Justin Baumann

School Address:
Department of Marine Sciences
University of North Carolina at Chapel Hill
3202 Venable Murray Hall, CB 3300
Chapel Hill, NC 27599

Permanent Address:
216 Lakeshore Drive West
Hebron, Ohio 43025
(513) 307-1516
baumannj@live.unc.edu

Education

2013-Present **The University of North Carolina at Chapel Hill**, Chapel Hill, North Carolina
Degree Sought: PhD Marine Sciences
Department: Department of Marine Sciences
Advisor: Karl Castillo
Dissertation: Characterizing coral community response to climate change on the Belize Barrier Reef System using thermal history and holobiont physiology.
Projected graduation: Spring 2018

2011-2013 **The Ohio State University**, Columbus, Ohio
Masters of Science
Department: School of Earth Sciences
Advisor: Andréa Grottoli
Thesis: The effects of elevated temperature stress on the acquisition and allocation of carbon in Hawaiian coral lipids.

2007-2011 **The Ohio State University**, Columbus, Ohio
Major(s): Biology (Bachelor of Science) Earth Sciences (Bachelor of Science)
Cum Laude
With Research Distinction in Geological Sciences
Cumulative GPA: 3.532
Honors Thesis: The effects of single and repeat bleaching on photosynthesis, respiration, and feeding in three species of Caribbean coral

GRE Scores: Verbal: 560 (78%), Quantitative: 750 (82%), Analytical: 4.5 (67%)

2004-2007 **Lakota West High School**, West Chester, Ohio
Honors Diploma

Honors and Awards

2015 **The Rufford Foundation, Second Rufford Small Grant:** a continuation grant of £5000 awarded for field research characterizing coral reef community response to climate change in Belize.

2014 **GPSF Travel Award:** $800 awarded for travel to the Benthic Ecology Meeting in Quebec City, Canada.

2014-2017	**Department of Defense National Defense Science and Engineering Graduate Fellowship (NDSEG):** Three year stipend, tuition, student fees, and health care awarded for academic merit and proposed research on coral resilience in Belize.
2014	**The Rufford Foundation, Rufford Small Grant:** £5000 awarded for field research characterizing coral acclimation in Belize.
2012	**Friends of Orton Hall Fund:** $1000 to attend and present MS research at the International Coral Reef Symposium, Cairns, Australia, July 2012.
2011	**Best Poster:** Natural and Mathematical Sciences Undergraduate Research Forum, The Ohio State University.
2011	**Mayers Undergraduate and Graduate Travel Fellowship:** $1000 to attend and present undergraduate research at ASLO Ocean Science Meeting, San Juan, Puerto Rico.
2010	**Featured in 2010 "Highlights of Undergraduate Research at The Ohio State University"**, a booklet published by the Undergraduate Research Office (URO).
2010	**Shell Undergraduate Research Experience (SURE)** Summer Intern, School of Earth Sciences, the Ohio State University.
2008-2011	**Dean's List** (Fall '08, Winter '09, Spring '09, Fall '09, Spring '10, Spring '11)
2007	**Eagle Scout**

Publications

Peer-reviewed Publications:

In Review	Schoepf V, Hu X, Holcomb M, Cai W, Li Q, Wang Y, Xu H, Warner ME, Melman TF, Hoadley KD, Pettay DT, Matsui Y, Baumann JH, Grottoli AG. Coral calcification under environmental change: A direct comparison of the alkalinity anomaly and buoyant weight technique. *Coral Reefs*. In Review.
2016	Baumann J, Davies SW, Courtney T, Aichelman H, Townsend J, Castillo KD. Characterizing patch reef environments on the Mesoamerican Barrier Reef System utilizing historical sea surface temperature records. *PLOS ONE*. DOI: http://dx.doi.org/10.1371/journal.pone.0162098
2016	Aichelman HE, Townsend JE, Courtney T, Baumann JH, Davies SW, Castillo KD. The Temperate Coal *Oculina arbuscula* Exhibits a Heterotrophic Rescue Effect to Temperature Stress. *Ecology and Evolution*. DOI: 10.1002/ece3.2399
2016	Hoadley KD, Pettay DT, Grottoli AG, Cai W, Melman TF, Levas S, Schoepf V, Ding Q, Yuan X, Wang Y, Matsui Y, Baumann JH, Warner ME. High-temperature acclimation strategies within the thermally tolerant endosymbiont *Symbiodinium trenchii* and its coral host, *Turbinaria reniformis*, differ with changing pCO 2 and nutrients. Marine Biology. Vol 163, issue 6. doi:10.1007/s00227-016-2909-8.

