Zoology NEWS

University of Wisconsin–Madison Issue 1 • Spring 2005

Welcome from the Chair

The Department of Zoology at the University of Wisconsin– Madison was recently rated #1 in undergraduate zoology education by an independent ratings group! Well, okay, the fact that most departments organize biology into a cellular/ developmental/ molecular group on the one hand, and an ecology/ evolution/ organismal on the other, leaving only 16 university zoology departments in the United States, may have helped us out some. Nonetheless, as most of you probably know, biology at UW–Madison is consistently rated in the top 20 nationwide, often in the top 10. We feel that the contributions from zoology play a major part in this. This is particularly evidenced by Monica Turner's election to the National Academy of Sciences this year. Steve Carpenter, already a member of the National Academy, was elected to the Swedish Academy of Sciences and was awarded a Wisconsin Alumni Research Foundation named chair. Too bad there's not a Nobel Prize in ecology! We're happy to report that Emily Stanley received a well-deserved promotion to Associate Professor with Tenure. Jim Kitchell received one of the American Fisheries Society's most prestigious career awards, their "Award of Excellence." Karen Strier was named a fellow of the American Association of the Advancement of Science and received the Chancellor's Award for Excellence in Teaching. Kurt Amann was named a Pew Fellow and was selected by the UW Graduate School as the UW's nominee to the Searle Fellowship competition. In addition, the quality of our staff is indicated by our Peggy Nowicki's (our chief administrator) being chosen as the winner of the highly selective classified staff early career award. Even our undergraduates can boast of major accomplishments. Carly Piper, a senior in Zoology just won an Olympic Gold Medal in the 200m relay in Athens.

Since our last newsletter in summer 2001, we have hired 4 new assistant professors.

Lauren Riters studies the neural control of sexually motivated song in birds; Janette Boughman studies the evolution of behavioral traits used in communication; and Kurt Amann focuses on developing a molecular understanding of the mechanisms underlying cell structure and motility. Finally, Andy Peters, who integrates theoretical population genetics with evolutionary studies, arrived this fall. His work has shed new light on such varied topics as inbreeding depression, fitness interactions between loci and alleles, and the evolution of sex. If you are interested in learning more about these exciting young zoologists, each of them has provided a short, personal biographical sketch, beginning on page 10.

Other major changes in the department will be a consequence of the recent retirements of of Jeff Baylis, Tim Moermond and Nancy Raffetto. Jeff, chair of the department from July 2001 to July 2003, plans to continue his research on fish reproductive behavior. He will use the time freed up by retirement to pursue new research as well, such as pollination strategies in orchids and the behavioral "tricks" that insectivorous plants employ to trap insect prey. Jeff and Denise expect to do a lot more traveling! Tim retired, not for real retirement, but to give himself the space and time to shift careers. He feels that he is starting on a long trip, but without knowing where he is going—both scary and exciting. He has already spent a month in China and a week in Baja. In January, he expects to go to Ecuador with one of my last students. Nancy and Al are

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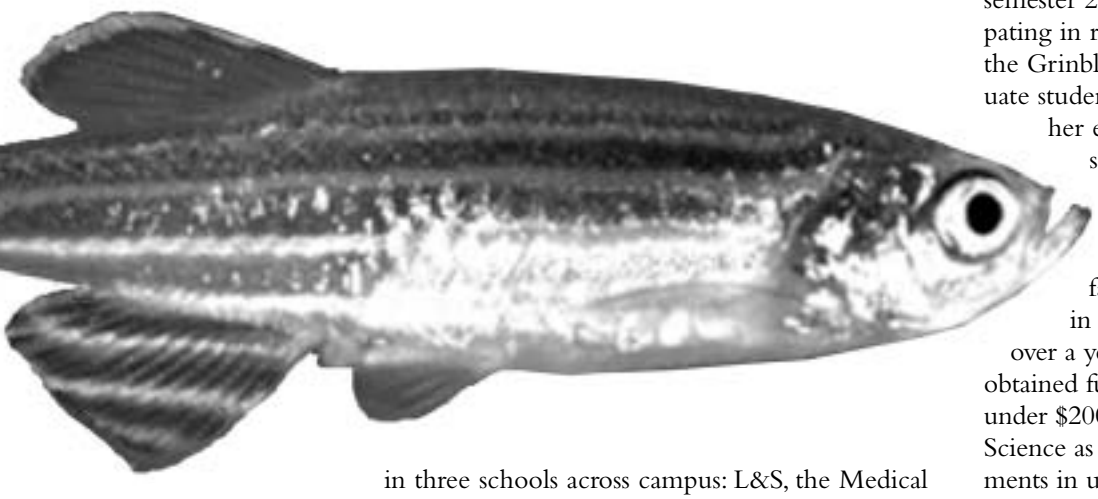
Karen Steudel

