



BioScience Now

News for Alumni and Friends of the Department of Integrative Biology

FALL 2023



ENGAGING UNDERGRADUATE
STUDENTS IN BIOLOGY
READ MORE ON PAGE 4.



From the Chair



Greetings from the Department of Integrative Biology! The department continues to grow, bringing new perspectives, discoveries, and student opportunities to campus. I am amazed that in a single department students can gain such an array of research experiences -- from pipetting and running assays in a cell biology lab to running complex gene expression analyses at the computer, to observations of fish, birds and plants both at the university and in locations ranging from the Florida Keys to Iceland. These opportunities are life changing and are preparing the next generation of biologists to find solutions to real-world problems spanning from medicine and human health to ecosystem conservation.

This year we continued to add new faculty and staff members and to attract

a growing number of students to our courses. We are exploring the exciting possibility of a new Biology Building to provide the highest level of education and cutting-edge research opportunities to our students. This project is now a top priority of the College of Letters & Science and raises exciting opportunities for collaboration between iBio and the Botany Department that can lead to new synergies and further excellence in both departments.

I share my heartfelt thanks to the strong support of our alumni! Your generous contributions allow us to build excellence, to make new discoveries and to prepare our students to address critical world challenges. We simply cannot fulfill our mission without your ongoing partnership. Thank you for your continued support.

Very best wishes,

Lauren Ritters
Department Chair and Professor



BioScience Now

is the alumni newsletter of the Department of Integrative Biology at the University of Wisconsin-Madison.

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From Dean Wilcots



This year, UW-Madison celebrates 175 years as one of the world's premier public universities. Since its founding in 1848, UW's traditions of teaching excellence, academic discovery and public service have set the standard for institutes of higher education throughout the world. And since its own founding in 1889, the College of Letters & Science has advanced the university's commitment that innovations developed here will impact the world.

How will L&S lead for the next 175 years? By focusing on the core values that define our liberal arts mission: honing our creative talents, developing the intellectual courage to ask tough questions about the world around us, and building the connections between disciplines, people and ideas that drive tomorrow's innovations.

Our breadth is our greatest strength, from the disciplines we teach to the students who learn and thrive in our classrooms. That diversity -- of thought, skills, backgrounds and lived experiences -- is what makes L&S such an extraordinary place. It is why our faculty, students, staff and alumni continue to be recognized on campus and around the globe for their teaching, research and service. And it is why Letters & Science will continue to remain an academic leader and the heart of this great university.

Join me this year in celebrating this incredible milestone, and thank you for supporting us as we help lay the foundation of excellence for UW-Madison's next 175.

On, Wisconsin!

Eric Wilcots, Dean
Mary C. Jacoby Professor of Astronomy
UW-Madison College of Letters & Science

New Florida Marine Biology Opportunity for Undergraduates

January 2023 saw the launch of our new winterim course called UW Marine Biology in the Florida Keys (Zoology 320: Field Marine Biology.) Undergraduate students spend two weeks at the Keys Marine Laboratory in the central Florida Keys learning all about marine biology with Integrative Biology faculty Olaf Jensen and Robert Johnson and Trout Lake Station director Gretchen Gerrish. Through a combination of lectures and field trips, students learn about the biology of marine organisms and get to experience a hands-on introduction to coastal marine habitats in Florida, including coral reefs, seagrass meadows, and mangroves. Students also learn about potential career opportunities involving marine science,

including a field trip to a local sea turtle rehabilitation center and a visit from a guest lecturer involved in resource management with the National Park Service. The course culminates with an independent research project, with students applying the knowledge and skills they've gained throughout the course and presenting their findings to their classmates. The inaugural offering of the Field Marine Biology course was a great success, receiving enthusiastic praise such as, "I think I have learned more in these two weeks than I did all of college," and "This was one of my favorite classes that I have taken at UW," from the first cohort of students. A high bar for future years!



Associate Professor Olaf Jensen (holding rope) is helping lay out a transect line for an in-water "Living Labs" exercise. Living Labs are a set of long-term, permanent monitoring sites around the Keys Marine Lab that visiting education groups help monitor and collect data from during their visits, which contribute to the long-term nature of the projects. Here you see students learning how to identify the various organisms at a site with species ID sheets. The students surveyed the entire 25 x 25 meter Living Labs site recording the locations and species numbers from various taxonomic groups such as seagrasses, macroalgae, and sponges. The activity begins with setting up a large grid system of transect lines covering the Living Labs site before students collect the data.

