Gabrielle Winters Bostwick, Ph.D.

Molecular neuroscientist · Comparative organismal physiologist · Undergraduate educator

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PROFILE

Molecular neuroscientist and comparative organismal physiologist with a Ph.D. in neuroscience who has served as instructor of record at four institutions, teaching introductory biology, cell and molecular biology, biochemistry, genetics, anatomy and physiology, and upper-division majors courses. Research on cephalopod nervous systems, from the octopus brain to the peripheral nervous system of the arm, spans molecular, cellular, and whole-organism levels of analysis and is built from projects that undergraduates can own from dissection through publication. Committed to evidence-based, inclusive course design and to settings where research and mentorship are the same activity.

EDUCATION

2011–2018 **Ph.D. in Medical Science (Neuroscience)**, University of Florida, Whitney Laboratory for Marine Bioscience. Advisor: Leonid Moroz. Dissertation: *Molecular Mapping of the Octopus Brain*. Interdisciplinary Program in Biomedical Science.

2009–2011 **M.S. in Biology, Stem Cell Technology**, California Polytechnic State University, San Luis Obispo. Graduated with distinction, GPA 3.93. CIRM intern, The Scripps Research Institute: induced pluripotent stem cell culture and iPSC-derived neuronal differentiation. Advisor: Nikki Adams.

2003–2007 **B.S. in Neurobiology, Physiology, and Behavior**, University of California, Davis.

TEACHING EXPERIENCE

2026– **Instructor of Record, Neuroscience Concentration Curriculum.** Oregon State University Ecampus, Department of Biochemistry and Biophysics. Full-time neuroscience teaching faculty at the rank of Instructor; asynchronous online instruction for a national and nontraditional student population. Fall 2026: BB 314 Cell and Molecular Biology; BB 450 General Biochemistry.

2023, 2026 **Lecturer, Instructor of Record.** San Francisco State University. Fall 2026: Conservation Biology; Advances in Physiology (graduate seminar); Advising for Success in the Biology Major (BIOL 231), with UNC's Project READY curriculum. 2023: Molecular Genetics (BIOL 357), an upper-division majors course with authentic datasets, gene-editing case studies, and student-designed experiments. Universal Design for Learning applied throughout.

2019–2020 **Instructor of Record, Human Anatomy and Physiology I and II.** Daytona State College. Gateway health-science courses with multimodal assessment supporting neurodiverse and multilingual learners.

2019–2020 **Instructor of Record, Environmental Science (NAS 107) and General Biology (BIO 111).** Flagler College. Field-based biodiversity sampling, sustainability assessments, and ecotours for non-majors.

2012 **Graduate Instructor, Marine Genomics and Developmental Biology.** Friday Harbor Laboratories, University of Washington / University of Florida.

2009–2010 **Teaching Associate, Introductory Biology Laboratory.** California Polytechnic State University. Inquiry-based laboratory sections.

PREPARED TO TEACH

Introductory cell and molecular biology; introductory organismal biology; general biology; environmental science; evolution; human anatomy and physiology; genetics; cell biology; neurobiology with laboratory; comparative and animal physiology; environmental physiology; invertebrate biology; biochemistry; molecular genetics; genomics and bioinformatics; evolution of nervous systems; undergraduate and honors research; course-embedded research experiences in comparative neurobiology; an advanced laboratory in comparative circuit physiology.

RESEARCH AND PROFESSIONAL EXPERIENCE

Summer 2026 — **Kavli-Grass Fellow, Independent Research Fellowship.** Marine Biological Laboratory, Woods Hole. Competitively awarded; designed and ran a self-directed project independent of doctoral or postdoctoral supervision, with full access to marine animal facilities and imaging cores.

2022–2026 — **Postdoctoral Research Fellow, Crook Lab.** San Francisco State University. Established transcriptomics and hybridization chain reaction approaches in a physiology-focused lab; produced the first molecular characterization of octopus arm neural circuits (*Current Biology*, 2024); developed calcium imaging pipelines capturing population-level activity in the intact arm (*iScience*, 2026); mentored M.S. and undergraduate students.

