetic resonance and mass spectrometry techniques
- Performed DNA extractions, PCR amplifications and tag-sequence library preparation for next generation sequencing platforms
- Experience in manipulative experimental work with reef-building corals
- Exposure in measuring basic coral physiology parameters (photosynthetic yield, biomass, symbiont density, protein content)
- Experience in manuscript publication and project completion
- AAUS Scientific Diver Certification

FIELD EXPEDITIONS

- | | |
|------|--|
| 2016 | Hydra institute, Elba, Italy: Led multiple field expeditions (April, July, October) to Elba, Italy. Activities: collected porewater samples and seagrasses for metabolomics, collected gutless worms, performed sediment incubation experiments, collected sediments for metagenomics |
| 2014 | Gump Field Station, Moorea, French Polynesia: Led field expedition to collect corals for metabolomic and metagenomic analyses |
| 2013 | Kalaupapa National Park, Molokai, Hawaii: Led two field expeditions (March, July) to Molokai for the collection for corals for metabolomic analysis in collaboration with the National Park Service. <i>Kalaupapa is a remote sampling location off of Molokai requiring complex logistics for field research.</i> |

These represent a subset of field expeditions where I served as the main coordinator of research activities, including dive planning, sample collection, and logistics. My weekly research activities in Hawaii included small field excursions for sampling that are not listed here.

REFERENCES

Dr. Nicole Dubilier
Director, Head of the Symbiosis Department
Max Planck Institute for Marine Microbiology
Tel: +49 421 2028-932
Fax +49 421 2028-580
email: ndubilie@mpi-bremen.de
Current post-doc mentor

Dr. Jonathan Eisen
Professor, University of California Davis
Adjunct Scientist, DOE Joint Genome Institute
Tel: +1 530-752-3498
email: jaeisen@ucdavis.edu
External mentor and collaborator

Dr. Hollie Putnam
Assistant Professor
Department of Biological Sciences
University of Rhode Island
Tel: +1 401-874-9510
email: hputnam@uri.edu
Mentor during my time in Dr. Ruth Gates' Lab