Shaping Our Future

NEW FACULTY HIRES

The Department of Integrative Biology continues to grow! Two new Assistant Professors joined us in 2023: **Farrah Madison** and **Robert Johnson**.

Madison studies neural plasticity in songbirds, particularly different species of finches and canaries, trying to track the way their brains change in response to varying hormone concentrations and social environments. Those changes can offer clues related to how songbirds navigate their environment in addition to providing some insight into similar mechanisms in the human brain.

As a coastal marine ecologist, Johnson studies how seagrass ecosystems respond to green turtle grazing and environmental stressors such as warming temperatures. Gained insights enhance understanding of seagrass structure and function and help inform effective conservation efforts to preserve these important coastal habitats.

"We are thrilled to welcome Farrah and Robert to Integrative Biology. Their new skills, perspective, and energy are integral to our continued excellence as a department," says Chair Lauren Ritters.

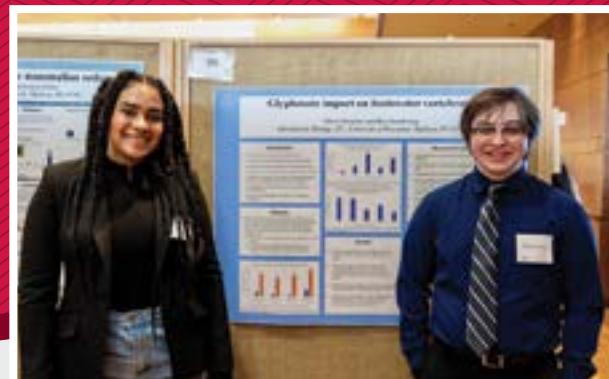
Student Engagement

College is a remarkable period of learning and self-discovery. Read more about the ways we help undergraduate students expand their horizons in biology



ACADEMIC ADVISING

Ginny Jackson, one of our five academic advisors, chats with students and parents at one of the many campus outreach events our advisors participate in each year. Academic advisors provide meaningful guidance and feedback to students, helping them navigate through our various undergraduate majors and graduate study programs.



IBIO RESEARCH POSTER SYMPOSIUM

Undergraduates **Olivia Kreykes** and **Ben Jirochvong** proudly displayed their poster at the Zoology 152 Research Poster Symposium in May 2023. Kreykes and Jirochvong examined the impact of a common household herbicide on the survival and fertility of freshwater vertebrates during their semester-long independent research project. Nearly 1,000 students across over 620 projects presented their work at the spring symposium. This event takes place each semester and offers students the opportunity to share their novel research with campus and the public.



SIYUN LIU

IN THE LAB

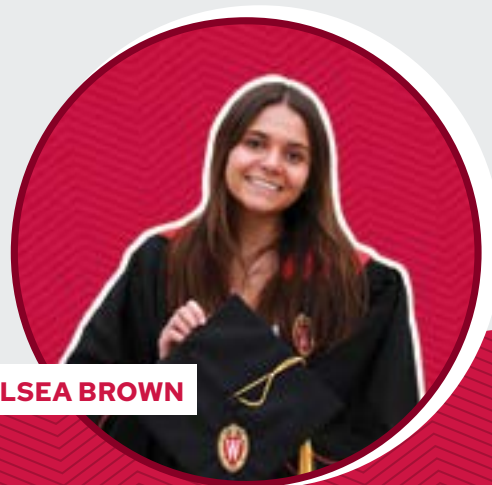
Siyun Liu, an undergraduate in Assistant Professor Han Wang's lab, is researching the gene *dec-7* and its significance in regulating an ultradian rhythmic behavior in the nematode *C. elegans*. She is working to show a phenotype that other researchers are unable to report in the literature. Liu began doing research in the lab as part of her Zoology 152 course in 2022 and currently has a 2023–24 UW Hilldale Undergraduate Research Fellowship supporting her research endeavors.





