

Joseph E. Townsend
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Research interests:

- The impact of abiotic factors on marine ecology, physiology, and resilience
- How ecological interactions drive community structure and function
- Understanding the interactions between morphology and ecological function of marine organisms
- Science communication, conservation, policy, and management

EDUCATION

University of the Virgin Islands (August 2017-December 2019)

Masters of Marine and Environmental Science

GPA: 4.0

University of North Carolina at Chapel Hill (2012 - 2016)

Biology (B.A.), Communications (B.A.), minor studies in Marine Science

GPA: 3.3

Sea Education Association (March 2015-June 2015), Class C-259

Semester of coursework as a part of the Marine Biodiversity and Conservation Program

GPA: 3.84

Current GRE Scores

Quantitative Reasoning: 160 (76th percentile)

Verbal Reasoning: 162 (90th percentile)

Analytical Writing: 4.5 (86th percentile)

MANUSCRIPTS AND PUBLICATIONS

Aichelman, H. E.; Townsend, J.; Courtney, T.; Baumann, J.; Castillo, K. D. "Heterotrophy mitigates temperate coral *Occulina arbuscula* response to temperature stress". *Ecology and Evolution* 4 August 2016.

Baumann, J.; Townsend, J.; Courtney, T.; Aichelman, H. E.; Davies, S. W.; Castillo, K. D. "Temperate regimes impact coral assemblages along environmental gradients on lagoonal reefs in Belize". *PLoS ONE* 11(9): e016298.

Townsend, J.; Jerris K. G. "Differences in fish communities associated with three-dimensional reef reconstructions". In Prep.

Smith, T. B.; Mukherjee, S.; Townsend, J.; Hollister K. J. "Temperature in mesophotic reefs of the Virgin Islands: Thermal stress and hurricane impacts". In Prep.

Afshar, M. D.; Clower, P. O.; Cobleigh, K.A.; Farchette, A.; Funk, K. A.; Hollister K. J.; Jerris, K. G.; Nagel, J. A.; Packard, A. J.; Raymore, M. N.; Roper, Z. N.; Townsend, J. "Impacts of Hurricanes Irma and Maria on coral restoration and associated fish diversity in St. Thomas, USVI". In Prep. *Note: Authors are equal contributors presented in alphabetical order.*

AWARDS/HONORS

May 2017 **SEAS Your Tomorrow: Bridge to the PhD**

\$7,000 awarded jointly by University of the Virgin Islands and Pennsylvania State University to study and conduct research at PSU

Sept 2015 **Increasing Diversity and Enhancing Academia (IDEA) 2015-2016 Academic Year Internship**

\$2,700 awarded to conduct tank experiment on coral stress response using live corals from Belize

Aug 2015 **Research Experience for Undergraduates at Bermuda Institute of Ocean Sciences**

\$5,500 awarded in order to conduct research in the Goodbody-Gringley laboratory as a full-time researcher

July 2015 **Top Oral Presentation - UNC Graduate School**

Honor recognizing top three oral presenters at the Undergraduate Summer Research Symposium

June 2015 **Increasing Diversity and Enhancing Academia (IDEA) Summer 2015 Internship**

\$6,000 awarded in order to conduct research in the Castillo laboratory as a full-time researcher

June 2014 **Increasing Diversity and Enhancing Academia (IDEA) Summer 2014 Internship**

\$6,000 awarded in order to conduct research in the Castillo laboratory as a full-time researcher

Nov 2011 **Eagle Scout**

Highest rank in the Boy Scouts of America

RESEARCH EXPERIENCE

January 2019-Present **Research Technician- UVI Department of Marine Science**

Supervisor: Dr. Marilyn Brandt

Supervision and management of spatial distribution research for the recent emerged Stony Coral Tissue Loss Disease (SCTLD) and implementation of coral disease treatments. Verification and survey of the revitalized Acropora Monitoring Program in the USVI. Additional as-needed work in miscellaneous marine research projects ranging from urchin and coral restoration to marine sponge assessment. Statistics tutor for Masters of Marine and Environmental Sciences students.

August 2017-December 2019 **Research Assistant – UVI Department of Marine Science**

Advisors: Dr. Tyler Smith, Dr. Marilyn Brandt

Data organization and management for the Territorial Coral Reef Monitoring Project (TCRMP), Analysis of data following hurricanes Irma and Maria. Conducted coral field surveys and data collection at annual locations, and regular collection of fish and algae for study of Ciguatera Fish Poisoning. Assistance with additional fieldwork in miscellaneous marine research projects ranging from urchin and coral restoration to marine sponge assessment. Additional as-needed work on the SCTLD-outbreak in St. Thomas.

