

Jacob Warner, PhD

University of North Carolina
601 S. College Rd., Wilmington, NC 28409

+1(910)-962-0542 warnerj@uncw.edu warnerlab.org
ScientistJake @ScientistJake 2-BitBio.com

Highlights

- Marine invertebrate developmental biologist with 17 publications.
- Over \$2.7 million in external grants in first four years as PI.
- Internationally recognized research program (international talk invitations).
- Deep pedagogical training with bio-medical teaching portfolio.

Academic Positions

2019 – Current Assistant professor

Department of Biology and Marine Biology.
University of North Carolina Wilmington, Wilmington NC.
Research focus: Developmental genetics of marine invertebrate embryos.

2014 - 2018 Post-doctoral fellow

Laboratory of Eric Röttinger, Institute for Research on Cancer and Aging of Nice (IRCAN).
Project: Comparison of embryonic and regenerative gene regulatory networks in the sea anemone *Nematostella vectensis*.

2013- 2014 Interim post-doc

Laboratory of David McClay, Department of Biology Duke, University.
Project: Left-right asymmetry in the sea urchin embryo.

2008 - 2013 Graduate research fellow

Laboratory of David McClay, Department of Biology Duke, University.
Project: Hedgehog signaling in the sea urchin embryo.

2005 - 2006 Undergraduate research assistant

Laboratory of Jeffrey Marks, Department of Pathology, Duke University.
Project: Gene expression and targeted chemotherapy in breast cancer.

Education

2013 PhD Genetics and Genomics, Duke University, Durham, NC

Certificates in college teaching and cell and molecular biology.
Preparing Future Faculty fellow.
Dissertation Title: “Mechanistic Diversification of the Hedgehog Signaling Pathway: Insights into Left-Right Asymmetry and Transduction by Motile Cilia in the Sea Urchin”
Thesis advisor: David R. McClay

2006 BS Biology, High Point University, High Point, NC

Majors: Biology, French. Minor: Chemistry
Distinctions: Magna cum laude. Presidential scholar athlete. French Honor Society.

Publications

* Indicates mentored student co-authors

- 2023** Desplat Y*, **Warner JF**, Blake EJ, Vijayan N, Cuvelier M, Blackwelder P, Lopez JV. Morphological and transcriptional effects of crude oil and dispersant exposure on the marine sponge *Cinachyrella alloclada*. *Science of the Total Environment*. 2023 Jun 20;878:162832. doi: 10.1016/j.scitotenv.2023.162832. Epub 2023 Mar 15. PMID: 36924960.
- 2023** Oulhen N, Shumpei M, **Warner JF**, Wessel G. CRISPR/Cas9 knockin methodology for the sea urchin embryo. *Molecular Reproduction and Development*. 2023 Feb;90(2):69-72. doi: 10.1002/mrd.23672.
- 2022** Vyas H, Schrankel CS, Espinoza JA, Mitchell KL, Nesbit KT, Jackson E, Chang N, Lee Y, **Warner J**, Reitzel A, Lyons DC, Hamdoun A. Generation of a homozygous mutant drug transporter (ABCB1) knockout line in the sea urchin *Lytechinus pictus*. *Development*. 2022 Jun 1;149(11):dev200644. doi: 10.1242/dev.200644. Epub 2022 Jun 6. PMID: 35666622
- 2021** Desplat Y*, **Warner JF**, Lopez JV. Holo-Transcriptome Sequences from the Tropical Marine Sponge *Cinachyrella alloclada*. *Journal of Heredity*. 2021 Dec 7:esab075. doi: 10.1093/jhered/esab075. Epub ahead of print. PMID: 34875073.
- 2021** McClay DR, Croce JC, **Warner JF**. Conditional specification of endomesoderm. *Cells and Development*. 2021 Jul 7:203716. doi: 10.1016/j.cdev.2021.203716. PMID: 34245941
- 2021** **Warner JF**, Lord JW*, Schreiter SA*, Nesbit KT, Hamdoun A, Lyons DC. Chromosomal-level genome assembly of the painted sea urchin *Lytechinus pictus*, a genetically enabled model system for cell biology and embryonic development. *Genome Biology and Evolution*. 2021 Mar 26:evab061. doi: 10.1093/gbe/evab061. PMID: 33769486
- 2021** Johnston J¹, **Warner JF**¹, Amiel AR, Nedoncelle K, Carvalho EJ, Rottinger E. Whole body regeneration deploys a rewired embryonic gene regulatory network logic. *In revision at Nature Communications*. 2021 bioRxiv; doi: <https://doi.org/10.1101/658930>
1=equal contribution
- 2021** **Warner JF**, Rottinger E. (2021) Transcriptomic Analysis in the Sea Anemone *Nematostella vectensis*. *Methods in Molecular Biology*. 2021; 2219:231-240. doi: 10.1007/978-1-0716-0974-3_14. PMID: 33074544
- 2020** McClay DR, **Warner J**, Martik M, Miranda E, Slota L. (2020) Gastrulation in the sea urchin. *Current Topics in Developmental Biology*. 2020 ;136:195-218. DOI: 10.1016/bs.ctdb.2019.08.004.
- 2018** **Warner JF**, Guerlais V*, Amiel AR, Johnston H, Nedoncelle K, Rottinger ER. NVERTx: A gene expression database to compare embryogenesis and regeneration in *Nematostella vectensis*. *Development*. 2018 May 17;145(10).

