



College of Letters & Science

UNIVERSITY OF WISCONSIN-MADISON

# Zoology Now

News for Alumni and Friends of the Department of Zoology

Winter 2015

A close-up photograph of a yellow-orange scorpion, identified as Centruroides sculpturatus, being held by a pair of metal tweezers. The scorpion is positioned vertically, with its pincers at the top and its legs extending downwards. The background is a soft, out-of-focus green and white.

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## Letter from the Chair



Chair Jeff Hardin

Dear alumni and friends,

Welcome to another issue of *Zoology NOW*. It is my pleasure to share some of the exciting work happening in our department since the last issue.

From Tony Ives, honored with a Steenbock Professorship to support his studies of the dynamics of ecosystems in Iceland, to the Center for Limnology's decades-long longitudinal study of water quality in Lake Mendota highlighted recently by the Big Ten Network, to the neuroscience research of Tony Stretton that flows seamlessly into his innovative laboratory course, recently featured by the College of Letters and Science, our faculty continue a long tradition of excellence. Our newest faculty continue that tradition: Marc Wolman's research on development of the nervous system recently garnered a Shaw Scientist award, and our newest arrival, Prashant Sharma, has hit the ground running as he studies

key questions in evolutionary biology. You'll hear more about the exciting work of our evolutionary biologist Robert Bleiweiss, which spans the globe, in this issue.

Add to this the dedication of our instructional and administrative staff and our commitment to innovative and outstanding teaching, and I hope you can sense, as I see every day, what an exciting place the Zoology Department is.

Without your generous support, we couldn't continue this exciting work. We're grateful for your partnership with us.

As always, remember that we love to hear about you, too, and we're happy to share your comments. Please send updates (and especially photos!) to [newsletter@zoology.wisc.edu](mailto:newsletter@zoology.wisc.edu).

Sincerely,  
Jeff Hardin  
Professor and Chair

## From the Dean's Desk

### Correction

**Dr. John Emlen** was misidentified in the 2014 *Zoology Now* newsletter.

The Zoology Department would like to apologize and thank Dr. Emlen's family for their continued support.



Dean Karl Scholz

Where would you be today without your degree from the Zoology Department in the UW-Madison College of Letters & Science at UW-Madison? As a father of three daughters—one of them in college—I think often about the impact of education on their lives. From selecting a major to landing that first job to pursuing a fulfilling career, their choices will be greatly influenced by their academic experiences.

I hope your degree has opened doors for you, as it does for more than 2,000 new L&S graduates every year. When you graduated with a degree in zoology, UW-Madison was one of the nation's best public institutions. Now, we need your support to keep it that way.

In 1849, UW-Madison opened its doors to the people of Wisconsin. Now, your university needs you. This fall, we are embarking on a

comprehensive fundraising campaign to ensure that UW-Madison remains not only strong now, but for the next 167 years. The College of Letters & Science—the heart of our great university—is critical to UW-Madison's global standing as a research and teaching powerhouse.

Please consider giving back. By doing so, you will be helping to create a legacy of excellence for future generations. As we launch this campaign, I ask you to remember the professors and programs, the opportunities and insights, the depth and breadth of learning that set you on your path to success in life and work. Help us ensure that future Badgers will enjoy the same experiences, and so much more. To find out about what your support can do for the Zoology Department and the College of Letters & Science, visit [zoology.wisc.edu/support/excellence.html](http://zoology.wisc.edu/support/excellence.html).

Thank you for all that you do on behalf of this great university. On, Wisconsin!



DEPARTMENT OF  
**Zoology**  
UNIVERSITY OF WISCONSIN-MADISON

*Zoology Now* is the alumni newsletter of the Department of Zoology at the University of Wisconsin-Madison.

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## New professor turns to arachnids to solve evolutionary puzzles .....

Once he decided to study arthropods instead of going to medical school, Prashant Sharma never looked back. Not even when he was kayaking into a pitch-black cave in central Laos last year, armed with camping gear, headlamps and vials to collect as many different species of pseudoscorpion scorpions, a mysterious lineage unique to Southeast and Central Asia, as he could possibly find.

“It was spectacular,” recalls the University of Wisconsin–Madison assistant professor of zoology, who’s among the 24 new faculty members joining the College of Letters & Science this fall. “Of this particular species, there were only four or five specimens known to science. But we found over 25 specimens in two hours!”