INSTRUCTIONAL LAB COURSE

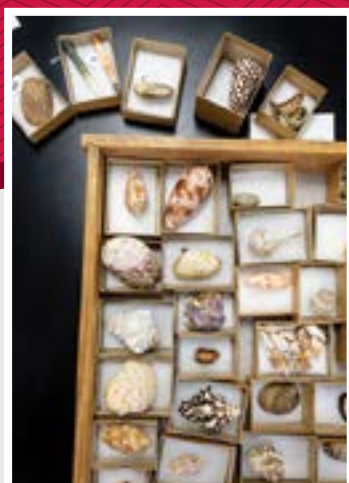
Associate Professor **Prashant Sharma** interacts with students studying various specimens during Zoology 302 (Invertebrate Biology and Evolution Lab) in Noland Hall. Instructional labs provide valuable opportunities for students to ask questions, probe for answers, conduct investigations, and collect data.



CHELSEA BROWN

GRADUATION

Around 600 students graduate annually from our four undergraduate majors. Recent zoology graduate **Chelsea Brown '23** shared, "Majoring in zoology allowed me the opportunity to take a vast array of courses with topics spanning from evolutionary biology to effects of climate change on our ever-changing environment and the organisms that inhabit it. I was exposed to content in my classes about wildlife, companion, and livestock animals, aiding me in my journey towards veterinary school and assisting me in the decision to pursue livestock veterinary."



MUSEUM SPECIMENS used in Teaching:

UW Zoological Museum specimens are regularly used for research and instructional purposes. Here, museum specimens representing each class of shelled molluscs were prepared for an instructional lab course to show the diversity of molluscs and the differences in shell anatomy by molluscan class. Students were asked to draw the shells at the top of the photo and then identify the class of each specimen.

FIELD RESEARCH

A group of undergraduate students conducting independent research meet with **Professor Ellen Damschen** at Muir Woods in Madison. Students can experience all aspects of the research process, from assisting others in the lab, to participating in field research, to designing, directing, and presenting their own research. It is also possible to obtain funding or credit for undergraduate research work.

UNDERGRADUATE RESEARCH

Providing hands-on research experience to aid our undergraduate students in their career paths is essential to us. Lab experiences enable students to learn essential skills in microscopy and methods to measure DNA, mRNA, and proteins in cells that prepare them for employment or medical/graduate school most frequently in the areas of education, health care, life sciences, nonprofit, research, and information technology



Faculty & Staff Stories

Laura Monahan

UW Zoological Museum Associate Director and Curator of Osteology
Laura Monahan was a recipient of the 2023 Board of Regents Academic Staff Excellence Award. The award recognizes exceptional university service and is the UW System's highest recognition bestowed upon members of its academic staff. Through her administration and supervision of the museum, including budgeting and fundraising, the Museum has obtained extramural funding to support regular operations and upgrade spaces and Museum storage to further enhance the collections and their usability in research and teaching. In addition, Monahan has encouraged and created collaborative relationships with local, state, and federal agencies; formalized positions for adjunct curatorial and collection volunteers; strengthened the internship program and developed new instructional opportunities offered by the Museum.



Prashant Sharma

Associate Professor Prashant Sharma is a recipient of the 2023 UW–Madison Distinguished Teaching Award recognizing some of the university's finest educators. Sharma stands out for his extraordinary devotion to undergraduate and graduate education. In particular, he is known for his innovative, immersive teaching approaches and for broadening participation of historically underrepresented groups in STEM. In addition to the courses he teaches, he actively participates as an invited lecturer for residential learning communities and K-12 teacher training programs. He mentors 5-6 undergraduate students per year in directed research projects in his laboratory, leading to several published peer-reviewed works. When working with students, Sharma never hesitates to roll up his sleeves and join in the work, whether it's at the bench, microscope, or field sites.



India Viola

The UW–Madison 2023 Community Leadership Award recipient was **Academic Advisor India Viola**. The award honors individuals who have made exceptional contributions to the advising, career services, and/or learning support communities. India's nominators shared: "She is attentive to and supportive of her students as they make their way through the bioscience curriculum, she shares content with her peers in order to support their work, and more importantly, India advocates for the advising community by demanding that campus leaders recognize the vital role that advisors play in helping students chart their course and career plans, their campus involvement and their community engagement." India was honored during the Spring Celebration & Awards Ceremony hosted by the Office of Undergraduate Advising in May 2023.



