Curriculum Vitae: S. Zachary Swartz

Marine Biological Laboratory
7 MBL Street
Woods Hole, MA 02543

(508) 289-7354
zswartz@mbl.edu

Current Positions

Assistant Scientist, Marine Biological Laboratory, Bell Center (Woods Hole, MA) 2022-present

Education

Brown University, Ph.D. Developmental Biology 2015
University of Rochester, B.S. Developmental Biology 2007

Doctoral and postdoctoral research

Whitehead Institute, Massachusetts Institute of Technology (Cambridge, MA) 2015-2022
Mentor: Iain Cheeseman, Ph.D.

Brown University, B.S. Developmental Biology 2008-2015

Grants and fellowships (Last 5 Years)

National Institutes of Health

- R35GM162442 NIGMS MIRA (PI): *Sea star oocytes as a model system for Wnt pathway activation through novel signaling organelles.* Awarded March 11, 2026 ($471,625 annually for 5 years)
- NICHD K99/R00 Pathway to Independence Award: 2019-2025 ($726,325 total)

Pew Charitable Trusts

- Biomedical Scholars Fellowship: 2025-2029 ($300,000 total)

Publications

Google Scholar: https://scholar.google.com/citations?user=CpHbbJoAAAAJ&hl=en

1. Naigles, B., McGonagle, B.S., and **Swartz S.Z**. (2026). Shining stars: Transgenesis and efficient metamorphosis in the sea star Patiria miniata. bioRxiv. DOI: https://doi.org/10.64898/2026.08.05.742869
2. Paganos, P., Naigles, B., Wolff, C., Voronov, D., and **Swartz, S.Z.** (2026). Molecular evidence for pre-chordate origins of ovarian cell types and neuroendocrine control of reproduction. Nature Communications. DOI: https://doi.org/10.1038/s41467-026-74401-5
3. Liu, J., Burkart, T., Ziepke, A., Reinhard, J., Chao, Y., Tan, T., **Swartz, S.Z.**, Frey, E., and Fakhri, N. (2025). Light-induced cortical excitability reveals programmable shape dynamics in starfish oocytes. Nature Physics. DOI: https://doi.org/10.1038/s41567-025-02807-x
4. Clarke, D.N., Kane, A., Perillo, M., Lowe, C., and **Swartz, S.Z**. (2024) VitelloTag: a tool for high-throughput cargo delivery into oocytes. Development, **151.** DOI: https://doi.org/10.1242/dev.202857
5. Perillo, M., **Swartz, S.Z.**, Pieplow, C, and Wessel, G.M. (2023). Molecular mechanisms of tubulogenesis revealed in the sea star hydro-vascular organ. Nature Communications 14:2402.
6. Perillo, M., **Swartz, S.Z.**, and Wessel, G.M. (2022). A conserved node in the regulation of Vasa

between an induced and an inherited program of primordial germ cell specification. Developmental Biology, **482**: 28-33.

7. Pal, D., Visconti, F., Sepulveda-Ramirez, S.P., **Swartz, S.Z.**, and Shuster, C.B. (2022). Use of echinoderm gametes and early embryos for studying meiosis and mitosis. Mitosis: 1-17.
8. **Swartz, S.Z.,** Tan, T.H., Perillo, M., Fakhri, N., Wessel, G.M., Wikramanayake, A.H., and Cheeseman, I.M. (2021). Polarized Dishevelled dissolution and condensation drives embryonic axis specification in sea star oocytes. Current Biology, 31: 5633-5641.
9. **Swartz, S.Z.,** Nguyen, H.T., McEwan, B.C., Adamo, M.E., Cheeseman, I.M., and Kettenbach, A.N. (2021). Selective dephosphorylation by PP2A-B55 directs the meiosis I-meiosis II transition in oocytes. eLife 2021;10:70588. DOI: 10.7554/eLife.70588
10. Wigbers, M.C., Tan, T.H., Brauns, F., Liu, J., **Swartz, S.Z.,** Frey, E., and Fakhri, N. (2021). A hierarchy of protein patterns robustly decodes cell shape information. Nature Physics, 17: 578-584.
11. **Swartz, S.Z.,** McKay, L.S., Su, K.C., Padeganeh, A., Maddox, P.S., Knouse, K.A., and Cheeseman, I.M. (2019). Quiescent cells actively replenish CENP-A nucleosomes to maintain centromere identity and proliferative potential. Developmental Cell, **51**: 35-48.
12. Oulhen, N.*, **Swartz, S.Z.***, Teo, Y.V., Foster, S., Wang, L., Wikramanayake, A.H., Neretti, N., and Wessel, G.M. (2019). Distinct transcriptional regulation of Nanos in the germ line and soma by the Wnt and Delta/Notch pathways. Developmental Biology, **452**: 34-42.
    **Co-first authors listed alphabetically*
13. Oulhen, N., **Swartz, S.Z.**, Laird, J., Mascaro, A., and Wessel, G.M. (2017) Transient translational quiescence in primordial germ cells. Development **144**: 1201-10.
14. Fresques, T., **Swartz, S.Z.**, Juliano, C., Morino, Y., Kikuchi, M., Akasaka, K., Wada, H., Yajima, M., and Wessel., G.M. (2016). The diversity of nanos expression in echinoderm embryos supports different mechanisms in germ cell specification. Evolution & Development, **18**: 267-278.
15. **Swartz, S.Z.** and Wessel, G.M. (2015). Germ line versus soma in the transition from egg to embryo. Current topics in developmental biology. Curr Top Dev Biol, **113:** 149-190.
16. **Swartz, S.Z.**, and Wessel, G.M. (2015). Earlier, but later than that, though not that early… Simplifying the many shades of gray in germ line determination. Mol Reprod Dev, 82.
17. **Swartz, S.Z.**, Reich, A.M, Raz, T., Milos, P.M., Campanale, J.P., Hamdoun, A., and Wessel, G.M. (2014). Deadenylase repression protects inherited mRNAs in primordial germ cells. Development, **141**: 3134-42
18. Wessel GM, Brayboy L, Fresques T, Gustafson EA, Oulhen N, Ramos I, Reich A, **Swartz SZ**, Yajima M, Zazueta V. (2014). The biology of the germ line in echinoderms. Mol. Reprod. Dev., **81**: 679-711.
19. Juliano, C., **Swartz, S.Z**., and Wessel, G.M. (2013). Isolating Specific Embryonic Cells of the Sea Urchin by FACS. Developmental Biology of the Sea Urchin and Other Marine Invertebrates: 187.
20. Materna, S.C., **Swartz, S.Z.**, and Smith, J. (2013). Notch and Nodal control forkhead factor expression in the specification of multipotent progenitors in sea urchin. Development, **140**: 1796806.
21. Juliano, C.E., **Swartz, S.Z.**, and Wessel, G.M. (2010). A conserved germline multipotency program. Development, **137**: 4113-26.

