

# SHEILA A. KITCHEN, Ph.D.

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## CURRENT POSITION

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2016-Present Postdoctoral Researcher, Pennsylvania State University  
Advisor: Dr. Iliana Baums

## EDUCATION

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- 2010-2016 Ph.D. Zoology, Oregon State University  
Advisor: Dr. Virginia Weis
- 2008-2010 M.S. Marine Biology, UNC Wilmington  
Advisor: Dr. Alison Taylor
- 2004-2007 B.S. Marine Biology with Honors, UNC Wilmington  
Honors Advisor: Dr. Richard Satterlie

## PROFESSIONAL EXPERIENCES

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### Postdoctoral Researcher, Pennsylvania State University, University Park, PA

Laboratory skills include microsatellite genotyping, RFLP assay for species-specific markers, 2bRAD sequencing, SNP array construction, and Caribbean Acroporid spawning and larval rearing.  
Computational skills include hybrid genome assembly (Illumina and PacBio) and annotation, shallow genome SNP analysis, linkage map construction, and development of SQLite Acropora SNP database and Science Gateway integrated into a Galaxy platform.

### Japan Collaborations, University of Ryukyus and Okinawa Institute of Science and Technology

Over two summers (2013-2014), I developed a collaborative project with Drs. Saki Harii, Noriyuki Satoh and Chuya Shinzato. During this project, I worked with coral larvae measuring survival, symbiont colonization, symbiont density, and global transcriptional patterns using RNASeq. Bioinformatic tools were used to analyze the RNASeq data. Additionally, I analyzed RNASeq data from a previous colonization experiment on symbiont specificity.

### Research Assistant, Department of Integrative Biology, Oregon State University, Corvallis, OR

Laboratory skills obtained include algal cell culturing, RNA extraction, development of a protocol for quantitative PCR, protein extraction and immunohistochemistry, lipid extraction, *in situ* hybridization, library preparation for transcriptome and RNASeq experiments, cell maceration techniques and live-cell imaging with confocal microscopy.  
Computational skills include using “R” statistical package, bash and Perl scripting, comparative transcriptome analysis tools, differential gene expression tools for RNASeq data and phylogenomic analyses.

### Research Assistant, Department of Biology, UNC Wilmington, Wilmington, NC

Laboratory skills include algal culturing, live-cell imaging using confocal microscopy, electrophysiology techniques on unicellular protists, PCR amplification, basic molecular sequence analysis and phylogenetic tree construction.

### Honors Thesis, Department of Biology, UNC Wilmington, Wilmington, NC

Laboratory skills include microtome sectioning of paraffin embedded tissue and light microscopy.

### Lab assistant, Department of Biology, UNC Wilmington, Wilmington, NC

Prepared reagents and table set up for introductory biology labs. Calibrated spectrophotometers and other equipment.

## PUBLICATIONS

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Co-first authors #; Mentored graduate student \* or undergraduate student ^

### A. Published Manuscripts

7. **Kitchen**, S.A., A.J. Bourdelais, and A.R. Taylor. (*in review*) Interaction of a dinoflagellate neurotoxin with voltage-activated ion channels in a marine diatom. *PeerJ*.
6. Kramer, B., A.J. Bourdelais, S.A. **Kitchen**, and A.R. Taylor. (*in review*) Uptake and localization of fluorescently-labeled *Karenia brevis* metabolites in marine microbial taxa. *Journal of Phycology*.
5. **Kitchen**, S.A., A.Z. Poole, and V.M. Weis. (*accepted*) Sphingolipid metabolism of a sea anemone is altered by the presence of dinoflagellate symbionts. *The Biological Bulletin*.
4. Sproles\*, A.E., N.L. Kirk, S.A. **Kitchen**, C.A. Oakley, A.R. Grossman, V.M. Weis, and S.K. Davy. (2017) Phylogenetic characterization of transporter proteins in the cnidarian-dinoflagellate symbiosis. *Molecular Phylogenetics and Evolution*.  
<https://doi.org/10.1016/j.ympev.2017.12.007>
3. **Kitchen**, S.A. and V.M. Weis. (2017) The sphingosine rheostat is involved in the cnidarian heat stress response but not necessarily in bleaching. *Journal of Experimental Biology* 220: 1709-1720.
2. Poole, A.Z., S.A. **Kitchen**, and V.M. Weis. (2016) The role of complement in cnidarian-dinoflagellate symbiosis and immune challenge in the sea anemone *Aiptasia pallida*. *Frontiers in Microbiology*, 7: 519.
1. **Kitchen** S.A., C.M. Crowder, A.Z. Poole, V.M. Weis, and E. Meyer. (2015) *De novo* assembly and characterization of four Anthozoan (phylum Cnidaria) transcriptomes. *G3: Genes/Genomes/Genetics*, 5(11): 2441-2452.