- 2016** **Warner JF**, Miranda EL, McClay DR. Contribution of hedgehog signaling to the establishment of left-- right asymmetry in the sea urchin. *Developmental Biology*. 2016 Mar 15;411(2):314-24. doi: 10.1016/j.ydbio.2016.02.008. Epub 2016 Feb 9. PubMed PMID: 26872875; PubMed Central PMCID: PMC4790456.
- 2015** Amiel AR, Johnston HT, Nedoncelle K, **Warner JF**, Ferreira S, Röttinger E. Characterization of Morphological and Cellular Events Underlying Oral Regeneration in the Sea Anemone, *Nematostella vectensis*. *Int J Mol Sci*. 2015 Dec 1;16(12):28449-71. doi: 10.3390/ijms161226100. PubMed PMID: 26633371; PubMed Central PMCID: PMC4691047.
- 2014** **Warner JF**, and McClay DR. Left–right asymmetry in the sea urchin. *Genesis*, 2014: 52: 481–487. doi:10.1002/dvg.22752
- 2014** **Warner JF**, McClay DR. Perturbations to the hedgehog pathway in sea urchin embryos. *Methods Mol Biol*. 2014;1128:211-21. doi: 10.1007/978-1-62703-974-1_14. PubMed PMID: 24567217.
- 2014** **Warner JF**, McCarthy AM*, Morris RL, McClay DR. Hedgehog signaling requires motile cilia in the sea urchin. *Molecular Biology and Evolution*. 2014 Jan;31(1):18-22. doi: 10.1093/molbev/mst176. Epub 2013 Oct 11. PubMed PMID: 24124205; PubMed Central PMCID: PMC3879447.
- 2012** **Warner JF**, Lyons DC, McClay DR. Left-right asymmetry in the sea urchin embryo: BMP and the asymmetrical origins of the adult. *PLoS Biology*. 2012;10(10):e1001404. doi: 10.1371/journal.pbio.1001404. Epub 2012 Oct 9. PubMed PMID: 23055829; PubMed Central PMCID: PMC3467244.
- 2009** Walton KD, **Warner J**, Hertzler PH, McClay DR. Hedgehog signaling patterns mesoderm in the sea urchin. *Developmental Biology*. 2009 Jul 1;331(1):26-37. doi: 10.1016/j.ydbio.2009.04.018. Epub 2009 Apr 23. PubMed PMID: 19393640;

Grants and Fellowships

Extramural

2023	<i>Developing transgenic corals as novel technology for reef restoration</i> CORDAP – Coral Accelerator Program (CAP) 2022 Fogarty N (Co-PI), Warner JF (Co-PI), Crowe N (Co-PI), Conanco C (Co-PI), Artigenio M (Co-PI)	\$1,458,095
2022	Collaborative Research: Genomic mechanisms controlling the slow development of the Antarctic urchin <i>Sterechinus neumayeri</i> National Science Foundation, OPP Warner JF (Lead-PI), Range RR (Co-PI), Fenner J (Co-PI), Halanych K (Co-PI)	\$888,103
2022	Developing Transgenic Corals for Reef Restoration North Carolina Biotechnology Center Warner JF (Co-PI), Fogarty N (Co-PI)	\$19,430
2021	Developing a high-resolution gene regulatory network of EMT National Institutes of Health, NIGMS	\$413,836

Warner JF

2014 Post-doctoral fellowship ~\$100,000
Association pour Recherche sur Cancer (Cancer Research Association, France)

Warner JF

Intramural

2022 A Marine Biotechnology Seminar Series \$10,000
UNCW – SPARC Interdisciplinary seminar series
Warner JF (Co-PI), Crowe N (Co-PI), Strangman W (Co-PI), Williamson T (Co-PI), McCall J (Co-PI)

2021 Analysis of gene expression during coral embryogenesis \$5,000
UNCW- SPARC Research momentum fund
Warner JF (Co-PI), Fogarty N (Co-PI)

2021 Undergraduate Research and Creativity Awards \$3,230
UNCW- CSURF
Warner JF (Co-PI), Rosenblum E (Undergraduate)

2020 Leica Mz10 Fluorescent Dissecting Microscope for the RMD \$28,690
UNCW- CAS Equipment Fund
Warner JF (Co-PI), Taylor A (Co-PI), Lepabic P (Co-PI).