2016 Cai W, Ma Y, Hopkinson B, Grottoli AG, Warner M, Ding Q, Hu X, Yuan X, Schoepf V, Xu H, Han C, Melman T, Hoadley K, Pettay DT, Matsui M, Baumann J, Levas S, Ye Y, Wang Y. Microelectrode characterization of coral interior pH and carbonate chemistry. *Nature Communications*. Vol. 7. DOI: 10.1038/ncomms11144

2016 Levas SJ, Schoepf V, Warner ME, Aschaffenburg MD, Baumann JH, Bauer JE, Grottoli AG. Can heterotrophic uptake of DOC and zooplankton mitigate C budget deficit in annually bleached corals? *Coral Reefs*. 10.1007/s00338-015-1390-z

2015 Hoadley KD, Pettay DT, Grottoli AG, Cai W, Melman TF, Schoepf V, Hu X, Li Q, Xu Hui, Wang Y, Matsui Y, Baumann J, Warner ME. Physiological response to elevated temperature and pCO_2 varies across four Pacific coral species: Understanding the unique host+symbiont response. *Scientific Reports*. Vol: 5. DOI: 10.1038/srep18371

2015 Schoepf V, Grottoli AG, Levas SJ, Aschaffenburg MD, Baumann J, Matsui Y, Warner ME. Annual coral bleaching and the long-term recovery capacity of coral. Proc. R. Soc. B. Vol: 282 Issue: 1819. DOI: 10.1098/rspb.2015.1887

2015 Levas SJ, Grottoli AG, -Warner ME, Cai W, Bauer J, Schoepf V, Baumann J, Matsui Y, Gearing C, Melman T, Hoadley KD, Pettay DT, Hu X, Li Q, Xu H, Wang Y. Organic carbon fluxes mediated by corals at elevated pCO_2 and temperature. MEPS. Vol. 519: 153-164, 2015. DOI: 10.3354/meps11072

2014 Baumann J, Grottoli AG, Hughes A, Matsui Y. Photoautotrophic and heterotrophic carbon in bleached and non-bleached coral lipid acquisitions and storage. JEMBE. Vol. 461: 469-478, 2014. DOI: http://dx.doi.org/10.1016/j.jembe.2014.09.017

2014 Grottoli AG, Warner ME, Levas SJ, Aschaffenburg M, Schoepf V, McGinley M, Baumann J, Matsui Y. The cumulative impact of annual coral bleaching can turn some coral species winners into losers. Global Change Biology. Vol. 20: 3823-3833. DOI: 10.1111/gcb.12658

2013 Schoepf, V, Grottoi AG, Warner ME, Cai W, Melman TF, Hoadley KD, Pettay T, Hu X, Li Q, Xu H, Wang Y, Matsui Y, Baumann J. Coral Energy Reserves and Calcification in a High-CO_2 World at Two Temperatures, PLoS ONE. DOI: 10.1371/journal.pone.0075049

Theses:

2013 Baumann J. The effects of elevated temperature stress on the acquisition and allocation of carbon to lipids in Hawaiian corals. The Ohio State University, Master's Thesis. http://rave.ohiolink.edu/etdc/view?acc_num=osu1374229960

2011 Baumann, J. The effects of single and repeat bleaching on photosynthesis, respiration, and feeding rates in three species of Caribbean coral. Ohio State University Knowledge Bank. http://hdl.handle.net/1811/48894

Research Experience

Research Interests:

- Impacts of temperature and ocean acidification on coral physiology, ecology, recovery, and resilience
- Coral heterotrophy
- Lipid biogeochemistry
- Conservation, policy, and management
- Marine ecology
- Human impacts on marine environments
- Science communication and outreach

2014-Present **Graduate Research Assistant, Coral Physiological Ecology Lab at the University of North Carolina at Chapel Hill**

- Advisor: Karl Castillo
- **PhD Dissertation Research**: Investigating the impacts of thermal history and nutrient enrichment on coral and symbiont communities on Mesoamerican Barrier Reef System (MBRS) in Belize
    - Created a novel metric for coral reef classification and identification based on thermal parameters using ArcGIS
    - Benthic surveys, coral coring, symbiont identification via ITS-2 metabarcoding, and in-situ nutrient sample collection and analysis
- **Other Projects**
    - Impacts of global and local stressors on the growth of the coral *Siderastrea siderea* in Belize
        - Utilizing CT-scan imagery and ICPMS to investigate century-scale responses.
        - Mapping and recording growth, calcification, and density rates of 45 coral cores from the BBRS
        - Isotope geochemistry of cores utilizing ICPMS.
    - Assessing growth rate of two major reef building corals throughout the Caribbean based on thermal history and human impacts.
        - NSF funded study
        - Coral coring in the Florida Keys, Belize, and Caribbean Panama