Aug 2018-May 2019 **Sea Turtle Intern – UVI Center for Marine and Environmental Studies**

Advisor: Dr. Paul Jobsis

Management, organization, and data collection associated with UVI's sea turtle catch-and-release tagging program. Responsible for organizing personnel, data management and analysis, proper and effective sea turtle handling and tagging during both the day and at night, organization of outreach events, and maintenance of UVI's sea turtle club.

May 2018-July 2018

Bridge to PhD Graduate Researcher- Pennsylvania State Department of Biology

Advisor(s): Dr. Mònica Medina, Dr. Roberto Iglesias-Prieto, Dr. Iliana Baums

Rotated through laboratories in the PSU Department of Biology, was trained in coral genomics, photophysiology, and microbial ecology. Main project consisted of the identification of algal symbiont present in samples from shallow and mesophotic corals from the US Virgin Islands.

June 2015-May 2016

Increasing Diversity and Enhancing Academia (IDEA) - UNC Marine Sciences Department

Advisor: Dr. Karl Castillo

Studied the interactive effect of nitrate, low salinity, and temperature on the tropical coral *Siderastrea siderea* in 30-day common garden tank experiment. Responsible for experimental design, daily aquarium maintenance, data collection, nutrient quantification, and data analysis of growth, color, and nutrient concentration data.

March 2015-June 2015

Sea Education Association (SEA) - Woods Hole, MA

Advisor: Dr. Amy Siuda

Studied the morphology and population connectivity of *Panulirus argus* phyllosoma. Responsible for diurnal neuston net water sampling, species identification and staging, DNA isolation, phylogenetic and population connectivity analyses.

August 2014-March 2015

Volunteer Undergraduate Researcher - UNC Marine Sciences Department

Advisor: Dr. Karl Castillo

Investigated acclimation and resilience in corals on the Belize Barrier Reef System (BBRS). Responsible for novel design, collection, and analysis of reef video surveys, collection of water samples, and collection of coral tissue microsamples for genomic, metagenomic, and transcriptomic analyses. Additionally responsible for directing, filming, and editing video documentary of the field season, available on YouTube. Summarized in peer-reviewed journal article, published in *PLoS One*.

June 2014-August 2014

Increasing Diversity and Enhancing Academia (IDEA) - UNC Marine Sciences Department

Advisor: Dr. Karl Castillo

Investigated the effect of feeding on growth of the temperate coral *Occulina arbuscula* at elevated temperature. Responsible for data collection and daily maintenance of tank system, data analysis of growth and surface area data. Summarized in peer-reviewed journal article, published in *Ecology and Evolution*.

CERTIFICATIONS

- 150-ft. Scientific Diver- American Academy of Underwater Sciences (AAUS)
- Technical Diving International (TDI) Certified decompression and enriched air diver
- Red Cross First Aid, Emergency Oxygen, and CPR/AED for the professional rescuer
- Proficient in Microsoft Office
- North Carolina and Florida Boaters Education Certification

TECHNICAL SKILLS

- Lab-based Skills
 - Live coral care in closed circuit aquaria
 - DNA Amplification with PCR of animal, algal, and bacteria DNA
 - PAM Fluorometry and Spectrophotometry
 - 3D Digital Scanning and reconstruction
 - Analytical quantification of dissolved nutrients
- Field-based Skills
 - Caribbean coral, fish, algae, sponge, and other invertebrate survey and identification
 - Sea Turtle hand-capture, tagging, and release
 - Biopsy collection for genetic and isotopic analysis
 - Neuston net sampling
 - Conductivity, Temperature, and Depth (CTD) deployment
- Computer/Software based Skills
 - R Statistical analysis
 - Analysis of sequence data using MEGA and Geneious
 - Phylogenetic, Population Connectivity and Metabarcoding analyses
 - Advanced image and film capture and editing using Adobe Creative Suite/Final Cut Pro/Avid
 - ArcGIS
 - Proficient repair and maintenance abilities with advanced media technology

CONFERENCES AND PRESENTATIONS

Poster Presentations

Townsend, J.; Brandt, M. E.; Mukherjee, S.; Medina, M.; Smith, T. B. “Lesion Recovery of corals along a shallow to mesophotic depth gradient”. Poster presented at the Benthic Ecology Meeting. April 2019.

Townsend, J.; Brandt, M. E.; Mukherjee, S.; Medina, M.; Smith, T. B. “Differences in coral tissue recovery and regeneration between shallow and mesophotic coral ecosystems”. Poster presented at the Mesophotic Coral Ecosystems Gordon Research Conference. June 2018.