2019 Leveraging Cnidarian Genomes for Regenerative Therapies \$15,000
UNCW- OIC Translational research grant
Warner JF

Awards and Distinctions

2023 **UNCW Rising Research Excellence Award**
Institution wide award recognizing pre-tenure faculty with exceptionally high research output.

2022 **Invited speaker: Climate change in the age of Evo Devo**
Society for Developmental Biology annual meeting, Vancouver, CA
With travel award by provided by NSF

2016 **Hilde Mangold post-doctoral symposium selected talk**
Society for Developmental Biology annual meeting, Boston, MA
With travel award supplied by Developmental Dynamics

Student Mentorship

(Listed in year of graduation)

As PI at UNCW

Current Nicholas Majkut (MS)
Samantha Schreiter (MS)

Ryan Besemer (MS)
Michael Priest (MS)
Laura Sheppard (BS)
Christopher Canny (BS – Honors)
Yanni Shaw (BS)
Jake Rusnack (BS)
Kyle Cortés (BS)

2021 Chelsea Karp (BS)
Casey Pardue (BS)

2020 Brynn Carrick (BS)
Gordon Leary (BS)
Ruth Delosreyes (BS)

2019 Bernard Williams (BS)
James Lord (BS)
Ashlyn Boyd (BS)

As a postdoc at Université de Nice

2017 Vincent Guerlais (MS / M2)
2015 Yvain Desplat; (BS)

As a graduate student at Duke University

2012 Helen Zou (BS)
2011 Ali McCarthy (BS-Wheaton College)
2010 Sarah Lachance (BS – Guilford College)

Other Training and Certification

2019 **Course Curriculum Design Institute**
UNCW, Center for Teaching Excellence. Week long intensive course on the principles of course design and active learning methods.

2015 **Biological Interpretation of Next Generation Sequencing Course**
European Bioinformatics Institute (EMBL-EBI), Hinxton, UK. One-week course focused on computational approaches to analyzing RNAseq, CHIPseq and genomic data. Primarily using R and Linux tools.

2012 **College Teaching Certificate**
Duke University, Durham, NC. Completed coursework: BIO 705s Teaching College Biology, GS755 College Teaching and Course Design.

2011 – 2012 **Preparing Future Faculty Program**
Duke University, Durham, NC and Guilford College, Greensboro, NC (Advisor: Michele

Malotky)

2006 Teaching English as a Foreign Language Certification

EBC International, Madrid, Spain.

2005 French Language Certificate

Sorbonne, Paris, France.

Teaching Experience

** indicates new course developed*

At UNCW

BIO 485 Stem Cell and Regeneration Biology*

3 credits. Upper level class that investigates the principles of stem cell biology, cancer, and the major model systems for development and regeneration. Emphasizes molecular techniques. Active learning approaches include inquiry-based learning/ experimental design and group work.

BIO 410 Biotechnology*

3 credits. Survey course that examines the modern techniques associated with the major biotech sectors: Pharmaceuticals, stem cell engineering, forensics, and agriculture. Active learning approaches include a capstone project in which students develop their own biotech product.

BIO 495/595 Jobs in the Biological Sciences*

1 credit. Senior capstone course / Graduate course. Students interview professionals from a variety of non-academic careers including technical sales reps, scientific writers, patent lawyers, genetic counselors, ecological consultants, EPA researchers, etc. CV preparation and job searching is also covered.

BIO 495/595 Marine Biotechnology*

1 credit. Senior capstone course. Students investigate marine derived pharmaceutical therapies.

Prior to UNCW

2013 Team teacher: Biotechnology*

Durham Technical Community College, Durham, NC
Three 4-hour sessions of a modular Biotechnology course.

2012 Teaching Assistant: Animal Physiology

Duke University, Durham NC
1 credit recitation section associated with Bio 329D.

2012 Guest Lecturer: Biology of Human Disease*

Guilford College, Greensboro, NC
Lecture and lab section of the Biology of Human Disease course.

2011 Laboratory Teaching Assistant: Molecular Biology

Duke University, Durham NC
2.5 hour lab section one day per week.

2010 Teaching Assistant: Gene Regulatory Networks Course

Woods Hole MBL, MA
Course directors: Eric Davidson, David McClay

2010 Guest Lecturer: Developmental Biology*

High Point University, High Point, NC.
Contact: Dr. Dinene Crater.

Presentations

2023 Talk: Benthic Ecology Meeting

Miami, FL. Title: Developing functional genomic tools for the reef building coral *Astrangia poculata*

2023 Invited Talk: University of Miami Department of Biology

Miami, FL. Title: Reverse engineering an embryo: the GRNs of early coral development

2022 Invited Talk: Auburn University Department of Biology

Auburn, AL. Title: A conserved gene regulatory network drives stony coral embryonic development.

