Masters of Science in Biology

Western Washington University

The Biology Department at Western Washington University has openings for graduate students starting Fall 2021. Faculty members in the department offer a wide range of expertise, from molecular biology to ecology. Graduate students are eligible for teaching assistantships, which fund the majority of tuition and provide a stipend of $13,650 per academic year. WWU is located in Bellingham, WA, a coastal city north of Seattle at the base of Mt. Baker in the northwestern part of the state. We strongly advise interested students to contact potential advisors in their area of specialty to get more details about individual labs.

APPLICATION DUE DATE: Feb. 1, 2021

More information can be found with the following resources:

- The Biology Dept: https://cse.wwu.edu/biology/biology-graduate-program;
- The WWU Graduate School: http://www.wwu.edu/gradschool/App_Reqs_Deadlines.shtml;
- By contacting Dr. David Hooper, Biology Graduate Program Advisor, hooper at wwu.edu;
- By contacting the individual faculty, below.

Potential advisors

Shawn Arellano: Marine invertebrate larval ecology and deep-sea ecology. The Arellano lab has opportunities to study larval biology and larval ecology in deep-sea, methane-seep organisms as part of an NSF-funded project. Some sea-time will be required, and research training opportunities may include larval culturing and embryology, larval physiology and behavior techniques, use of oceanographic equipment, microscopy, and/or molecular ecology approaches.
https://wp.wwu.edu/arellanolab/

Jim Cooper: The Cooper Evo-Devo lab focuses on aspects of development that have shaped long-term evolutionary patterns. We are particularly interested in how changes in skull morphogenesis alter the cranial mechanics of fishes in ways that allow them to invade new feeding niches. To do this we combine several different approaches that include studies of wild-caught marine fish larvae from the Salish Sea, experimental work with genetically modified zebrafish, using high-speed video to collect biomechanical data, transcriptomic studies of fish skull development, genetic mapping, and evolutionary studies of cranial form and function. Because our work is highly integrative, our lab group can accommodate students with a diverse range of interests.
cooperw5@wwu.edu

Lina Dalberg: The Dahlberg Lab uses the model organism *C. elegans* to probe the neurobiological, cellular, and behavioral role for proteins involved in a ubiquitin-dependent processes called Endoplasmic Reticulum Associated Degradation (ERAD). Student projects will use a variety of techniques, including fluorescence microscopy, behavioral assays, and biochemical characterization to investigate how ERAD targets neural receptors for degradation. A second, NSF-funded project focuses on improving metacognitive skills in undergraduate Biology students; students interested in this project should have experience (via coursework or research) in education and pedagogy research.
http://faculty.wwu.edu/dahlbec/

Deb Donovan: (*Note: Prof. Donovan will not be taking new students in fall 2021*). Research in the Donovan lab is focused on restoration aquaculture of our native pinto abalone, *Haliotis kamtschatkana*. Pinto abalone populations have declined precipitously in the last few decades and we collaborate with the Puget Sound Restoration Fund and with government agencies to restore populations in the Salish Sea. Student projects could focus on any aspect restoration, including optimizing rearing of juveniles at the hatchery, outplanting larval or juvenile abalone, or monitoring abalone at outplant sites. Students work closely with hatchery personnel to identify projects that align with student interest and that contribute meaningfully to abalone restoration.
https://www.biol.wwu.edu/donovan/

Nick Galati: Cilia are evolutionarily ancient, hair-like projections that generate hydrodynamic force and process extracellular information. The goal of our lab is to understand how cells build cilia, with a specific focus on how individual proteins traffic to and from a structure at the base of cilia, called the basal body. Much like traffic cameras and GPS illuminate vehicular traffic patterns, we aim to create a spatial map of protein movement to and from cilia as they assemble and sense the environment. To do this, we combine high-resolution fluorescence microscopy with digital image analysis to detect and quantify ciliary protein trafficking in space and over time. Our analyses are primarily conducted in mammalian cells and in the protist *Tetrahymena*.
https://biology.wwu.edu/people/galatid

David Hooper: Plant Community and Ecosystem Ecology: effects of riparian restoration on nutrient retention in mixed use watersheds. I will be accepting one graduate student in fall 2021 to work on a modeling project to understand how to better prioritize riparian restoration. Student work would combine GIS analyses and modeling of riparian buffers with field work assessing nutrient runoff to validate modeling results. This project is linked to the Nooksack Fraser Transboundary Nitrogen Project and the International Nitrogen Management System. Please see a full description of the project and desired grad student characteristics at my web site below. I strongly recommend contacting me prior to applying if you are interested in working in my lab.
https://wp.wwu.edu/hooper/

Suzanne Lee: A fascinating discovery in the early 2000s was that many more regions of eukaryotic genomes are expressed than previously thought, producing a variety of RNAs whose

functions, if any, are unclear. Current research in the Lee Lab is focused on understanding the biological impacts of these mysterious RNAs, with the broad goal of elucidating the underlying molecular mechanisms that govern RNA production, function, and degradation to maintain optimal cellular health. Key questions that intrigue us include: What are the molecular mechanisms that control the expression of non-protein coding and non-functional RNAs? What are the biological functions of uncharacterized non-protein coding RNAs? What happens to a cell if pathways normally responsible for processing or degrading these RNAs are disrupted? How are messenger RNAs, non-coding RNAs, and non-functional RNAs distinguished from one another? To address these and other questions, we employ the tools of biochemistry, molecular biology, bioinformatics, microscopy, cell biology, and reverse genetics, using the ciliate *Tetrahymena thermophila* as our model organism.
https://biology.wwu.edu/people/lees65