2020– — **Director of Scientific Operations, Ocean Genome Atlas Project.** UN Decade of the Oceans-designated initiative mapping global marine biodiversity at single-cell resolution. Oversee scientific strategy and operations for an international program deploying mobile genomic labs aboard sailing research vessels; coordinate research across international taxonomic teams; lead grant development and institutional partnerships.

2020–2022 — **Lab Operations Manager and Cell Engineer, Octant Bio.** Emeryville, California. Managed facilities operations for all company laboratories and led a major laboratory buildout; mammalian cell culture (HEK293, fibroblasts) and reporter expression in human cell lines; NGS library construction and sequencing platform development.

2011–2018 — **Doctoral Researcher, Moroz Lab.** University of Florida, Whitney Laboratory for Marine Bioscience. Molecular diversity in molluscan memory centers using single-cell sequencing, in situ hybridization, and immunohistochemistry; electrophysiology and molecular mapping of identified *Aplysia* neurons.

2008–2009 — **Volunteer Research Assistant.** Hopkins Marine Station, Stanford University.

UNDERGRADUATE RESEARCH MENTORSHIP AND ADVISING

- Mentor, Crook Lab, San Francisco State University, 2022–present. Trained M.S. and undergraduate students in molecular biology, microscopy, image quantification, and scientific communication; mentees are co-authors on two publications.
- Mentor, Moroz Lab NSF REU cohorts and summer trainees, University of Florida, 2013–2018. Designed projects sized to a ten-week residency; mentee Rayanna Laux won the NSF REU Poster Presentation Award (2015). Led bioethics courses and symposium lab workshops for REU cohorts.
- M.S. thesis committee member, San Francisco State University, 2022–present.
- Academic advising: instructor of record for BIOL 231, San Francisco State University's major-advising course.

CURRICULUM DEVELOPMENT AND ONLINE INSTRUCTION

- Developed course-embedded undergraduate research experiences (CUREs) and modular lab units linking foundational concepts to advanced neuroscience topics.
- Designed online-ready materials including mixed-media content, asynchronous discussion protocols, and reflective assessments, since carried back into in-person courses.
- Delivering Oregon State University Ecampus courses in cell and molecular biology and biochemistry in fully asynchronous format.
- Integrating primary literature and bioinformatics into undergraduate coursework through BREWMOR and CEETL professional development.
- Developed K–12 and adult learner outreach curricula in biodiversity, genetics, and marine science (University of Florida / SeaKeepers collaboration, 2013–2018).

PROFESSIONAL DEVELOPMENT IN TEACHING

- UNC Project READY: Reimagining Equity and Access for Diverse Youth; completed and taught as instructor of record for BIOL 231, 2026
- Teaching Writing: Meeting the Moment, SFSU CEETL, 2025
- BREWMOR: Data-Driven Student Assessment and Reflection in Undergraduate Research, 2025
- MicroBREW: Assessment of Undergraduate Experiential Learning in Biology Labs, 2025
- BREWMOR: Integrating Bioinformatics into the Undergraduate Classroom, 2024
- BigBREW: Integrating Primary Literature into the Undergraduate Classroom, 2023
- Advancing Learning Webinar: Moving Instruction Online, 2020

TECHNICAL EXPERTISE

Functional and cellular physiology	Calcium imaging (population and single-cell); confocal, two-photon, and live-cell microscopy; neural tissue dissection and slice physiology; neurotransmitter pharmacology; electrophysiology of identified neurons.
Molecular biology	RNA/DNA extraction and NGS library construction; in situ hybridization and multiplex HCR; immunohistochemistry; single-cell and single-nucleus transcriptomics; molecular cloning.
Cell culture	Mammalian cell culture (HEK293, fibroblasts) and reporter expression in human cell lines; induced pluripotent stem cell culture and iPSC-derived neuronal differentiation (CIRM internship, The Scripps Research Institute).
Genomics and computation	Bulk and single-cell RNA-seq analysis; de novo transcriptome assembly; comparative gene expression analysis; custom Python pipelines for calcium imaging and image quantification.
Pedagogy	Active learning; Universal Design for Learning; online course design; scaffolded assessment; bioinformatics integration; mentorship of diverse learners.