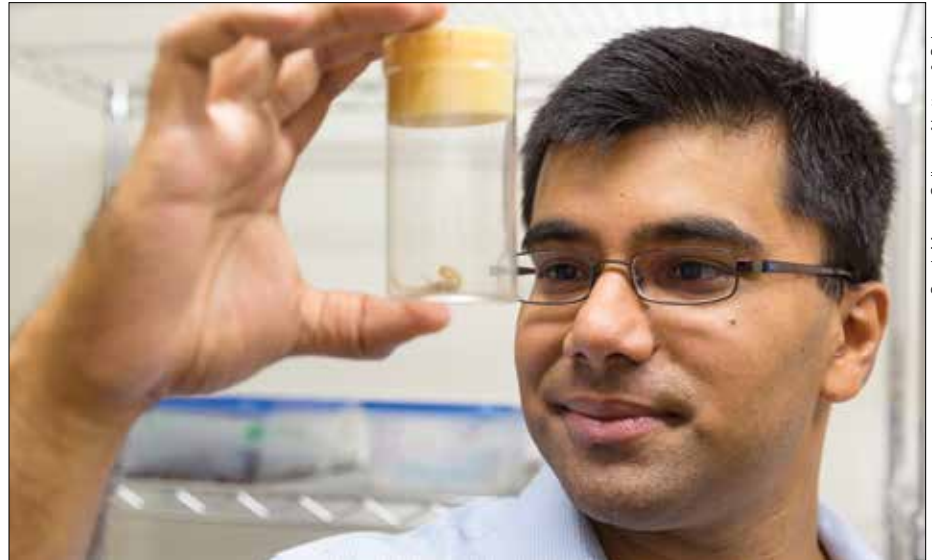
Why go looking for scorpions in the dark? For what they can tell us about the process of evolution.

Because they do not fly or swim long distances and yet are astoundingly diverse across their lineages, live arachnids like scorpions make ideal research models. How did some species make it across the Pacific Ocean? Why is “biogeographical signal”—the correspondence between species and their geographic distributions—a better predictor of their relationships than anatomy? And why do scorpions have complex, segmented tails, not seen in their closest relatives? These questions, and more, are inspiring ever more sophisticated research into the genetic databank that encodes the body plan.

Sharma is particularly interested in the scorpion’s tail and the evolution of venom.

“If you look at the genetic code of the arthropod common ancestor, the scorpion tail is an impossibility,” says Sharma. “Scorpions should not have enough genes to create their tails—yet they do.”

During his recent three-year post-doctoral appointment at the American Museum of Natural History in New York, Sharma studied the Hox family of genes, which control whether any animal, from worms to humans, will develop different body regions, such as mouthparts, wings or tails. What he found may have potentially solved the mystery of the scorpion’s tail—and provided scientists with a useful



Sarah Moron, College of Letters & Science

framework for all sorts of other evolutionary questions.

But before he could even get started, there was a problem: No one had created a reliable scorpion phylogenetic tree—a branching diagram showing the inferred evolutionary relationships among species and lineages, based on their physical or genetic characteristics.

That meant collecting live scorpions, which meant putting a team of scorpion hunters together to poke around in places that were dark and bat-ridden.

Torrential rain, village-wide power outages, and unpredictable (or non-existent) transportation were all in a day’s work for Sharma, as was the curled-up python he stumbled over in a cave in Australia. And then there were the scorpions, some of them “relatively large.”

“You just pick them up with forceps,” says Sharma. “It’s really no different from collecting anything else.”

Last summer, Sharma’s team published findings that help solve the mystery of the scorpion’s unique tail.

“[Biologists] had inferred that there were 10 Hox genes present in the arthropod common ancestor—meaning the arthropod can only pattern so many segments,” says Sharma. “But we found that they have at least 19 Hox genes, and what we were able to show was that the original Hox genes are duplicated. Some duplicated copies have acquired a new expression

boundary during embryonic development in the region of the scorpion tail.”

Insights from Sharma’s work on arthropods might end up informing gene therapy, disease studies, epidemiology and many other disciplines.

“You can ask the same question of many groups—What makes some lineages more diverse than others? What role does geography play in the evolution of diversity?” he says. “And this framework will apply.”

To continue our history of looking forward we need to advance in all directions. Your gift to Zoology will support scholarships, facilities improvements, student travel, faculty research, and curriculum updates.