### B. Papers in Preparation

4. **Kitchen**, S.A., G. Von Kuster, K. Stankiewicz\*, W. Miller, and I.B. Baums (*in preparation*) Standardized single nucleotide variant markers to distinguish genotypes, populations, and species of endangered Caribbean *Acropora* corals.
3. **Kitchen**, S.A., M.K. Devlin-Durante, E. Meyer, H.G. Reich\*, K. Stankiewicz\*, A.N. Chan, S.A. Vohsen, N.D. Fogarty, W. Miller, and I.B. Baums (*in preparation*) Genome-wide analysis of introgression and speciation in Caribbean Acroporids.
2. Ratan A.#, S.A. **Kitchen**#, O.C. Bedoya-Renia, R. Burhans, N.D. Fogarty, W. Miller, and I.B. Baums (*in preparation*) A computer resource for analyzing genomic variants among threatened *Acropora* corals. *Molecular Ecology Resources*.
1. **Kitchen**, S.A., D. Jiang, S. Harii, N. Satoh, V.M. Weis, N. Satoh and C. Shinzato. (*in preparation*) Transcriptional differences in coral larvae during the onset of symbiosis and elevated temperature. *Nature Communications*.

### C. Large-scale Sequence Submissions

2. **Kitchen**, S.A., C.M. Crowder, A.Z. Poole, V.M. Weis and E. Meyer. (2015) Anthozoan transcriptome project (accession numbers NCBI SRA: SRP063463, and DRYAD digital repository, doi:10.5061/dryad.3f08f)
1. Hersh, A.R., ... **Kitchen**, S.A., et al. (2012) Illumina sequencing of *Mycobacterium* phage Tiger complete genome with 300x coverage (accession number NCBI: JQ684677)

#### D. Media Coverage

2015 Print: "Lab Studies Coral, Anemones", The Daily Barometer, OSU

2010 Print: "*Tiny but deadly: Karenia brevis' method for poisoning*", Re:Search, a Journal of Intellectual Inquiry, UNCW

#### INVITED SEMINARS

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- 2015 Penn State; "Determinants and consequences of cnidarian-dinoflagellate symbiosis in a changing world through a host-centric lens"
- 2015 Northeastern University; "Determinants and consequences of cnidarian-dinoflagellate symbiosis in a changing world through a host-centric lens"
- 2013 Tropical Biosphere Research Center at the University of Ryukyus; "NSF EAPSI Summer Program: Impacts of Hyperthermal Stress on Coral Larvae Undergoing Symbiont Colonization"

#### PUBLISHED ABSTRACTS AND ORAL PRESENTATIONS

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Mentored graduate student \* or undergraduate student ^

9. **Kitchen**, S.A., A. Ratan, W. Miller, and I.B. Baums (2018) Genome synteny, divergence and introgression between Caribbean Acroporids. *Society for Integrative and Comparative Biology final program and abstracts, January 3-7.*
8. **Kitchen**, S.A., M.K. Devlin-Durante, R.S. Harris, A. Ratan, N.D. Fogarty, W. Miller, and I.B. Baums. (2017) Genomic evidence of complex hybridization in Caribbean acroporids. *Society for Integrative and Comparative Biology final program and abstracts, January 4-8.*
7. **Kitchen**, S.A., D. Jiang, S. Harii, N. Satoh, V.M. Weis, and C. Shinzato. (2016) Hyperthermal stress alters transcriptomic response of coral larvae at the onset of symbiosis. *13<sup>th</sup> International Coral Reef Symposium, Hawaii, USA, June 19-24.*
6. Baums, I.B., M.K. Devlin-Durante, N.D. Fogarty, and S.A. **Kitchen**. (2016) Genetic data indicates that hybridization between Caribbean elkhorn and staghorn corals is a likely mechanism for rapid adaptation. *13<sup>th</sup> International Coral Reef Symposium, Cairns, Australia, June 19-24.*
5. Sproles\*, A.E., N.L. Kirk, S.A. **Kitchen**, C.A. Oakley, V.M. Weis, A.R. Grossman, and S.K. Davy. (2016) Phylogenetic analysis of nutrient transporters in the cnidarian-dinoflagellate symbiosis. *13<sup>th</sup> International Coral Reef Symposium, Cairns, Australia, June 19-24.*
4. **Kitchen**, S.A., A.Z. Poole, and V.M. Weis. (2016) Modulation of cnidarian sphingosine rheostat during symbiosis onset and breakdown. *Society for Integrative and Comparative Biology final program and abstracts, January 3-7.*
3. **Kitchen**, S.A., C. Shinzato, S. Harii, N. Satoh, and V.M. Weis. (2015) Consequence of hyperthermal stress on larvae undergoing symbiont colonization. *Integrative and Comparative Biology*, 55: E97.