PEER–REVIEWED PUBLICATIONS AND PREPRINTS

1. Winters-Bostwick GC, Bostwick CJ, Crook RJ. Neurochemical control of decentralized octopus arm circuitry. *iScience*. In press, accepted 2026. Preprint: bioRxiv 2025, doi:10.1101/2025.11.29.691307.
2. Benedict J, Engelman M, Klos M, Crook RJ, Winters-Bostwick GC. Molecular and ultrastructural characterization of the intramuscular nerve cords of the octopus arm. bioRxiv, 10 June 2026, doi:10.64898/2026.06.06.730610. In revision, *Journal of Comparative Neurology*.

3. Winters-Bostwick GC, Giancola-Detmering SE, Bostwick CJ, Crook RJ. Three-dimensional molecular atlas highlights spatial and neurochemical complexity in the axial nerve cord of octopus arms. *Current Biology*. 2024;34(20):4756–4766. doi:10.1016/j.cub.2024.08.049.
4. Deutsch S, Parsons R, et al., Winters-Bostwick G, Crook RJ. Evaluation of candidates for systemic analgesia and general anesthesia in the emerging model cephalopod, *Euprymna berryi*. *Biology* (Basel). 2023;12(2):201. doi:10.3390/biology12020201.
5. Stern-Mentch N, Winters Bostwick G, Belenky M, Moroz L, Hochner B. Neurotransmission and neuromodulation systems in the learning and memory network of *Octopus vulgaris*. *Journal of Morphology*. 2022;283(5):557–584. doi:10.1002/jmor.21459.
6. Winters GC, Polese G, Di Cosmo A, Moroz LL. Mapping of neuropeptide Y expression in *Octopus* brains. *Journal of Morphology*. 2020;281(7):790–801. doi:10.1002/jmor.21141.
7. Yoshida MA, et al., Winters GC, Kohn AB, Moroz LL. Molecular evidence for convergence and parallelism in evolution of complex brains of cephalopod molluscs. *Integrative and Comparative Biology*. 2015;55(6):1070–1083. doi:10.1093/icb/icv049.

SELECTED PRESENTATIONS

- Molecular and Functional Mapping of the Octopus Arm Nervous System. Invited speaker, CephNeuro Conference, Galveston, TX, February 2026.
- Three-Dimensional Molecular Atlas of Octopus Arm Neuroanatomy. Oral presentation, CephNeuro Conference, Woods Hole, MA, April 2024.
- Cephalopod Transcriptomes Unravel Details of Complex Nervous System Evolution. Oral presentation, SICB Annual Meeting, San Francisco, CA, January 2018.
- Cephalopod Neurogenomics: Insights into the Evolution of Complex Brains. Invited speaker, TONMOCON VI, Sarasota, FL, October 2015.
- Cephalopod Transcriptomes Unravel Details About Centralized Brain Evolution. Invited speaker, Monterey Bay Aquarium, April 2014.

GRANTS, AWARDS, AND FELLOWSHIPS

- Kavli Science and Society Sparks Program, The Kavli Foundation, 2026
- Kavli-Grass Fellow, Marine Biological Laboratory, independent research fellowship, 2026
- Grinter Fellowship, University of Florida, 2011–2014
- Alumni Fellowship, University of Florida, 2011–2015
- Poster Awards, Florida Genetics Meeting (Honorable Mention; Third Place), 2014, 2015
- NSF REU Poster Presentation Award (student mentee Rayanna Laux), 2015

SERVICE AND OUTREACH

- Selected participant, Kavli Science and Society Sparks Program, training in public engagement and science–society communication, November–December 2026
- President, Whitney Laboratory Graduate Student Association, University of Florida, 2013–2016
- Developed and taught K–12 and adult learner outreach curricula in biodiversity, genetics, and marine science (University of Florida / SeaKeepers collaboration, 2013–2018)
- Volunteer Research Assistant, Stanford University, Hopkins Marine Station, 2008–2009

References available upon request.