Help us move forward at [allwaysforward.org/giveto/zoology](http://allwaysforward.org/giveto/zoology)



## FACULTY SPOTLIGHT

### Robert Bleiweiss – A Bird’s Eye View of Color

Colored plumage is a key feature of mating in birds. But how does attractiveness of plumage actually work from the birds’ perspective? **Dr. Rob Bleiweiss** is exploring the significance of the fact that birds can see wavelengths of light that humans can’t, especially ultraviolet light. Rob’s research is unraveling how this expanded repertoire of color vision works in birds, and how bird plumage capitalizes on this “bird’s eye” view of feather color. He has also discovered a fascinating, deep connection between the kinds of structures that channel light in feathers and similar light

channels in eyes. The remarkable collections of the University of Wisconsin Zoological Museum, as well as specimens obtained worldwide, are key to this work. Rob’s fieldwork in Ecuador is providing additional insights into bird plumage in more natural settings. It is a great example of how our faculty are bringing new facets of the natural world to light.



Rob Bleiweiss

Blue-winged mountain tanager

## Faculty Awards



**Professor Monica Turner** was given a **Vilas Research Professorship**, which is awarded to faculty possessing unusual qualifications and promise, and who have been recognized nationally and internationally for the quality of their research



**Professor Tony Ives** was named **Steenbock Professor of Biological Sciences**. This professorship provides outstanding UW–Madison faculty with 10 years of financial support for their research programs.



**Assistant Professor Marc Wolman** received the **Shaw Scientist Award** from the Greater Milwaukee Foundation, which supports emerging scientists from UW–Madison and UW–Milwaukee who are engaged in research in the fields of biochemistry, biological science or cancer research.

# Crayfish on the Brain

New lab offers hands-on experience to future neuroscientists

The hottest new major in the College of Letters & Science might involve a few sore fingers. Just watch Matt Stachowski (Biology, X'16), as he plunges one hand into an aquarium, where a bright red crayfish scuttles backwards.

"He's going to pinch you!" someone warns.

The opportunity to learn how the brain's nerve cells are born, grow and connect makes slippery moments like this one worthwhile for juniors and seniors like Stachowski who want to study neuroscience.

Fueled by President Obama's \$300 million BRAIN Initiative, which supports innovative research around emerging neurotechnologies, this rapidly expanding field is drawing students from many disciplines, including mathematics, physics, computer science, psychology, engineering, and medicine.

The demand for the "Neurobiology Option" offered as part of the major has skyrocketed since it was first offered in 2005. Averaging close to 300 students enrolled each year, the program is currently beyond capacity, with undergraduates lining up to get into neurobiology labs like this one, added this spring and taught by zoology Professor Tony Stretton, neuroscience Professor Peter Lipton and neurology Professor Corinna Burger. Many neurobiology students end up taking labs in other disciplines, such as ecology, to meet their requirement.

That will change starting in fall 2016, when the College of Letters & Science launches the new Neurobiology major in the Department of Zoology.

"An official major will finally put this program on sound footing and make it sustainable for the future," says Lipton. "Students would much rather have a major than an option. It enables them to do more neuroscience, and makes them more relevant to employers, graduate schools and medical schools."

Lipton notes that despite the past lack of a departmental home and no funding for teaching assistants and

equipment, professors worked hard to find equipment for laboratories and build rapport among students.

"These students know they have been part of a pioneering neuroscience effort on campus," he says. "They call themselves 'the neuro kids.'"

After they're through with crayfish, students will have two more 5-week modules where they'll examine synaptic transmissions in rat hippocam-

pal slices, as well as how the learning behavior of rats is influenced by Parkinson's disease.

By the end of the course, they will have progressed from carrying out specified experiments, to devising an original short project on their own. That's the essence of the scientific laboratory method, and adding more labs like this one will make UW-Madison a stand-out choice for many potential neuroscience majors.

Brain scientists are achieving remarkable breakthroughs in areas as diverse as obesity, stroke, dementia, Parkinson's, epilepsy, and many more challenging disease studies. Today, for these undergraduate students, it's crayfish. In ten years, it may be a cure for Alzheimer's.

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In fall 2016, the  
College of Letters & Science  
launches the new  
Neurobiology major in  
the Department of Zoology

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— by Mary Ellen Gabriel



Sarah Morton, College of Letters & Science

### New undergraduate scholarship honors acclaimed professor John T. Curtis

Through the generosity of Tom and Steve Curtis, the 2014–2015 John T. Curtis Ecology Scholarship was awarded to two University of Wisconsin–Madison undergraduate students, **Kelly Martin** and **Leah Weston**. The scholarship was established by the Curtis sons to honor their father, John T. Curtis, a former UW–Madison professor of botany renowned for his work as an ecologist. His classic work, *The Vegetation of Wisconsin*, was a major contribution to the development of plant ecology. The oldest restored prairie in the nation, a showpiece of the UW Arboretum, was named after him.