Inside Zoology

A Fish Tale

Starting up a new faculty research program



The Zoology Department has accomplished the long-anticipated construction of a large, state-of-the-art facility to house and breed zebrafish, a small striped aquarium fish that has become extremely popular for studies of embryonic development. The zebrafish facility is an offshoot of the research laboratories of two Zoology Assistant Professors, Dr. Mary Halloran and Dr. Jenya Grinblat, and is intended to support undergraduate teaching in zoology as well as the research of the Grinblat and Halloran labs. Drs. Grinblat and Halloran both joined the department as part of a zebrafish cluster hire that also includes Dr. Francisco Pelegri of the Genetics Department. Because Mary and Jenya both have joint appointments in Zoology and in the Anatomy Department, this cluster brings together three departments located in three schools across campus: L&S, the Medical School, and CALS. The Zoology zebrafish facility provides crucial support for the collaborative work of this cluster, and was made possible by concerted and vigorous efforts of both the Zoology and Anatomy departments.

One of the goals of the facility is to contribute to undergraduate zoology teaching by exposing the students to the latest techniques and approaches in development and genetics. Drs. Halloran and Grinblat are reviving an undergraduate laboratory course in Developmental Biology and redesigning the course to predominately use zebrafish as a model animal. The zebrafish is an ideal preparation for undergraduate lab courses for a number of reasons. Zebrafish embryos are fertilized externally, allowing easy access for observation and manipulation of embryos at all stages of development. Zebrafish have very large spawn sizes and spawn throughout the year, so that *thousands* of embryos can be obtained each week for experiments. Furthermore, scientists have identified hundreds of zebrafish mutants in genes important for development. These mutant lines are available, and an in-house holding facility of this scale allows us to maintain several lines for undergraduate experiments. Students will therefore be able to analyze the function of specific genes in regulation of cell fates and movements during early development, patterning of the embryonic body plan, development of the nervous system, muscles, internal organs, cranial facial structures, and numerous other systems. Because zebrafish embryos are beautifully transparent and accessible at all stages, students can clearly visualize these events and the individual cells involved, often in living embryos. The facility also makes it possible for Drs. Halloran and Grinblat to provide undergraduate independent research experiences to many students. Spring semester 2003 there were 5 undergrads participating in research in the Halloran lab and 2 in the Grinblat lab. One of Dr. Grinblat's undergraduate students won the Hilldale Award (2004) for her efforts in the lab, worth $4000 to the student and $1000 to the faculty supervisor from the Hilldale Foundation and the Wisconsin State Legislature.

The new Zoology zebrafish facility was completed and ready to take in its first denizens in January 2002, after over a year of efforts directed at this goal. We obtained funds for this project, which cost just under $200,000, from the College of Letters and Science as part of a directive to support improvements in undergraduate biology teaching. After sending the project out for bids from several companies, we decided to hire a German company named Aquarien-Bau Schwarz (just plain Schwarz to us) to build our facility. Schwarz is a family-run business in Germany that built the huge facility for the world-famous zebrafish laboratory of Nobel Prize winner Christiane Nüsslein-Volhard. A former research laboratory in the basement of the Zoology Research Building was renovated and prepared for the fish facility.

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Applause & Accolades!

The zoology faculty and staff have enjoyed plentiful recognition and been met with a number of awards and honors over the past few years for their tremendous accomplishments. Some particularly distinguished honors go to Monica Turner, Steve Carpenter, and Peggy Nowicki.

Monica at Yellowstone National Park (2003) in a stand of young lodge-pole pine that were established after the 1998 fires.

CONGRATULATIONS TO MONICA!

We are proud to announce that Professor Monica Turner was elected to the National Academy of Sciences in April 2004. Election to the NAS is among the highest honors in science. 72 new members and 18 foreign associates from 13 countries were elected this year in recognition of their distinguished and continuing achievements in original research. The National Academy of Sciences is a private organization chartered in 1863 by President Abraham Lincoln to serve as an official adviser to the federal government on matters of science and technology. At present there are about 2000 members, including 42 from the U.W.-Madison, among them 4 from the Department of Zoology, Monica Turner, Steve Carpenter, Hans Ris, James Crow.

Monica, a member of the UW–Madison faculty and Zoology Department since 1994, has research interests in landscape ecology, ecological modeling, and natural disturbance dynamics. Our heartiest congratulations on this well-deserved honor!

CONGRATULATIONS TO STEVE!

Steve Carpenter was elected to the Royal Swedish Academy of Sciences on April 20, 2004. The Academy is an independent organization, which acts to promote sciences, especially natural sciences and mathematics. Being elected a member of the Academy constitutes exclusive recognition of successful research achievements.