2011-2013 **Graduate Research Assistant, Stable Isotope Biogeochemistry Lab at The Ohio State University**

- Advisor: Andrea Grottoli
- Coral lipid stable isotope analysis to examine differences in carbon acquisition and utilization between bleached and healthy corals
    - Wet chemistry and lipid extractions
    - Running samples on Stable Isotope Ratio Mass Spectrometer (SIRMS)

- NSF-funded collaborative field research: Synergistic effects of temperature, nutrients, and ocean acidification on the physiology and resilience of Pacific corals. Reef Systems Coral Farm, New Albany, Ohio.
    - Designed, built, maintained 48 tank system.
    - DOC incubations, bi-weekly feeding, tank maintenance, pH stability

2009-2011 **Undergraduate Research Assistant, Stable Isotope Biogeochemistry Lab at The Ohio State University**

- NSF funded collaborative field and laboratory research examining the effects of repeat bleaching events on coral and algal physiology. Puerto Morelos, Mexico.
    - Daily tank maintenance, experiment monitoring, specimen collection, DOC incubations, polyp dissection for feeding experiments
    - Data analysis to determine the effects of repeat bleaching on photosynthesis, metabolism, and feeding rates in the experimental corals (Senior Honors Thesis work).
    - Coral fragment surface area measurements, sample preparation for SIRMS work, energy reserves, lipid extractions.
- NSF funded collaborative field study on the synergistic effects of temperature, nutrients, and ocean acidification on the physiology and resilience of Pacific corals. Reef Systems Coral Farm, New Albany, Ohio
    - Construction and maintenance of 48 tank recirculating seawater system.
    - DOC incubations
    - Feeding, daily pH calibration

Technical Skills

- PADI Open Water Diving Certification
- AAUS Science Diver
- Biological field sampling techniques: coral coring, AGRRA and video reef surveys, coral identification, specimen collection: nets, seines, trawling, measuring depth, wind speed, light penetration, manipulative field experiments
- Molecular Techniques: DNA extraction, PCR, gel electrophoresis, nanodrop
- Knowledge of, and experience running and maintaining SIRMS (Stable Isotope Ratio Mass Spectrometry)
- Wet chemistry laboratory techniques: coral fragment surface area, lipid extractions, organic separation
- Experience running manipulative tank experiments: NSF-funded repeat bleaching project in Puerto Morelos, Mexico, NSF-funded synergistic effects of temperature, nutrients and ocean acidification project in New Albany, Ohio.

Outreach

2011	Peer Research Contact for the Undergraduate Research Office (URO)
2011	Presented at URO sponsored “Research Across Continents, OSU Undergrads in Latin America”
2011-2012	Ohio State Biological Science Scholars lab tours for undergraduates

2012	Ohio State Biological Science Scholars "How to get into grad school" panel ` member
2013-Present	**UNdertheCblog:** Co-founder and blogger for graduate student run science blog (underthecblog.wordpress.com, @underthecblog)
2013-Present	**SciREN Triangle Organizing Committee:** 1 of 12 graduate students from UNC, Duke, and NC State working on the organizing committee for this statewide workshop that allows K-12 teachers and scientists in STEM fields to share lesson plan ideas and develop connections. The program is designed to stimulate growth and interest in STEM fields and raise awareness of important research projects. Our first annual Raleigh event took place in Nov 2014 and had over 300 participants. Our second annual event in Raleigh took place in September 2015 and had approximately 300 participants.
April 2014	**Classroom Outreach:** Presenting science and discussing scientific careers with 8th grade science classes, Jackson Middle School, Columbus, Ohio. April, 2014.
2015-Present	**Morehead Planetarium and Science Center Science Communication Ambassador (January 2015-Present):** Attend science communication seminar courses, design and implement a hands-on science activity at the Planetarium. Participate in any of the numerous outreach opportunities provided through Morehead Planetarium.
Annually	**Scientific Research and Education Network (SciREN) Workshop Participant:** K-12 teachers and marine scientists lesson planning workshop (February 2014, February 2015)
Annually	**North Carolina Science Festival:** Setup and run a marine science related booth for UNC Science Day. Give public lab tours.
Jan 2015	**Classroom Outreach:** Marine science career discussion and hands-on coral reef ecology activity presented to 30 "Science Explores" at Dillard Drive Middle School, Raleigh, NC. January, 2015.
Dec 2015	**Classroom Outreach:** Taught 1 hour lesson on marine adaptation and coral reef ecology to 4th grade students at Glenwood Elementary, Chapel Hill, NC. December 2015
Dec 2015	**Morehead Planetarium Middle School Science Camp:** Designed and led a hands-on food web lesson focused on coral reefs, overfishing, and other human impacts. December 2015

