

James Townsend

Community scientist
Organismal 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

ACADEMIC AFFILIATION:

Research Associate **November 2023 – present**

Smithsonian National Museum of Natural History, Washington, DC

As a guest researcher under the supervision of curator Dr. Allen Collins I am using molecular methods to better describe ctenophore biodiversity, particularly within the genera *Lyrocteis* and *Callianira*, and developing a fractal dimensional description of bryozoan colony ultrastructure supported by high resolution computed tomography (CT) scans.

PAST POSITIONS:

AAAS Science and Technology Policy Fellow **September 2023 – August 2025**

National Science Foundation, Alexandria, VA

As a fellow in the office of Information and Intelligent Systems, I aimed to understand how policy can facilitate artificial intelligence research that is accessible, ethical, and aligned with democratic values. I engaged colleagues at NSF through solicitation and panel development, and through running a philosophy of data science learning circle. I also conducted outreach to nontraditional and informal research communities to understand how they might be better included in the growing AI research ecosystem.

Postdoctoral associate **September 2021 – February 2023**

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

Worked with the Martindale lab to characterize exogenous biomineralization transgene products in starlet sea anemone. Began pilot studies of nanoscale CT techniques for the study of bryozoan physiology at the University of Florida Museum of Natural History.

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:

- Irvine T, Costello J, Gemmell B, Sutherland K, Corrales-Ugalde M, Townsend J, Colin S. (2025) Ctenophores are a highly impactful predatory guild in open oceanic ecosystems. *Current Biology*, 35 (10), 2467-2473. doi: <https://doi.org/10.1016/j.cub.2025.04.029>
- Potter B, Townsend J, Corrales-Ugalde M, Colin S, Costello J, Sutherland K, Collins R, Gemmell B. Quantifying the feeding behavior and trophic impact of a widespread oceanic ctenophore. *Scientific Reports*, 13, 2292 (2023). <https://doi.org/10.1038/s41598-023-27955-z>
- 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*. BioArXiv. 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:

- Klumpen 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>
- Klumpen 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 – *January 2023*
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

RESEARCH 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 *Nathanial 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

ADDITIONAL COURSEWORK:

- **Basic Spanish 2**, International Language Institute, Washington DC, *Autumn 2024*
- **Artificial Intelligence Policy Clinic**, Center for AI and Digital Policy, *Spring 2024*
- **Bioinformatics/Genomics Bootcamp**, Auburn University, *Summer, 2017*
- **Invertebrate Embryology**, Friday Harbor Labs, University of Washington: *Summer, 2014*

CERTIFICATIONS:

- PADI Rescue and Enriched Air Nitrox Diver
- AAUS Scientific Diver (inactive)