22. **Swartz, S.Z**., Chan, X.Y, and Lambert, J.D. (2008). Localization of Vasa mRNA during early cleavage of the snail Ilyanassa. Dev. Genes. Evol., **218**: 107-13.

Teaching and mentoring

Trainees Mentored:

Postdocs	3
Technicians	3
Master's Students	1
Rotation Ph.D. students	1
Undergraduate Interns	3

Courses Taught:

2026: *Faculty*, Undergraduate Semester in Biological Discovery, Embryology, Marine Biological Laboratory, BIOS 27761 at University of Chicago

2025: *Faculty*, Undergraduate Semester in Biological Discovery, Embryology, Marine Biological Laboratory, BIOS 27761 at University of Chicago
Faculty, Embryology Course, Marine Biological Laboratory
Group Leader, Middle School Catholic Faith Formation, St. Joseph Guardian of the Holy Family Parish

2024: *Faculty*, Embryology Course, Marine Biological Laboratory

2023: *Faculty*, Embryology Course, Marine Biological Laboratory

2014-2020: *Teaching assistant*, Woods Hole Embryology Course, Marine Biological Laboratory

Seminars and poster presentations (Last 5 years)

2026: *Massachusetts Marine Educators Association Annual Meeting,* keynote speaker.
NESM Virtual Spring Symposium, keynote speaker.

2025: *Embryology Course, Echinoderm Module,* faculty lecturer. Course director: Athula Wikramanayake, University of Miami
Science Forum, GMGI, Gloucester, MA. Host: Andrea Bodnar
Biology Seminar Series, Colby College, Waterville, ME. Host: Christina Cota
Developmental Biology Guest Lecturer, Amherst College, Amherst, MA. Host: Katerina Ragkousi

2024: *Neuroscience, development and physiology in a changing environment*, symposium organized by MBL faculty, University of Puerto Rico, San Juan
NIH Dir. Tenure Track Symposium, NICHD, Bethesda, MD, Plenary Speaker. Host: Leah Rosin
Biological Sciences Grad Program Seminar, Auburn University, Auburn, AL. Host: Ryan Range

2023: *Reproductive Longevity Conference*, Chicago, IL, Invited Speaker
Department seminar, University of Chicago Biological Sciences Division. Hosts: Urs Schmidt-Ott and Michael Glotzer
Department seminar, Carnegie Mellon Dept. of Biological Sciences. Host: Veronica Hinman

Developmental Biology of the Sea Urchin and Other Marine Invertebrates, Woods Hole, MA, Young Investigator Keynote Speaker
Department seminar, Stazione Zoological Anton Dohrn, Naples, Italy. Host: Ina Arnone

2022: *Developmental Biology of the Sea Urchin and Other Marine Invertebrates*, Woods Hole, MA, Invited Speaker

2021: *Princeton Developmental Biology Colloquium,* Princeton, NJ, Invited Speaker

Service to the community

2026 **Middle & High School Science Tour,** St. Joseph's Guardian of the Holy Family Parish (Falmouth, MA)

2025-present: **Grade 6 Group Leader**, Catholic Faith Formation St. Joseph's Guardian of the Holy Family Parish (Falmouth, MA)

2025: **Lead Organizer**, International Developmental Biology of Marine Invertebrates conference (April 2-5, 2025, Woods Hole, MA)

2024: **Co-organizer,** MBL-University of Puerto Rico symposium and CRISPR workshop
Postdoc Association Faculty Liaison
Co-organizer, "Diversifying Science Panel Discussion;" part of MBL's Juneteenth celebration

2023: **Postdoc Association Faculty Liaison**

2017-2022: **Member**, Whitehead Postdoctoral Association Committee

2017: **Co-organizer** of MIT Post-doc Work In Progress Series

2016-17: **Organizer** of Whitehead Forum Seminar Series