

Biology Research Opportunities at UWSP

The Ecology and Evolutionary Biology of *Cannabis Sativa*

Dr. Brian Barringer
Associate Professor of Biology
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Description: I have a variety of projects focused on the ecology and evolutionary biology of *Cannabis sativa*. Some of my work focuses on understanding the ecology of feral populations and whether and to what extent feral lineages can be used to improve modern-day varieties. Other projects focus on the ability of this species to act as a phytoremediator (removing toxins from the soil and sequestering them in plant tissues). I'm also quite interested in the interactions this species has with other organisms (soil biota, insects, etc.).

Techniques: Experimental design, growing and caring for plants in the greenhouse and field, gathering, analyzing, and interpreting data, sharing results with others in written and oral presentations

General Requirements for Students: Intellectual curiosity, responsible, motivated and takes initiative, positive disposition and works well on own and as part of a team

Number of new students: Not actively recruiting but always interested in working with motivated students

Project Timeline: Fall and spring

The Ecology and Evolution of *Clarkia* spp. in California

Dr. Brian Barringer
Associate Professor of Biology
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Description: I have a number of ongoing projects focused on a few different species in the genus *Clarkia* (a group of annual plants native to the western US). Most of my work in this study system focuses in one way or another on understanding the ecology and evolutionary biology of plant mating systems. The work includes both greenhouse and lab work at UWSP and field work in CA.

Techniques: I involve students in all aspects of my research, including experimental design and execution, data analysis and interpretation, and sharing results via scientific conferences and publications

General Requirements for Students: Students must be intellectually curious, responsible, and must work well with others

Number of new students: Not actively recruiting but always interested in working with motivated students

Project Timeline: Fall and spring

Biogeography of Wisconsin Fishes and Fish Communities

Dr. Justin Sipiorski
Professor of Biology
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Description: My students survey waterways for all fish species using a variety of methods. In the face of climate change and environmental degradation, aquatic ecosystems are constantly in flux (including fishes). We submit findings to the Wisconsin DNR. The DNR focuses on gamefish populations and our efforts complement theirs, providing data on non-game fish distributions. Each year we discover new localities for fish species, and are also investigating evidence for recent potential fish extirpations. We curate fish specimens in the UWSP Museum of Natural History's Becker Memorial Ichthyological collection, one of the major collections documenting current and historical Wisconsin fish populations. Other projects include illustration and field guide design.

Techniques: Fish collection techniques (seines, dip nets, purse seines, electrofishing); aquatic habitat qualification/quantification; fish age, growth and body condition estimation; fish life history description; fish population dynamics modeling; fluid vertebrate collection curation techniques; georeferencing biological collection

General Requirements for Students: reliability, interest in biogeography, interest in biological collections, interest in fish diversity

Number of new students: 1-10

Project Timeline: Year-round

Parasitology Museum Curation and Digitization Projects

Dr. Sarah Orlofske
Assistant Professor of Biology
sorlofsk@uwsp.edu

Description: The UWSP Stephen J. Taft Animal Parasitology Collection contains over 22,000 specimens and represents one of the largest parasite-focused collections in the Midwest. Active curation of physical slide and vial specimens is needed to secure the collection for research and teaching purposes. Active digitization efforts make our specimens available to the public, researchers and students world wide. Current emphasis is on Arthropod parasites, but significant work is needed on Helminths and Protozoa.

Techniques: Museum preservation methods, microscopy (including digital photomicroscopy), molecular methods for species identification, literature reviews and exhibit development and outreach.

General Requirements for Students: General interest in Museum Collections, Natural History, Parasitology, Taxonomy, Evolution or Systematics. Ability to work as a team and follow detailed protocols for handling specimens, working with microscopes, and computer programs. General computer skills including Microsoft Excel and Adobe Creative Suite.

Number of new students: 1-3

Project Timeline: Fall and spring



Waterfowl Parasitology: Ecosystem and Community Ecology

Dr. Sarah Orlofske
Assistant Professor of Biology
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Description: Waterfowl are obtained from hunters and then dissections are performed by standardized protocols to obtain accurate species identifications and quantitative data on infection prevalence and intensity. We address a variety of research questions including detecting the presence of pathogenic species or discovery of new species. Overall the ecological and evolutionary significance stems from understanding how the environment or host characteristics influence parasite infection and the potential impact parasites have on hosts. There are also numerous opportunities for public engagement and outreach through existing collaborations with Wisconsin Waterfowl Association, USGS, WDNR, and individual hunters.

Techniques: Microscopy, Dissection Protocols, Museum Methods, Molecular Techniques
General Requirements for Students: Interest in parasitology, ecology, evolution or wildlife disease. Ability to work as a team and follow detailed safety protocols. Attention to detail and interest in statistics and data analysis.
Number of new students: 2-4
Project Timeline: Fall and spring

Student Enrichment, Engagement, and Equity in Chemistry, Biology, and Biochemistry through Science History and Research Displays (SEEE CBB SHAReD)

Dr. Lindsay Dresang
Associate Professor of Biology
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Description: Representation promotes inclusion and instills confidence to succeed in STEM fields. Our goal is to develop a series of themed displays in CBB related to great discoveries in science, explaining the history and importance of these discoveries while simultaneously highlighting the contributions made by women and minorities in science. Additionally, we will connect these great discoveries to the research work of our current faculty and career opportunities. Displays will have interactive QR codes to promote engagement for community events and allow us to analyze the effectiveness of the displays in improving engagement and belongingness for K-12 students, science majors and community members.

