

# James Townsend

Marine biophysicist

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## EDUCATION:

### PhD, Biochemistry and Biophysics

May, 2018

University of Pennsylvania

Dissertation: *Biochemical and Biophysical Methods in Ctenophore Physiology*

Committee: Drs. Alison Sweeney (advisor), Mark Goulian, Paul Janmey, Kim Sharp (chair)

### BA, Biology (hons.)

June, 2012

University of Chicago

Honors thesis: *The complex folding behavior of a designed protein*. Advisor: Dr. Tobin Sosnick

## POSITIONS:

### Postdoctoral associate

September 2021 – present

University of Florida/Whitney Laboratory for Marine Biosciences, St. Augustine, FL

Developing several emerging projects, including engineered biomineralization in anemones and methods for nanoscale CT scanning of marine organisms for museum and research use.

### Postdoctoral researcher

June 2019 – August 2021

Providence College/Marine Biological Laboratory, Woods Hole, MA

Investigated the diet and feeding mechanics of oceanic ctenophores through DNA metabarcoding of gut contents and *in situ* predator-prey interaction studies, collected through blue water SCUBA diving in the Gulf Stream.

### Community Scientist

July 2018 – May 2019

BioBus, Greater NYC area

Designed and facilitated informal science education experiences for K-12 students at high economic need schools throughout NYC, with a focus on Manhattan's Lower East Side.

Cofounded the Marine Ecology Explorers Club and an intensive marine invertebrate DNA barcoding internship for high school students at Eastside Community High School.

## RESEARCH PUBLICATIONS:

Potter B, Townsend J, Corrales-Ugalde M, Colin S, Costello J, Sutherland K, Collins R, Gemmell B. (Under review at *Limnology and Oceanography*, 2022) Ubiquitous yet Inconspicuous: Quantifying Feeding behavior and Trophic Impact of a Widespread Oceanic Ctenophore.

Tassia MG, David KT, Townsend JP, Halanych KM. (2021) TIAMMA: Leveraging biodiversity to revise protein domain models, evidence from innate immunity. *Molecular Biology and Evolution*, 38, 5806–5818. doi: <https://doi.org/10.1093/molbev/msab258>

Townsend JP, Mercus GOT, Castellanos GP, Pickering M. (2021, preprint). Colloblasts act as a biomechanical sensor for suitable prey in *Pleurobrachia*. BioRxiv. doi: <https://www.biorxiv.org/content/10.1101/2020.06.27.175059v2>

Gemmell BJ, Dabiri JO, Colin SP, Costello JH, Townsend JP, Sutherland KR. (2021) Cool Your Jets: Biological Jet Propulsion in Marine Invertebrates. *Journal of Experimental Biology*, 224.

Xu NW, Townsend JP, Costello JH, Colin SP, Dabiri JO. (2020). Field testing of biohybrid robotic jellyfish to demonstrate enhanced swimming speeds. *Biomimetics* 5(4), 64.  
doi: <https://doi.org/10.3390/biomimetics5040064>

Townsend JP, Tassia MG, Damian-Serrano A, Whelan NV, Halanych KM, Sweeney AM (2020). A mesopelagic ctenophore representing a new family, with notes on family-level taxonomy in Ctenophora: *Vampyroctena delmarvensis* gen. nov. sp. nov (Vampyroctenidae, fam. nov.). *Marine Biodiversity*. 50:34 doi: 10.1007/s12526-020-01049-9

Townsend JP, Gemmell BJ, Sutherland KR, Colin SP, Costello JH (2020). Ink release and swimming behavior in an oceanic ctenophore, *Eurhamphaea vexilligera* Gegenbaur, 1856. *Biological Bulletin* 238, 1: 206-213. doi: 10.1086/709504

Townsend JP and Sweeney AM (2019). Catecholic compounds in ctenophore colloblast and nerve net proteins suggest a structural role for DOPA-like molecules in an early-diverging animal lineage. *Biological Bulletin* 236, 1: 55-65. doi: 10.1086/700695

Cai J, Townsend JP, Dodson TC, Heiney PA, and Sweeney AM (2017). Eye patches: Protein assembly of index-gradient squid lenses. *Science* 357, 564. doi: 10.1126/science.aal2674

#### **OTHER PUBLICATIONS:**

Klompen A, Townsend J, Chang SE, Mitchell M, Helm R. (2021) *Coral emoji proposal (approved for Unicode 14.0)*. <https://www.unicode.org/L2/L2020/20220-coral-emoji.pdf>

