

Biology Research Opportunities at UWSP

Anesthesia Response in Handled and Non-Handled Laboratory Rats

Dr. Jennifer Bray, Associate Professor of Biology - krista.slemmons@uwsp.edu
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Description: The goal for these species is to reduce the stress the rats may be exposed to in order to obtain improved physiologic results prior to and during sedation. Assessing anesthesia risks and identifying potential problems is important for potential complications or contraindications to a procedure. In previous years, during ovariectomy procedures on rats, the rats would not readily take to sedation. This could result in redosing the animal which increases the risk of complications or removing the animal from the project altogether. Our theory is that a highly anxious and stressed rat will be less vulnerable to the effect of KXA used as a sedative. Our project documents and tests this theory of anxiety and anesthetic induction failure to ensure future success prior to and during anesthetic induction. Our work desensitizes eight treatment rats by handling prior to testing by petting, holding, and talking to them. We then test anxiety levels using the elevated plus maze which tests rat anxiety. Introducing more than the typical momentary touch suggests that rat handling plays a role in the reduction of stress prior to undergoing and while under anesthesia.

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

Bird-Window Collision Project

Dr. Robert Jadin
Biology lecturer
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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

Deep Water Culture Hydroponic Systems and Dissolved Oxygen

Dr. Ann Impullitti
Associate Professor of Biology
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Description: Plants grown in soilless systems require oxygen to be delivered to their root zones. Recently we observed difference in plant growth in deep water culture (DWC) hydroponic systems depending on placement of aerators. The objective of this project is to determine if the microbial community and dissolved oxygen levels result in differences in plant growth.

Techniques: Hydroponics

General Requirements for Students: Introductory Biology

Number of new students: 2

Project Timeline: Fall and spring



Detection of Cannabis pathogens

Dr. Ann Impullitti
Associate Professor of Biology
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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 Learned: DNA extractions, PCR, sterile technique, culturing fungi and oomycetes
General Requirements for students: Introductory Biology

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

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

The Ecology and Evolutionary Biology of *Cannabis Sativa*

Dr. Brian Barringer
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

Heightened Awareness: How Social and Emotional Learning Pedagogy Aids STEM Teacher Preparation

Dr. Krista Slemmons, Associate Professor of Biology, Jesse Mossholder, Associate Lecturer of Education, and Dr. Laura Lee, Associate Professor of Biology
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Description: This project involves working on developing curriculum to be implemented during a summer week long workshop for 7th grade girls in STEM. The student will help with design and implementation as well as post workshop data analysis.

Techniques: Basic experimental design, writing and implementing science curriculum, data analysis, mentoring strategies.

General Requirements for Students: Willing to work on a team, interest in science education and promoting underrepresented groups in science.

Number of new students: 2

Project Timeline: Fall and spring



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

Identifying aquatic community resiliency following anthropogenic acidification and landscape alterations of Little Rock Lake, in the National Ecological Observatory Network (NEON), Wisconsin, USA

Dr. Krista Slemmons
Associate Professor of Biology
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Description: Lake sediment samples are collected from lake bottoms and analyzed for a variety of parameters including lake chemistry and aquatic organisms. The project analyzes a lake that was acidified over 40 years ago to determine the influence that event had on the aquatic community as well as the resiliency of the system.

Techniques: Microscopy, lake ecology sampling techniques, diatom identification, gathering and interpreting data.

General Requirements for Students: General interest in lake ecology, environmental issues and climate change. Ability to work with others and independently.

Number of new students: 2

Project Timeline: Fall and spring

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: 1-4

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

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 and spring

Projects in Phylogenetics and Systematics

Dr. Robert Jadin
Biology lecturer
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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

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



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