“I hope to be part of the generation that facilitates the continued existence and beauty of Earth’s biodiversity.”

**Kelly Martin, senior, Zoology**



“I want to inspire others to see nature as a living, breathing, complex system of interactions and connections to which all of us can belong.”

**Leah Weston, senior, Botany**

#### Did you know...?

Department chair **Jeff Hardin** started as a music performance and physics major at Michigan State, but finished with degrees in Zoology and German. He still plays the clarinet.

**Gale Oakes**, the Zoo 102 lab coordinator, is a big baseball fan who finds time to catch several Cubs home games at Wrigley Field in Chicago every summer.

**Professor Warren Porter** played the tuba for four years in the UW marching band during the time when the fourth quarter Tuba March was first put into practice.

**Professor Seth Blair** and **Zoology Department Artist, Bill Feeny** perform with their band, Reptile Palace Orchestra, in and around Madison.

**Professor Lauren Ritters** ran the Boston Marathon last spring and qualified for the 2015 New York Marathon.

#### Retirements

**Professor Patricia McConnell** retired in May 2015. She taught one of students’ most beloved classes, Zoo 335, Human and Animal Relationships.



**Roger Larson** was the Zoology Department’s Storekeeper from 1997 until his retirement in 2014. He moonlighted as Santa Claus for many years in the Baraboo/Wisconsin Dells areas.



#### In Memoriam

**Diane Mockrud**, who provided glassware and media preparation services for the Zoology Research building for 37 years, passed away October 31, 2014.

**Emeritus Professor William C. Burns**, who taught Comparative Anatomy and Parasitology and served as department chair, passed away on November 3, 2014.

**Jerry Ballweg**, a former storekeeper, passed away on August 4, 2015.



## Outreach: Graduate Students Make Science Fun



Carly Ziter

Cat Frock

(left to right) Cat Frock demonstrates a snake's jaws, Devin Merullo explains the concept of mimicry, and Joe Phillips and Pete Guiden teach kids about animal foraging behavior.

### Eat or be eaten!

What do you get when you combine: Bucky Badger, snake skeletons, a handful of acorns, two bins of rice and beans, graduate students who work on topics ranging from trophic cascades in Wisconsin to the digestive systems of birds, and hundreds of schoolchildren with their parents? A successful public science outreach booth run by Zoology graduate students!

During the 2014–2015 academic year, Outreach Committee members of the Zoology Graduate Student Organization (ZooGSO) participated in multiple science education events around campus. The most recent one was an Exploration Station called “Eat or Be Eaten: How Animals Find Food in a Dangerous World” at the 2015 UW Science Expeditions. Using animal specimens from the UW–Madison Zoological Museum, a Bucky stuffed animal toy, display boards, games, and hands-on activities, graduate

students helped participants learn about concepts related to animal foraging such as trophic guilds, food webs, feeding adaptations, camouflage, predation risk, habitat refugia, and tradeoffs.

“It’s fun seeing how excited kids are about animals,” says former ZooGSO President Devin Merullo. “They love to learn why the critters in their backyards look and act the way they do.”

Many educational materials at the ZooGSO booth this spring were new or improved due to a small grant for supplies from UW–Madison Science Expeditions. Jeremy Spool, the 2015–2016 Outreach Chair for ZooGSO, hopes to continue to expand the Committee’s efforts this coming year. Spool is currently pursuing a Delta Certificate in Research, Teaching, and Learning, and can be contacted via e-mail at [spool@wisc.edu](mailto:spool@wisc.edu).



Carly Ziter (left) and Devin Merullo (right) show off some kids’ artwork after discussing animal coloration and camouflage.

# Stay in Touch

We'd like to hear from you!

Please send any news that we can include in future newsletters to:

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call (888) WIS-ALUM (947-2586);  
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Photo of Kandis Elliot Illustration by University Communications

Portion of The Fishes of Wisconsin, created by UW Senior Artist Emerita, Kandis Elliot. To view the whole poster, or to purchase one, go to [charge.wisc.edu/zoology/items.aspx](http://charge.wisc.edu/zoology/items.aspx). All proceeds benefit the UW-Madison Zoological Museum.