Klompen A, Chang SE, Helm R, Kim D, Mitchell M, Townsend J. (2021) *Jellyfish emoji proposal (approved for Unicode 15.0)*. <https://www.unicode.org/L2/L2021/21217-jellyfish-emoji.pdf>

#### **SELECTED FIRST-AUTHOR PRESENTATIONS:**

“Stop, Ink, and Roll: In situ observations of *Eurhamphaea vexilligera* swimming behavior” Society for Integrative and Comparative Biology, Austin, TX: 2020

“Catecholic compounds in ctenophore colloblast and nerve net proteins suggest a structural role for DOPA-like molecules in early animal evolution” Society for Integrative and Comparative Biology, San Francisco, CA: 2018

“The Slimes That Bind: physiology and biochemistry of *Mnemiopsis mesoglea*” Ctenopalooza, Whitney Laboratory for Marine Bioscience, St. Augustine, FL: 2016

#### **EXTRAMURAL SERVICE:**

- Town Commissioner, Town of Marineland, Florida: February 2022 – present  
One of 3 voting members for the governing body of the town. Working with local government and citizens to conserve and uplift Florida’s first Remarkable Coastal Place.

#### **AWARDS AND HONORS:**

- Best Student Presentation, Ctenopalooza  
Whitney Laboratory for Marine Bioscience, St. Augustine, FL: 2016
- Buchsbaum Prize for Excellence in Photomicrography, B/W division  
American Microscopical Society: 2016
- Third Place in Biophysics, Graduate Student Poster Award,  
Univ. of Pennsylvania Department of Biochemistry and Biophysics: 2015
- Honorable Mention, Graduate Student Poster Award,  
Univ. of Pennsylvania Department of Biochemistry and Biophysics: 2014

**FELLOWSHIPS:**

- NIH Structural Biology and Molecular Biophysics Training Grant: 2014-2015
- NIH Neuroscience and Neuroengineering Fellowship: 2010-2011

**TEACHING ASSISTANTSHIPS:**

- Physiology, Marine Biological Laboratory, Woods Hole, MA: *Summer 2015*
- Macromolecular Biophysics: Principles and Methods, Univ. of Pennsylvania: *Autumn 2013*
- Introduction to Biology for Majors, University of Chicago: *Spring 2011*
- Molecular Biology of the Cell, University of Chicago: *Autumn 2010*

**OCEANOGRAPHIC CRUISES AND FIELDWORK:**

- Antarctic fieldwork: Surveying benthic invertebrates on the NBP 20-10 cruise aboard the RVIB *Nathaniel B. Palmer* from Port Hueneme, CA to Punta Arenas, Chile, then through the Bransfield Strait and into the Weddell Sea, totaling 3 months at sea: 2020
- Three week-long cruises aboard the NSF-UNOLS research vessel *R/V Hugh R. Sharp*, collecting specimens by midwater trawling and performing experiments in the northwestern Atlantic Ocean: 2015-2016
- Four summer field seasons collecting samples and conducting physiology experiments at Friday Harbor Laboratories (Friday Harbor, WA) and at the Marine Biological Laboratory (Woods Hole, MA): 2014-2017

**MENTORSHIP AND OUTREACH:**

- LRSM REU Student mentorship, Philadelphia, PA: *Summer 2016*  
Led materials science research project on ctenophore tentacle adhesion with a visiting undergraduate biology student from Univ. of Puerto Rico Cayey
- Undergraduate mentorship, Philadelphia, PA: 2015-2016  
Led ecological data collection examining the effects of water quality on ctenophore abundance and physiology in the salt marshes of SE New Jersey
- BioBus guest instructor, Philadelphia, PA and New York, NY: 2014-2017  
Collected and showcased ctenophores, echinoderms, and crustaceans from the mid-Atlantic coast to groups of science enthusiasts young and old

**ADDITIONAL COURSEWORK:**

- Bioinformatics Bootcamp, Auburn University, *Summer, 2017*  
An intensive week-long workshop on next-generation DNA sequence analysis, phylogenomics, and other bioinformatics topics.
- Invertebrate Embryology, Friday Harbor Labs, University of Washington: *Summer, 2014*  
Collected, spawned, and experimented on embryos from representatives of dozens of invertebrate phyla including ctenophores, sponges, cnidarians, echinoderms, and more.

**CERTIFICATIONS:**

AAUS Scientific Diver

PADI Rescue and Enriched Air Nitrox Diver