2022 Invited Talk: Society for Developmental Biology / Pan-American Society for Developmental Biology joint meeting.

Vancouver, Canada. Title: Stony corals as a novel model system for cnidarian development in the face of a changing climate.

2022 Talk: Origins of Metazoa meeting

Roscoff, France. Title: A conserved gene regulatory network drives development of stony corals

2022 Talk: Developmental Biology of the Sea Urchin meeting.

Woods Hole, MA. Title: A conserved gene regulatory network drives development of stony corals

2021 Invited Talk: Spiralbase virtual lab meeting.

Virtual, Title: Construction of GRNs using high throughput sequencing data

2021 Talk: Temperate Coral Research Conference.

Virtual, Title: The evolution of gene regulatory networks of development in reef building corals.

2019 Poster: Society for Developmental Biology annual meeting.

Boston, MA. Title: Distinct gene regulatory sub-networks are deployed during gastrulation of the sea urchin.

2017 Talk: Origins of Metazoa meeting.

Paris, France. Title: Regeneration is a re-deployment of the embryonic gene regulatory network.

2016 Talk: Society for Developmental Biology annual meeting.

Boston, MA. Talk Selected for the Hilde Mangold Post-doctoral symposium. Title: Regeneration is a partial redeployment of the embryonic gene regulatory network.

- 2013** **Poster: Society for Developmental Biology annual meeting**
Cancun, Mexico. Title: Hedgehog signaling is dependent upon motile cilia in the sea urchin.
- 2012** **Talk: Developmental Biology of the Sea Urchin meeting**
Woods Hole, MA. Title: Hedgehog signaling is dependent upon motile cilia in the sea urchin.
- 2011** **Poster: American Society for Cell Biology annual meeting**
Denver, CO. Title: Hedgehog signaling is dependent on ciliary trafficking proteins in the sea urchin.
- 2011** **Talk: Developmental Biology of the Sea Urchin meeting**
Woods Hole, MA. Title: Hedgehog signaling and ciliary trafficking proteins in the sea urchin.
- 2010** **Poster: Duke Systems Biology Symposium**
Durham, NC. Title: Left-Right asymmetry and hedgehog signaling in the sea urchin.
- 2009** **Poster: Developmental Biology of the Sea Urchin meeting**
Woods Hole, MA. Title: Hedgehog signaling patterns mesoderm in the sea urchin embryo.
- 2009** **Invited speaker: High Point University**
High Point, NC. Title: Hedgehog signaling in the sea urchin embryo

Major Collaborations

- 2022-current** **Athula Wikramanayake, University of Miami.**
Transgenesis in the starlet sea anemone.
- 2021-current** **Leslie Babonis, Cornell, Koty Sharp, Roger Williams U.**
Development of the temperate coral *Astrangia poculata*
- 2020-current** **Ryan Range, Auburn University and Kenneth Halanych, UNCW.**
Gene regulatory networks of the Antarctic sea urchin *Sterechinus neumayeri*
- 2018-current** **Deirdre Lyons, Scripps Institute of Oceanography.**
Cell type homology and evolution using neural networks to evaluate single cell RNA sequencing data. *Lytechinus pictus* genome assembly and annotation.
- 2018-2022** **Joe Lopez, Nova Southeastern University.**
Transcriptomic analysis of the sponge *Cinachyrella alloclada*.
- 2012** **Robert L Morris and Ali M McCarthy, Wheaton College, MA.**
Cilia transduction of Hedgehog signaling.

Outreach

- 2022** **Flow ILM at the Cameron Art Museum, Wilmington, NC**
Exhibited sea urchin embryonic development to general public arts event.
- 2022** **UNCW Marine Quest – Summer ventures speaker**
Speaker and lab organizer for UNCW's Marine Quest summer ventures program for under-represented minority students.

- 2016 - Current** **2-bitbio.com**
A blog of bioinformatic tutorials. <https://2-bitbio.com/>
- 2016 - Current** **Pokemodels!**
An open access educational outreach card game based on a popular video game series.
More info found at <https://pokemods.github.io/>
- 2016 - 2017** **Fête de la Science**
Université de Nice, Nice France. Science outreach day at the University of Nice.
- 2009 - 2013** **North Carolina State Science Fair Judge**
Raleigh, NC.
- 2008 - 2011** **NC DNA Day Ambassador**
NC. Targeted outreach for rural and underprivileged high schools.

Web Apps

- Cnidomes** *In development*
Genomic and protein database for stony coral developmental biology.
- NVERTx** <http://nvertx.ircan.org>
Gene expression database of the starlet sea anemone *Nematostella vectensis*

Other Skills

- Languages:** French - fluent in reading writing and speaking.
- Diving:** PADI open water certified
- Boat operations:** Boat safety certification. UNCW boat operator.