Monica Turner

Eugene P. Odum Professor of Ecology Monica Turner was elected to the American Academy of Arts and Sciences in 2023. She has spent over 30 years researching the forest ecosystem of Greater Yellowstone through a variety of lenses: vegetation dynamics, nutrient cycling, bark beetle outbreaks, climate change, and most notably, the impact of fires on forest resilience. Her work and long-term research on the 1988 Yellowstone fire has helped us better understand how climate change is altering the landscape and helped land managers plan for the future. In Wisconsin, Monica studies abrupt change in ecological systems, land-water interactions and spatial dynamics of ecosystem services. She has served as a past-president of the Ecological Society of America (ESA), received the 2008 ESA's Robert H. MacArthur award and is a member of the National Academy of Sciences.



Student Stories

Carl Shirley

Carl Shirley is a recipient of the 2023 Barry Goldwater Scholarship, the premier undergraduate scholarship in mathematics, natural sciences and engineering in the United States. Shirley is from Bristol, New Hampshire, and is majoring in molecular and cell biology with comprehensive honors. He started research with Professor Kristen Johnson at the University of New Hampshire while in high school, and since his freshman year at UW–Madison, has worked with Professor Nihal Ahmad on novel molecular pathways in the process of melanoma development. Shirley received a competitive research fellowship from the Provost's Office to start an independent project, and he earned co-authorship on a published review article. As a 2022 Amgen Scholar, Shirley worked in the cancer biology lab of Professor Gerard Blobe at Duke University, earning co-authorship on a research manuscript in submission. Shirley received the 2023 Undergraduate Scholar Award from the American Association for Cancer Research. He plans to pursue a doctorate in cancer immunology to help patients overcome resistance to immunotherapy.



Stephanie McFarlane

Stephanie McFarlane recently completed her doctoral research, which evaluates the outcomes of ecological restoration in grassland ecosystems and advances the predictive capacity of restoration ecology. While working on her Botany PhD with Integrative Biology Professor Ellen Damschen, McFarlane mentored 12 undergraduates with the commitment to support the growth and success of each individual student. She spent many hours in the field and lab with her mentees demonstrating hands-on data collection and analysis methods, while creating a culture that encourages creativity, asking questions, and building collaborations. In recognition of her contribution to our students' Wisconsin Experience, McFarlane received a 2023 Undergraduate Mentor Award from the UW Provost Office. Now as a postdoctoral fellow with Integrative Biology, she continues to mentor students exploring mechanisms that attract pollinators to restored prairies. Image: Award recipients with campus leadership; Stephanie is third from the left in the front row.



Brandon Polzin

Brandon Polzin recently completed his PhD in Integrative Biology. As a graduate student, he was selected for the 2023 Graduate School Industry Summer Internship Program. This program provides hands-on experience for students interested in careers in the biotechnology industry. Polzin joined Stem Pharm, a startup based in Fitchburg, where he worked in bioinformatics to analyze large-scale RNA data to advance sophisticated in vitro neural organoid models for drug discovery. "My time at Stem Pharm has been an exceptional learning experience that reinforced my enthusiasm for a career in the industry," Polzin shares. "It's been an amazing opportunity to translate my experience in neuroscience and bioinformatics to an entirely new research context. At the same time, I gained insights into unfamiliar aspects of biotech like business development and intellectual property." Polzin plans to continue solving ongoing challenges in the biotech industry working as a bioinformatics scientist.

SUPPORT INTEGRATIVE BIOLOGY

The generosity of our donors allows the Department of Integrative Biology to help our students, faculty, and staff reach their full potential. Please consider making a gift to the Integrative Biology Department Fund (#132860093) through the UW Foundation.

allwaysforward.org/giveto/integrativebiology

Check donations can be made out to the University of Wisconsin Foundation. Please include the fund number on the check.

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The UW Zoological Museum regularly hosts undergraduate and graduate student interns who gain practical experience in Museum Studies and participate in directed projects related to their own research. One of those graduate student interns is Integrative Biology PhD student Kaitlyn Abshire from Associate Professor Prashant Sharma's lab. Abshire's research focuses on land snail evolution and development, specifically understanding land snails' adaptations for life on land and the evolution of gastropod head appendages. Abshire is working toward establishing a model for the developmental study of the helicid snail *Cornu aspersum* (Müller, 1774). "Working with the rich invertebrate collection at the museum has given me the opportunity to learn more about mollusk diversity and has introduced me to the principles and techniques for identifying, preparing, and processing museum specimens," says Abshire. Currently, Abshire is identifying and inventorying the David A. Baerreis snail collection and the Eastward Cruise invertebrate collection for the Museum.