2. **Kitchen**, S.A. and V.M. Weis. (2012) Impacts of thermal stress on sphingolipid metabolism in *Aiptasia pallida*. *12<sup>th</sup> International Coral Reef Symposium, Cairns, Australia, July 9-13.*
1. **Kitchen**, S.A. and A.R. Taylor. (2011) Brevetoxin interaction with voltage-activated ionic currents of a marine diatom. *Journal of Phycology*, 47: S26.

## **POSTER PRESENTATIONS**

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Mentored graduate student \* or undergraduate student ^

8. **Kitchen**, S.A., G. Von Kuster, S.B. Piorkowski^, W. Miller and I.B. Baums (2018) STAG: Standard Tools for Acroporid Genotyping. *Society for Integrative and Comparative Biology final program and abstracts, January 3-7.*
7. **Kitchen**, S.A., A.Z. Poole, and V.M. Weis. (2015) Sphingolipids in cnidarian-dinoflagellate interactions: investigating the role of the sphingosine rheostat during symbiont colonization. *The 8<sup>th</sup> Congress of the International Symbiosis Society at University of Lisbon, Lisbon, Portugal. July 12-18.*
6. **Kitchen**, S.A., C. Shinzato, S.Harii, N. Satoh, and V.M. Weis. (2014) Consequence of hyperthermal stress on larvae undergoing symbiont colonization. *5<sup>th</sup> Multidisciplinary Science Forum of the US Japan Society of Promotion of Science Fellows Alumni Association, Gainesville, FL. November 7-8.*
5. **Kitchen**, S.A., A.Z. Poole, C.M. Crowder, V.M. Weis, and E. Meyer. (2014) *De novo* assembly and characterization of four Anthozoan transcriptomes. *Center for Genome Research and Biocomputing Fall Conference, Oregon State University, Corvallis, OR. September 12.*
4. **Kitchen**, S.A., C.W. Paxton, A.Z. Poole, C.M. Crowder, J.J. McGraw^, B. Haslam, J. Flesher^ and V.M. Weis. (2011) The study of cnidarian-dinoflagellate symbiosis at OSU. *Center for Genome Research and Biocomputing Fall Conference, Oregon State University, Corvallis, OR. September 18-19.*
3. Echevarria M, S.A. **Kitchen**, and A.R. Taylor. (2011) Experimental strategies for investigating membrane excitability, calcium signaling and cellular homeostasis in Chromalveolates. *Journal of Phycology*, 47: S80.
2. **Kitchen**, S.A., A.J. Bourdelais, C. Tomas, and A.R. Taylor. An electrophysiological investigation of *Karenia brevis*. (2009) *1<sup>st</sup> North America Section Meeting. The International Society of Protistologist, Bristol, Rhode Island. June 11-13.*
1. Taylor A.R., F. Verret, D.C. Schroeder, S.A. **Kitchen**, and C. Brownlee. (2008) Evolution of the action potential. *Marine Biotechnology Workshop. North Carolina Biotechnology Center, Wilmington, NC.*

## **GRANTS, FELLOWSHIPS & AWARDS**

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### **Grants and Fellowships:**

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| \$6,225  | Dovetail Genomics EOY Matching Funds Grant, 2017  |
| \$70,392 | NOAA Domestic Coral Reef Conservation Grant Program. "Building a genetic and bioinformatic analysis pipeline for genotyping of Caribbean corals and their symbionts", Co-PI with I.B. Baums, funded 2017-2019 |
| \$3,610  | PADI Foundation Grant, 2014   |
| \$500    | SIGMA XI Grants in Aid of Research, 2014  |

\$11,000 NSF East Asia and Pacific Summer Institutes (EAPSI, OISE #1311087)/ Japanese Society for Promotion of Science (SP #13027) - Japan, 2013

#### **Awards:**

\$200 Travel Award from the Office of Postdoctoral Affairs, Penn State, 2016  
\$1,950 Oregon State University Libraries & Press Open Access Fund, 2015  
\$400 ZoRF Funds from the Dept. of Integrative Biology at OSU, 2015  
\$250 College of Science Student Travel Award at OSU, 2014  
- SICB Charlotte Mangum Student Support Program, Housing, 2014  
\$400 ZoRF Funds from the Dept. of Integrative Biology at OSU, 2014  
\$400 ZoRF Funds from the Dept. of Integrative Biology at OSU, 2013  
\$400 College of Science Student Travel Award at OSU, 2012  
\$400 ZoRF Funds from the Dept. of Integrative Biology at OSU, 2012  
\$900 ZoRF Funds from the Dept. of Integrative Biology at OSU, 2011  
\$300 Poster presentation at International Society of Protistologist conference received Third Place Honors, 2009  
\$7,800 UNCW Merit Scholarship, 2005-2007