Craig Moyer: My interests are marine microbiology and geomicrobiology focusing on molecular approaches for exploring microbial diversity, community structure and ecological interactions. Presently, my lab and I are focused on the study of iron-oxidizing Zetaproteobacteria acting as the ecosystem engineers in microbial mats found at strong redox boundaries, including seep, spring and vent habitats. We are also examining the evolutionary divergence of surface and deep subsurface Zetaproteobacteria in hydrothermal systems.
https://biology.wwu.edu/people/cmoyer

Brady Olson: (*Note: Prof. Olson will not be taking additional students in fall 2021*)
Microzooplankton consume approximately 70% of marine phytoplankton primary production, making them the most significant grazers in the ocean and drivers of globally-important biogeochemical cycles. My interests are gaining understanding of the mechanisms that govern the ecology of these important zooplankton, primarily the factors that regulate their feeding behavior.
http://faculty.wwu.edu/olsonm/index.html

Merrill Peterson: Insect Ecology, Evolution, and Diversity. A primary direction of potential graduate projects in my lab would involve field surveys to examine landscape-scale factors affecting the community composition of Lepidoptera (butterflies and moths) in the Pacific Northwest. Another project is to examine the temporal stability of insect hybrid zones, with a focus on a model system involving the leaf beetles, *Chrysochus cobaltinus* and *C. auratus*. Interested students are strongly encouraged to reach out to me to discuss project ideas prior to applying.
https://biology.wwu.edu/people/peterson

Lynn Pillitteri: Plant Molecular and Developmental Biology. A potential graduate project in my lab would be aimed at understanding the molecular mechanisms driving cell type differentiation in the model organism, *Arabidopsis thaliana*.
https://biology.wwu.edu/people/pillitl

Dan Pollard: We study the causes of cellular trait variation. Our primary system is mating pheromone induced cell differentiation in baker's yeast. We use a broad array of techniques

from genome editing to fluorescence microscopy to computer modeling. Much of our work focuses on RNA and protein metabolism. Current student projects include: (1) Molecular mechanisms of natural variation in protein production and degradation, (2) Genomic analysis of RNA interference pathway proteins (collaboration with Suzanne Lee in the department), (3) Inhibition of CRISPR Cas-9 by nucleosomes, (4) Influences of genetic and environmental variables on the kinetics of cell differentiation, and (5) Diversity and substrate specialization of yeast species in Whatcom county (outreach project w/ local middle schools). Graduate and undergraduate students typically work collaboratively in teams on projects and there are opportunities to develop new research directions. Please email me (pollard@wwu.edu) if you are interested in joining our team.
https://biology.wwu.edu/people/pollard

Dietmar Schwarz: Ecological and Evolutionary Genetics and Genomics, Evolutionary Ecology. Schwarz's lab offers opportunities to study speciation, hybridization, and adaptation in host specific insects (apple maggot flies and relatives). The Schwarz lab also collaborates with Alejandro Acevedo on the molecular ecology of foraging in harbor seals.
https://biology.wwu.edu/people/schward2

Anu Singh-Cundy: Plant Cell Biology and Biochemistry. We study cell-cell interactions at the physiological, cellular, and molecular levels. Current projects are focused on understanding the role of HD-AGPs, which are extracellular glycoproteins that are expressed in the transmitting tissue of the pistil and in the vasculature of roots and shoots. We also study pectins and pectin-modifying enzymes found in the pistil of solanaceous species.
https://biology.wwu.edu/people/anu

Adrienne Wang: Molecular mechanisms of aging and neurodegeneration. The Wang lab is interested in understanding the molecular mechanisms of neurodegenerative disease and in identifying genetic modifiers that confer susceptibility or resistance to disease. We are especially interested in understanding how conserved signaling pathways that affect aging may interact with and mediate disease onset and progression. Current projects use fruit fly models of Alzheimer's disease and mitochondrial disease to investigate these questions using a range of genetic, pharmacologic, and molecular techniques.
https://biology.wwu.edu/people/wanga5

Matthew Zinkgraf: Research in the Zinkgraf lab is focused on the ecological and evolutionary genetics of undomesticated forest trees. To accomplish this research, we apply an interdisciplinary approach that utilizes methods from computational biology, genetics/genomics, molecular biology and forest ecology. Ongoing research in the lab is concentrated around two main projects. First, creating genomic resources for Pacific Madrone (*Arbutus menziesii*), and apply these resources to understand patterns of genetic variation and selection. Second, investigating the genetic regulation of wood formation in *Populus* by understand how epigenetic modifications at specific genes can alter gene expression and regulatory networks.
https://biology.wwu.edu/people/zinkgrm