Conferences and Presentations

2016	Baumann J, Townsend JE, Watkins J, Davies SW, Castillo KD. Influence of thermal history and nutrient enrichment on coral and symbiont community structure on lagoonal reefs on the Belize Mesoamerican Barrier Reef. Oral presentation. 13th International Coral Reef Symposium. Honolulu, Hawaii. June, 2016.
2016	Cai WJ, Ma Y, Hopkinson BM, Grottoli AG, Warner ME, Ding Q, Hu X, Yuan X, Schoepf V, Xu H, Han C, Melman TF, Hoadley KD, Pettay DT, Matsui Y, Baumann JH, Levas S, Ying Y, Wang Y. Coral interior carbonate chemistry

measured with pH and carbonate microelectrodes suggests that the chemistry of the calcifying fluid affects resilience to OA. Oral presentation. 13th International Coral Reef Symposium. Honolulu, Hawaii. June, 2016.

2016 Aichelman HE, Townsend JE, Courtney T, Baumann JH, Davies SW, Castillo KD. The temperature coral *Oculina arbuscular* exhibits a heterotrophic rescue effect to temperature stress. Oral presentation. 13th International Coral Reef Symposium. Honolulu, Hawaii. June, 2016.

2016 Rippe JP, De Leener DN, Aichelman HE, Baumann JH, Davies SW, Bove CB, Fieseler CM, Castillo KD. Skeletal growth trends of two massive reef-building corals on the Florida reef tract: are inshore corals better off in a warming ocean? Oral presentation. 13th International Coral Reef Symposium. Honolulu, Hawaii. June, 2016.

2016 Castillo KD, Rippe JP, Courtney T, Lima FP, Aichelman HE, De Leener DN, Baumann JH, Davies SW, Fieseler CM, Bove CB, Cobleigh KA, Westfield IT, Horvath K, Ries JB. Impact of ocean warming on century-scale growth trends of inshore and offshore corals throughout the western Caribbean Sea. Oral presentation. 13th International Coral Reef Symposium. Honolulu, Hawaii. June, 2016.

2016 Townsend JE, Baumann JH, Aichelman HE, Courtney T, Davies SW, Castillo KD. An accurate and cost-effective reef survey method: video transects with GoPro technology. Poster presentation. 13th International Coral Reef Symposium. Honolulu, Hawaii. June, 2016.

2016 Baumann J, Townsend JE, Courtney T, Aichelman HE, Lima FP, Castillo KD. Influence of thermal history and nutrient enrichment on coral community structure on lagoonal reefs in Belize. Oral Presentation. 2016 Ocean Science Meeting. New Orleans, Louisiana. Feb. 2016

2015 Baumann J, Courtney T, Davies SW, Aichelman HE, Townsend J, Lima FP, Castillo KD. Influence of thermal history and nutrients on lagoonal reef composition on the Belize Barrier Reef System. Oral presentation. 44th Annual Benthic Ecology Meeting, Quebec City, Canada. March, 2015

2015 Aichelman HE, Townsend J, Courtney T, Baumann J, Castillo KD. The rescue effect of heterotrophic feeding during temperature stress on the temperate coral *Oculina arbuscula*. Oral Presentation. 44th Annual Benthic Ecology Meeting, Quebec City, Canada. March, 2015

2014 Aichelman H, Courtney T, Baumann J, Castillo KD. The effect of feeding and temperature on the calcification response of the temperate coral *Oculina arbuscula.* Poster. UNC Celebration of Undergraduate Research, April 2014.

2014 Foguel AD, Roycroft M, Horvath K, Baumann J, Courtney T, Castillo KD. Quantifying relative corallite morphology from microscope images. Poster. UNC Climate Change Symposium. November 2014.

2014 Foguel AD, Courtney T, Baumann J, Castillo KD. A comparison of density, extension, and calcification from CT and X-ray images of coral cores. Poster. UNC Climate Change Symposium. November 2014.

