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 researcher **June 2019 – present**
Providence College/Marine Biological Laboratory, Woods Hole, MA
Investigating 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. Advisor: Dr. Jack Costello

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.

PUBLICATIONS:

Townsend JP, Merces 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

Tassia MG, David KT, Townsend JP, Halanych KM. TIAMMAt: Leveraging biodiversity to revise protein domain models, evidence from innate immunity. (2021, in review at *Molecular Biology and Evolution*)

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

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

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*

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: Participant in 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*

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