#### **TEACHING EXPERIENCE**

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##### **Undergraduate Guest Lectures**

2017 **Coastal Biology, Penn State** – lecture on benthic life habits

##### **Teaching Assistant, Department of Integrative Biology, Oregon State University, Corvallis, OR**

2016 **Data analysis for the Human Anatomy and Introductory Biology series, 1 quarter**  
Pre- and post-survey data was collected from undergraduate for attitudes about learning science, science identity, attitudes about in-class activities, and learning assistance. The goals of the program were to improve student learning and learning experiences in undergraduate STEM courses. I analyzed the data and drafted the report.

2015 **Symbiosis in the Environment (Bi 358), 1 quarter**  
Lecture class on beneficial symbioses in the environment. I presented half the lectures, developed group activities, prepared quizzes and test material.

2015 **Human Anatomy and Physiology Laboratory, (Bi 343), 2 quarters**  
Present lectures, prepare quizzes, engage critical thinking skills on circulatory, respiratory, urinary, and digestive systems  
Mentor teaching intern: James Bonar (2015)

2012-  
2015 **Human Anatomy and Physiology Laboratory (Bi 341), 5 quarters**  
Present lectures, prepare quizzes, and engage critical thinking skills on bones and muscles  
Mentor teaching interns: Nathan Hanson (2012), Hannah Niestradt (2012), Charles Braugh (2013), Brooke Mischkot (2014), Miguel Garcia (2014), Matt W (2015), Danielle H (2015) Austin C (2015), Erik G (2015)

2012-  
2014 **Human Anatomy and Physiology Laboratory, (Bi 342), 3 quarters**  
Present lectures, prepare quizzes, and engage critical thinking skills on nervous, reproductive and endocrine systems  
Mentor teaching intern: Emily Monroe (2014)

2011-  
2014 **Invertebrate Zoology Laboratory (Z 362), 4 quarters**  
Present lectures, prepare labs, quizzes and exams, and coordinate field trips  
Mentor teaching intern: Emily Nicholson (2011), Ediyana Daniel (2012), Jamie Jo McGraw (2013), Maria Lorenz (2014), Jocelyn Powell (2014)

- 2013 **Curriculum design for Invertebrate Zoology Laboratory Manual, 1 quarter**  
Co-wrote and redesigned 10 laboratory to incorporate active learning exercises broadly covering animal physiology and behavior, ecology, evolution and molecular biology using key invertebrate model organisms throughout the course. In 2014, we received OSU Institutional Review Board (#6225) approval to collect data from our students that will be used to publish selected labs.
- 2011 **Principles of Biology Laboratory (Bi 212), 1 quarter**  
Present lectures, prepare quizzes, and lead online discussion boards on origins of life, energy transformation, plant and animal diversity
- 2010 **Principles of Biology Laboratory (Bi 211), 1 quarter**  
Present lectures, prepare quizzes, and lead online discussion boards on cell biology, organ systems, plant and animal physiology

**Teaching Assistant, Department of Biology, UNC Wilmington, Wilmington, NC**

- 2008- **Principles of Biology: Cell Laboratory (Bio 201), 2 semesters**  
2009 Present lectures and prepare quizzes on cellular and molecular basis of life and the transmission of genetic information

**Marine Science Instructor, Marine Quest, UNC Wilmington, Wilmington, NC**

- 2007- **Ocean Lab lead instructor, 3 summers**  
2010 Developed curriculum for middle school aged children (13-14yrs) in weeklong programs centered on physical, chemical, and biological oceanography topics. Activities in marsh plant ecology, fish identification and anatomy, operate ROV, snorkeling transect analysis, and participating in Phytoplankton Monitoring Network. In addition, emphasis was given to applicable marine science careers from both academia as well as technicians. Required certifications in kayak safety.  
[http://uncw.edu/marinequest/ocean\\_lab.html](http://uncw.edu/marinequest/ocean_lab.html)