Afshar, M. D.; Clower, P. O.; Cobleigh, K.A.; Farchette, A.; Funk, K. A.; Hollister K. J.; Jerris, K. G.; Nagel, J. A.; Packard, A. J.; Raymore, M. N.; Roper, Z. N.; Townsend, J. “Impacts of Hurricanes Irma and Maria on coral restoration and associated fish diversity in St. Thomas, USVI”. Poster presented at University of the Virgin Islands Research Day. April 2018. Note: Authors are equal contributors presented in alphabetical order.

Townsend, J.; Baumann, JH; Aichelman, HE; Courtney, T; Davies, SW; Castillo, KD. “An accurate and cost-effective survey method: video transects with GoPro® technology”. Poster presented at the International Coral Reef Symposium, Honolulu, HI. June 2016.

Townsend, J.; Bove, CB; Baumann, JH; Davies, SW; Castillo, KD. “The interactive effects of nutrient and salinity stress on corals from distinct environments on the Belize Barrier Reef System”. Poster presented at the UNC Climate Change Symposium, Chapel Hill, NC. April 2016.

Townsend, J.; Bove, CB; Baumann, JH; Davies, SW; Castillo, KD. “The interactive effects of nutrient and salinity stress on corals from distinct environments on the Belize Barrier Reef System”. Poster presented at the Ocean Sciences Meeting, New Orleans, LA. February 2016.

Townsend, J; Botta, W. J.; Plantz, R. W. "Dispersion dynamics of the Caribbean spiny lobster *Panulirus argus* phyllosoma". Poster presented at the Sea Education Association Annual Sargasso Sea Symposium, Woods Hole, MA. June 2015.

Townsend, J; Baumann, J.; Aichelman, H. E.; Courtney, T.; Davies, S.W.; Castillo, K. D. "Comparing coral survey methodology: gopro video vs. AGRRA". Poster presented at the 44th Annual Benthic Ecology Meeting, Quebec City, Canada. March 2015.

Oral Presentations

Townsend, J; Brandt, M.; Mukherjee, S.; Medina, M.; Smith, T. B. "Comparative lesion recovery of two deep-generalist corals from shallow to mesophotic depths". Accepted to present at the 2020 International Coral Reef Symposium. Bremen, Germany. July 2020. Conference Postponed due to COVID-19 concerns.

Townsend, J; Eanes, S.; Jerris, K.; Jobsis, P. "Storm Impacts and Recovery of Juvenile *Eretmochelys imbricata* and *Chelonia mydas* populations in Brewers Bay, St. Thomas". Accepted to present at the 2020 International Sea Turtle Symposium. Cartagena, Colombia. March 2020. Conference Postponed due to COVID-19 concerns.

Townsend, J.; Brandt, M. E.; Mukherjee, S.; Medina, M.; Smith, T. B. "Lesion Recovery of corals along a shallow to mesophotic depth gradient". Presented at the American Society of Limnology and Oceanography meeting. San Juan, PR. February 2019.

Aichelman HE; Townsend, J; Courtney, T; Davies, SW; Castillo, KD. "The temperate coral *Oculina arbuscula* exhibits a heterotrophic rescue effect to temperature stress". Presented at the 2016 International Coral Reef Symposium, Honolulu, HI. June 2016

Bauman, J; Townsend, J; Courtney, T; Aichelman, HE; Davies, SW; Watkins, J; Lima, FP; Castillo, KD. "Influence of thermal history and nutrient enrichment on coral and symbiont community structure on lagoonal reefs on the mesoamerican barrier reef". Presented at the 2016 International Coral Reef Symposium, Honolulu, HI. June 2016

Townsend, J; Bove, CB; Baumann, JH; Davies, SW; Castillo, KD. "The interactive effects of nutrient and salinity stress on corals from distinct environments on the Belize Barrier Reef System". Presented at the Undergraduate Research Symposium, Chapel Hill, NC. April 2016

Baumann, J; Townsend, J; Courtney, T; Aichelman, HE; Davies, SW; Castillo, KD. "Influence of thermal history and nutrients on coral community structure on lagoonal reefs in Belize". Presented at the 2016 Ocean Sciences Meeting, New Orleans, LA. February 2016

Townsend, J; Baumann, J; Aichelman, HE; Courtney, T; Davies, SW; Castillo, KD. "Characterizing coral reef community structure across reef sites with different thermal regimes". Presented at the Undergraduate Summer Research Symposium, Chapel Hill, NC. July 2015.