Techniques: IRB protocol, questionnaire formatting & analysis, science history
General Requirements for Students: interests in illustration, composition, diversity in STEM, and/or science education; required to have had a course with PI/co-PI/strong or strong recommendation from Justin Sipiorski
Number of new students: 1-2
Project Timeline: Summer 2023 to Spring 2024

Primate Stress Behavior and Fecal Cortisol Analysis

Dr. Sarah Jane Alger
Associate Professor of Biology
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Description: Primates Incorporated is a primate sanctuary about one hour south of campus. They collect behavioral data and fecal samples from their residents and send them to us for analysis. This project is to statistically explore the available data and write a grant to process the fecal samples.

Techniques: Grant writing and statistical design and analysis
General Requirements for Students: The completion of biology and statistics courses is preferred, but not required.
Number of new students: 1-2
Project Timeline: Fall

Neural Responses of Zebra Finches Exposed to Vocalizations of A Current Partner, Ex-Partner or Stranger

Dr. Sarah Jane Alger
Associate Professor of Biology
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Description: Zebra finches were exposed to vocalizations of a current partner, ex-partner or stranger. Brains were fixed and stained for proteins indicating neuronal activity. We will be counting active cells under the microscope for multiple brain regions of interest to see how brain activity compared in these three conditions.

Techniques: Microscopy and data analysis
General Requirements for Students: Must commit to the project for at least 2 semesters.
Number of new students: Up to 3
Project Timeline: Fall



Department of Biology
College of Letters and Science
University of Wisconsin - Stevens Point

Fish Culture (Aquaculture) of Commercially Important Wisconsin Fish

Dr. Chris Hartleb and Dr. Tyler Firkus, UWSP Northern Aquaculture Demonstration Facility - Bayfield, WI
chartleb@uwsp.edu, tyfirkus@uwsp.edu

Description: Multiple projects at the UWSP Northern Aquaculture Demonstration Facility in Bayfield, WI examine the husbandry practices for commercially important Wisconsin fish. Research involves all life stages from egg to adult and we use the latest techniques and equipment to improve fish health and production.

Techniques: You will learn and use state-of-the-art fish culture equipment and practices
General Requirements for Students: Willingness to spend the summer in Bayfield, WI since the campus' Northern Aquaculture Demonstration Facility is located in Northern, WI
Number of new students: 3
Project Timeline: Summer

Induction of Out-of-Season Spawning of Atlantic Salmon in Recycle Aquaculture Systems

Dr. Chris Hartleb and Dr. Tyler Firkus, UWSP Northern Aquaculture Demonstration Facility - Bayfield, WI
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Description: To keep pace with rapid growth of the US Atlantic salmon RAS industry, there is an urgent need for year-round domestic supply of eggs and embryos with improved performance in RAS, which is currently seasonally limited, and is limited to foreign suppliers. The ability to produce embryos throughout the year is critical to the growth and consistency of the Atlantic salmon industry, yet much work is needed to develop protocols leading to year-round broodstock performance that is comparable to in-season production.

Techniques: Fish culture, study design, data management, statistical analysis, fish physiology, fish sampling
General Requirements for Students: Undergraduate students who will have completed at least one-year of study towards a bachelor's degree and are still undergraduates during summer 2023
Number of new students: 1-2
Project Timeline: Summer

Bird-Window Collision Project

Dr. Robert Jadin
Biology lecturer
rjadin@uwsp.edu

Description: Window collisions by migratory birds are among the leading causes of bird mortality. To better understand the contributing factors and species affected, we coordinate with volunteers to collect birds on campus and other buildings, that have died by colliding with windows. We collect and voucher the specimens as part of an effort to document human impacts on bird populations and educate the public about this important issue. These data will hopefully allow us to implement strategies to reduce bird mortality.

Techniques: Bird identification, data collection, data analysis, creating presentations, presenting results to the public
General Requirements for Students: An interest in birds with abilities to learn techniques listed.
Number of new students: 3-8
Project Timeline: Fall and spring

Projects in Phylogenetics and Systematics

Dr. Robert Jadin
Biology lecturer
rjadin@uwsp.edu

Description: In my lab we generate original data and utilize bioinformatic tools and databases to: 1) investigate species relationships and biodiversity of a variety of taxonomic groups (e.g. snakes, platyhelminths, slugs, fish, amphibians); 2) identify patterns and processes of character evolution and adaptations of anatomical structures (e.g. hemipenis and external morphology, body size) across macroevolutionary time scales; 3) improve phylogenetic inference through increased understanding of morphological and molecular evolution (e.g. impact of missing data on analyses, total evidence phylogenetics); and 4) revise zoological taxonomy using the most thorough and advanced methods in systematics (i.e. integrative taxonomy).

Techniques: A variety of bioinformatic techniques but phylogenetic and statistical analyses in particular
General Requirements for Students: A serious interest in macroevolutionary biology
Number of new students: 2-3
Project Timeline: Any