**PROFESSIONAL DEVELOPMENT AND TRAINING**

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- 2017 **Preparing Your Teaching Philosophy Statement**, Pennsylvania State University  
2017 **Global Biodiversity Genomics Conference**, Smithsonian National Museum of Natural History  
2016 **How to be Your Own Best Mentor**, Pennsylvania State University  
2016 **Broader Impacts Workshop**, Pennsylvania State University  
2014 **Structuring Classrooms for Engaged and Active Learning**, Oregon State University  
2014 **Center for Genome Research and Biocomputing Fall Conference**, Oregon State University  
2011 **Center for Genome Research and Biocomputing Fall Conference**, Oregon State University  
2011 **Seeing is Believing: Advances in Live Imaging in Optogenetics**, University of Oregon  
2010 **Center for Genome Research and Biocomputing Fall Conference**. Oregon State University

**OUTREACH, SERVICE AND MENTORING**

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**Professional:**

- 2017 **Caribbean Coral Restoration Genetics Working Group**, NOAA  
2016 **Co-chair Symbiosis Session**, SICB

**Department and University:**

- 2017 **Postdoc Committee of the PSU Microbiome Center**, organize seminar series at PSU  
2017 **NSF Includes USVI Summer Program**, taught visiting students for two weeks at PSU  
2016-2017 **Symbiosis Reading Group**, founder of multi-department monthly reading group at PSU  
2015 **OSU Molecular and Cellular Biology Discussion Panel Member**

2014            **Fundraising committee**, Dept. of Integrative Biology  
2012-2013      **Biology Graduate Student Symposium**, Food Fundraising and Service  
2011-2012      **Biology Graduate Student Symposium**, Fundraising and Publicity Rep.

**Community:**

2017            **WPSU Eventapalooza**, coral activities designed for 4-7 year old children at PSU  
2016            **ECOGIG Ocean Discovery Zone**, volunteer for Penn State outreach event  
2013            **Winter Wonderings**, classroom activities for 3<sup>rd</sup> -4<sup>th</sup> graders  
2009            **Blue Heron Bowl**, volunteer the National Ocean Sciences Bowl

**Graduate Students Mentored:**

2017-2018      Kathryn Stankiewicz- Pennsylvania State University  
2017-2018      Kate Kuntz- Pennsylvania State University  
2016-2018      Hannah Reich- Pennsylvania State University  
2015            Jeremy Berthelieir- Aix Marseille University, France  
2015            Ashely Sproles- Victoria University of Wellington, New Zealand

**Undergraduates Mentored:**

2017            Sam Piorkowski, Pennsylvania State University  
2016-2017      Macklin Elder, Pennsylvania State University  
2014-2015      Kristin Brandon, Oregon State University  
2012-2013      Jessica Flesher, Oregon State University  
2011-2012      Ariana Meltvedt, Oregon State University  
2011            Jamie Jo McGraw, Oregon State University  
2011            Sam Kelly-Quattrocchi, Oregon State University

**Society memberships:** International Society for Reef Studies (2015-2017), International Symbiosis Society (2015-2018), Society for Integrative and Comparative Biology (2014-2018), Sigma Xi (2010/2014), The International Society of Protistologists (2009-2011)

**Associate Editor for:** *Coevolution section in Frontiers in Ecology and Evolution*

**Peer Review for:** *Biological Bulletin, BMC Genomics, GigaScience, Coral Reefs, Journal of Experimental Marine Biology and Ecology*

**PROFESSIONAL CERTIFICATIONS**

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2016            NAUI Diver (nitrox, rescue and advanced)  
2016            First Aid and CPR  
2015            Blood Borne Pathogen Training, OSU  
2013            Sea Safety & Survival Training Class, OSU  
2009            SDI Scuba Certification (open water)  
2008            UNCW Environmental Health and Safety Training  
2008            Formaldehyde Training, UNCW

**ACADEMIC ADVISORS**

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Dr. Iliana Baums, Postdoctoral advisor, Department of Biology, Pennsylvania State University, University Park, PA 16802

Dr. Virginia M. Weis, Ph.D. advisor, Department of Integrative Biology, Oregon State University, Corvallis, OR 97331

Dr. Alison R. Taylor, M.S. advisor, Department of Biology and Marine Biology, University of North Carolina, Wilmington, NC 28403

#### **PROFESSIONAL REFERENCES**

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1. **Dr. Iliana Baums**, phone: 814-867-0492, email: baums@psu.edu
2. **Dr. Virginia Weis**, phone: 541-737-4359, email: weisv@science.oregonstate.edu
3. **Dr. Eli Meyer**, phone: 541-737-3751, email: eli.meyer@science.oregonstate.edu
4. **Dr. Chuya Shinzato**, email: c.shinzato@oist.jp
5. **Dr. Alison Taylor**, phone: 910-962-2176 , email: taylor@uncw.edu