Biology Research Opportunities at UWSP

Courtship, Coloration, and Nest Success in Wild House Finches

Dr. Rebecca Koch
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Description: House finches are sociable songbirds that often visit birdfeeders around Stevens Point. Male house finches have bright red feather coloration that female house finches evaluate when they choose with whom to pair for the breeding season. My long-term research program aims to connect the dots between male color, female choice, and nesting success for both. Seasonal projects include running a lab protocol for distinguishing male and female finches via their DNA, setting up and maintaining feeding stations, and handling and observing wild house finches.

Techniques: Basic molecular lab techniques (DNA extraction, PCR, gel electrophoresis), wild bird capture and handling, field observation
General Requirements for Students: Foundation in introductory biology, responsibility to work independently and in a small team, and interest in behavioral ecology, evolutionary biology, and/or ornithology
Number of new students: 2
Project Timeline: Fall and spring

Detection of Cannabis Pathogens

Dr. Ann Impullitti
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Description: Cannabis is an emerging economic plant in Wisconsin. As acreage of Cannabis increases, it is likely that infection of plant tissues by plant pathogens will also increase. The primary objective of this project is to identify Cannabis pathogens in field-grown plants.

Techniques: DNA extractions, PCR, sterile technique, culturing fungi and oomycetes
General Requirements for Students: Introductory Biology
Number of new students: 2
Project Timeline: Fall and spring

Development of Embryonic Stable Cell Lines in the Zebra Finch through Conditional Reprogramming

Dr. Jianan Liu
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Description: The zebra finch is a key model for studying animal behavior and developmental biology, yet advances in cellular and molecular research are limited by the absence of stable primary cell lines. Existing zebra finch cultures survive only 12-15 passages, restricting reproducibility and large-scale genetic or screening approaches. This project aims to generate the first stable zebra finch primary cell lines using conditional reprogramming (CR), a feeder-based method that induces unlimited but reversible cell proliferation. Integrating CR with optimized embryonic culture will create a renewable platform that reduces the use of live birds and enables long-term in vitro research.

Techniques: Tissue cultures
General Requirements for Students:
Number of new students: 1-2
Project Timeline: Fall and spring

Development of a Non-Invasive Semen Collection Method in Zebra Finches (Taeniopygia guttata)

Dr. Jianan Liu
Assistant Professor of Biology
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Description: Understanding spermatogenesis and sperm competition in passerine birds is crucial for developing effective conservation strategies. Unlike many seasonal breeders, zebra finches reproduce year-round with stable performance, making them an ideal model for studying passerine reproductive physiology. This project aims to develop a non-invasive, practical semen-collection method for zebra finches. The conventional chicken-based manual stimulation method causes handling stress that may reduce sperm quality. A less invasive post-mating collection method used in quail offers advantages but has not been applied to zebra finches.

Techniques: Computer-Assisted Semen Analysis (CASA) in avian species
General Requirements for Students: Comfortable with handling of animals
Number of new students: 1
Project Timeline: Fall and spring

Department of Biology
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The Ecology and Evolutionary Biology of *Cannabis* Sativa

Dr. Brian Barringer
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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
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

Identifying spatial and temporal drivers of aquatic community change in Northern Wisconsin Lakes

Dr. Krisa Slemmons
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Description: The project examines how changes in the atmosphere and landscape changes can alter algae in lakes. This project uses paleo techniques to reconstruct the lakes environment in the past and compares it to current conditions.

Techniques: Water and lake sediment analysis, diatom microscopy, data analysis. Lake level modeling, Paleolimnological techniques
General Requirements for Students:
Number of new students: 2
Project Timeline: Fall and spring

Ornithology Museum Curation

Dr. Rebecca Koch
Assistant Professor of Biology
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Description: The ornithology collection at UWSP includes hundreds of scientific specimens and taxidermy mounts of birds from Wisconsin and beyond, as well as skeleton, feather, and other samples. Many of these specimens are more than 50 years old and are still catalogued in hand-written notebooks. In this project, students will learn museum management techniques while cataloguing and digitizing this rich resource to increase accessibility for research and teaching use.

Techniques: Cataloguing, organization, and maintenance of scientific bird specimens, taxidermy mounts, skeletal samples, and feather samples. Digitization of catalogue and potentially of specimens. Preparation of new specimens as available.
General Requirements for Students: General interest in scientific museum collections and/or curation. Experience with bird species identification is preferred but not required. Attention to detail, independence, and familiarity with Microsoft Excel.
Number of new students: 1-2
Project Timeline: Fall and spring

Parasitology Museum Curation and Digitization Projects

Dr. Sarah Orlofske
Associate Professor of Biology
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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 photo microscopy), 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

PFAS Phytoremediation and Soil Microbiology

Dr. Ann Impullitti
Associate Professor of Biology
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Description: Per- and polyfluoroalkyl substances (PFAS) are a class of man-made chemicals with widespread use in industrial applications. Because of their exceptional stability and high-water solubility, PFAS are persistent in the environment. We are currently investigating the ability of hemp (Cannabis sativa) and alfalfa (Medicago sativa) to remove PFAS from soil through a process termed phytoremediation (i.e., the uptake of contaminants using plants). We are also interested in understanding how soil quality and the soil microbial community influence PFAS remediation.
Techniques: DNA extractions, PCR, aseptic technique, culturing bacteria
General Requirements for Students: Introductory Biology
Number of new students: 2
Project Timeline: Fall and spring

Waterfowl Parasitology: Ecosystem and Community Ecology

Dr. Sarah Orlofske
Associate 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