Townsend, J; Huston, G; Keefe, M; Rolf, K. "Stressors on biodiversity and natural resources in the sargasso sea". Presented at Sea Education Association Annual Sargasso Sea Symposium, Woods Hole, MA. June 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". Presented at the 44th Annual Benthic Ecology Meeting, Quebec City, Canada. March, 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*”. Presented at the 44th Annual Benthic Ecology Meeting, Quebec City, Canada. March, 2015.

OUTREACH

STEM Saturday- Coordinator, Volunteer Scientist

Organizer of bi-annual community event for the public to observe sea turtles and the tagging process up close. Responsible for safe collection of turtles, introduction of turtles to the public, communication of sea turtle research, and safe measuring and tagging of turtles before return to the water

Science Saturday- Volunteer Scientist

Develop and lead activities for monthly events engaging with kids (usually beneath the age of 6) about science or science-related topics through crafts, stories, and activities

Discovery Space Marine Science Exhibit- Volunteer Scientist

Led an activity about larval settlement and a recruitment for children ages 3-14. Engaged with children and parents about marine science and mysteries of the ocean

2018 State College Arts Festival- Booth Volunteer

Created video exhibit and engaged with festivalgoers about coral biology and basic reef ecology.

2018/2019 Reef-Fest- Booth Volunteer

Created video exhibit and engaged with children discussing coral biology and restoration through arts and crafts. Assisted with miscellaneous event management.

A Marine Management Proposal for the Sargasso Sea- Author, Graphic Designer

Part of a team of 19 students that developed a 125-page proposal for feasible policy recommendations for management of the Sargasso Sea. This management proposal was then the central presentation of the 2015 annual Sargasso Sea Symposium by the Sea Education Association. Additionally served on a team of 4 students responsible for the visual design of the proposal document.

Sea Education Association Annual Sargasso Sea Symposium- Coordinator

Part of a team of 19 students to organize the 2015 Annual Sargasso Symposium held by Sea Education Association. The symposium is a gathering of both scientific experts and major policymakers involved in the Sargasso Sea in order to present both modern scientific findings surrounding the Sargasso Sea, as well as current policy recommendations for management of the Sargasso Sea.

Scientific Research and Education Network (SciREN) Triangle- Event Participant

Developed multiple science-based interactive lesson plans for elementary school educators. Presented at the second annual SciREN Triangle outreach event held in Raleigh, NC in November 2015 and SciREN coast event in September 2016.

Girls Advancing In STEM (GAINS)- Event Participant

Assisted with an exhibition table of coral reef related ecology for high school women interested in pursuing a scientific career. Activities included hands on activities, such as mock reef surveys, microscopy, and live coral care, as well as information on coral biology and global distribution.

Increasing Diversity and Enhancing Academia (IDEA)- Volunteer, Student Panel Member
Volunteered with summer camp for high school kids interested in geosciences. Conducted laboratory tours, interacted with students, and served on a panel of undergraduates discussing our experiences as minority researchers in the sciences.

VIDEO DOCUMENTARIAN/PHOTOGRAPHY EXPERIENCE

“Mountains and Maritime”- Charity Website (www.mountainsandmaritime.com)

Co-creator, Photography donor

Project Bucket- Feature-length documentary (Run time- 38 min.)

Director, Executive Producer, Cinematographer

Premiered in select local theaters on August 27th, 2017 (now publicly accessible [here](#))

Belize: Witnessing Climate Change Firsthand- Documentary Short (Run time-14 min.)

Director, Co-editor, Cinematographer

Publicly available: <https://www.youtube.com/watch?v=hdQVvIL0ZgI>

“Pettigrew State Park”- Segment on *North Carolina Now!* (Run Time- 14 min)

Producer, Assistant Cinematographer

Premiered on UNC-TV (North Carolina-statewide broadcasted public access channel) in December 2014 (see [completed projects](#) for segment)

OTHER RELEVANT WORK EXPERIENCE

VI-EPSCoR – University of the Virgin Islands, St. Thomas (Jan 2019- May 2019)

Communications Assistant

Responsibilities:

Provide scientific insight for output and translation to popular writing, gather information for relevant research being done around the university, provide multimedia content to the social media pages for VI-EPSCoR, re-development of the VI-EPSCoR website

Masters of Marine and Environmental Sciences- University of the Virgin Islands, St. Thomas (Jan 2018-Present)

Statistics Tutor

Responsibilities:

Assist students with learning advanced statistical theory and technique, provide both one-on-one and group-based tutoring, assist and supplement instruction of statistics for graduate students at the University

UNC Friday Center – Chapel Hill, NC (May 2016-May 2017)

Media Technician

Responsibilities:

Provide quality and prompt audio/visual service to all clients of the Friday Center, troubleshoot issues with media technology as it occurs