2014 Courtney T, Baumann J, Foguel AD, Horvath K, Westfield I, Castillo KD, Ries JB (2014), Characterizing 21st century trends of the scleractinian coral *Siderastrea siderea* throughout the Belize barrier reef and atoll system. Oral Presentation. 43rd Benthic Ecology Meeting, Jacksonville Florida. March, 2013

2014 Baumann J, Grottoli AG, Levas S, Matsui Y, Hughes A. Acquisition and allocation of carbon to lipids of bleached and healthy Hawaiian corals. Oral Presentation. 2014 Benthic Ecology Meeting, Jacksonville Florida. March, 2013

2012 Baumann J, Grottoli AG, Levas S, Matsui Y, Hughes A. Acquisition and Allocation of Carbon to Lipids of Bleached and Nonbleached Hawaiian Corals. 12th International Coral Reef Symposium (ICRS), Cairns, Australia. Oral Presentation. July, 2012.

2012 Schoepf V, Grottoli AG, Warner ME, Cai WJ, Melman T, Baumann J, Matsui Y, Pettay D, Hoadley K, Wang Y, Xu H, Li Q, Hu X. Interactive effects of elevated pCO_2 and temperature on coral calcification and energy reserves. 12thInternational Coral Reef Symposium (ICRS), Cairns, Australia. Oral Presentation. July, 2012.

2012 Levas S, Grottoli AG, Warner ME, Schoepf V, Baumann J, Aschaffenburg M, Matsui Y, Bauer J (2012) DOC fluxes in healthy and bleached *Montastraea faveolata, Porites astreiodes*, and *Porites divaricata* corals. 12th International Coral Reef Symposium (ICRS), Cairns, Australia. Oral Presentation. July, 2012.

2012 Hoadley K, Pettay DT, Warner ME, Grottoli AG, Melman T, Baumann J, Matsui Y, Cai WJ, Hu X, Wang Y, Xu H, Li O (2012) The impact of elevated CO_2 and temperature on the photosynthetic physiology and symbiosis stability of four Pacific reef-building corals. 12thInternational Coral Reef Symposium (ICRS), Cairns, Australia. Oral Presentation. July, 2012.

2011 Baumann J, Grottoli AG, Levas S, Schoepf V, Warner ME. The effects of single and repeat bleaching on photosynthesis and metabolism of three species of Caribbean coral. 2011 Natural and Mathematical Science (NMS), and 2011 Denman Undergraduate Research Forums, Ohio State University, Columbus, Ohio. Poster. April, 2011

2010 Baumann J, Grottoli AG, Levas S, Schoepf V, Warner ME. The effects of repeat bleaching on P/R and feeding rates of three species of Caribbean coral. 2010 American Society of Limnology and Oceanography (ASLO) Ocean Science Meeting, San Juan, Puerto Rico. Poster. February, 2010.

2010 Baumann J, Grottoli AG, Levas S. The effects of bleaching on photosynthesis, metabolism, and feeding rates of three species of Caribbean Coral. 2010 Biological, Math, and Physical Science (BMAPS) and 2010 Denman Undergraduate Research Forums, Ohio State University, Columbus, Ohio. Poster. February, 2010.

Teaching Experience

Earth Science 100 laboratory instructor
Ohio State University, School of Earth Sciences
Fall 2011, Winter 2011, Spring 2012, Fall 2012, Spring 2013 (converted from quarters to semesters after Spring 2012).

- Taught introductory Earth Science labs to non-science majors
- Instruct labs, lead discussions, proctor exams, and grade assignments

Earth Science 622 lab **(Stable Isotope Biogeochemistry)**
Ohio State University, School of Earth Sciences
Spring 2012

- Instructed a lab section of 8-10 graduate students
- Taught mixing models
- Guided the class through isotopic analysis of their own fingernail and hair samples and assisted them in designing a poster and presenting their findings.

Earth Science 100 lab coordinator
Ohio State University, School of Earth Sciences
Fall 2012-Spring 2013

- Taught introductory Earth Science labs to non-science majors
- Instructed labs, lead discussions, proctor exams, and grade assignments
- Organize and set-up labs
- Trained other Teaching Assistants to teach labs
- Communicated with professors and deal with any scheduling issues
- Independently designed a lab on climate change and sustainability.

Memberships

International Society for Reef Studies (ISRS)
Association for the Sciences of Limnology and Oceanography (ASLO)
Divers Alert Network (DAN)

Professional Association of Diving Instructors (PADI)
Consortium for Ocean Science Exploration and Engagement (COSEE)

Reviewer For

Ecology
Limnology and Oceanography
Marine Ecology Progress Series
PLOS ONE
Coral Reefs

Undergraduates Mentored

Hannah Aichelman- Now an MS student at Old Dominion University
Joseph Townsend
Alyssa Knowlton
Jessica Boulton
Daphne De Leener- Now a graduate student at University College London
Lauren Speare- Now a graduate student at UNC Chapel Hill
Brooke Benson
Kathryn Cobleigh
Logan Buie
Samir Patel