Did you know that committes of this Academy act as selection boards for the Nobel Prizes in Physics, Chemistry and the Prize in Economic Sciences? The Academy has about 350 Swedish members and 164 foreign members. Steve Carpenter is also a member of the National Academy of Sciences since his induction in 2001. Congratulations, Steve, on this most recent honor!

Peggy (right) and her daughter, Caitlin, in Granada, Spain.

CONGRATULATIONS TO PEGGY!

Peggy Nowicki, Assistant to the Chair, was an inaugural winner of the Classified Staff Excellence-Early Career Award in Spring 2004. One of only 3 to receive this award, Peggy stood up to some tough competition. Peggy has shown such dedication and innovation, and she has offered a consistent and reliable presence during a time of great change in the department. We are thankful for her efforts day in and day out, and this award demonstrates just how far reaching an impact Peggy has had not only in the department but across campus. Along with recognition, a cash award was also granted to the winners. The award helped to support Peggy's trip to Spain this spring to visit her daughter who was studying abroad. Congratulations, Peggy, we are proud and appreciative!

Remembering R.K. Meyer

Professor of Zoology, respected colleague, admired mentor, leader in science and in the department.

By Bette Barnes

Senior Lecturer Emerita, Physiology Department UW–Madison, received M.S. with R.K. in 1947, continued as an employee until she retired in 1972, currently serving many roles in social and community service/leadership organizations.

Roland Kenneth Meyer spent over 40 years, spanning the years from 1926 to 1972, as a member of the Zoology Department, starting as a graduate student and ending as William S. Marshall Professor from 1957 until his retirement in 1972.

He was both a teacher and a research scientist, and he excelled at both. Medical students came to "sit in on" his Endocrinology course lectures and the Endocrinology of Reproduction course was a model for others. He trained 78 PhD students, nurtured a number of postdoctoral fellows and collaborated with 130 other scientists in publishing nearly 300 papers. Those papers were carefully edited and meticulously proofread, in contrast to so many publications today.

The Memorial Resolution at the time of his death says it thusly: "He was a scientist who combined a fundamental concern for people of every nationality and persuasion with an absolute intellectual and ethical honesty."

In the early 1940s there was an influx of young women aspiring scientists, while the men were still in the Armed Forces during World War II. Dr. Meyer, known as R.K. by his friends, welcomed and guided women students as he did men. There was never a hint of racism, sexism or tokenism.

In those days of small departments, he was a classical biologist who taught many courses and used many different animal species in his research. He taught Embryology for years, while he was also developing and refining his Endocrinology course. His teaching philosophy was to present one gland in great detail, usually the thyroid; his enthusiasm was such that the last gland in the syllabus got short-shrift due to time restraints. He required "outside reading"—resumes of 50 pages of articles from appropriate journals at the end of each semester.

Although Endocrinology was a lecture course, he added Saturday morning laboratory sessions at various times throughout the semester to give students hands-on opportunities.

When the Endocrinology – Reproductive Physiology program was established in 1963, due to his nurturing efforts and enthusiasm, the Endocrinology of Reproduction became the advanced course. It consisted of 10 or 12 experiments, started separately, but overlapping because all required more than one week to complete, so each student was required to keep careful records and write a report for each completed experiment.

In the 1940s and 1950s Saturday afternoon would find him and most of his students in the old animal house at Birge Hall, often in the operating room, whether it was a football Saturday or not. Later these activities were transferred to the fourth floor of Zoology Research.

Obviously, he expected from his ever increasing number of graduate students the same dedication to research he had. To prepare students for the various careers they chose—research, often at pharmaceutical firms or hospitals; teaching; teaching research at colleges and universities; government service—all were required to present papers at journal clubs and seminars, and were encouraged to present their own research at scientific meetings.

He once said, "I particularly enjoyed working with young people, helping them develop their potential as scientists. The most rewarding aspect is seeing them learn to the point where they have confidence to develop their own programs and can make important contributions as teachers and researchers."

The outpouring of letters and gifts, and the presence of many of his students from all regions of the world at his retirement party in June 1972, attests to the esteem, even reverence, felt by those he had mentored.

By Bob Auerbach

Emeritus Professor of Zoology and long-time colleague of RK's.

R.K. Meyer was one of my heroes. He was a gentleman, when to be one was still considered a high compliment, a true scientist, an extraordinary mentor. He was an endocrinologist with a vision on birth control that led to his service as an advisor to The Population Council and to health agencies and universities in India long before there was popular understanding of hormonal regulation of pregnancies. The scientific contributions made by R.K. are still being cited in the current literature. Some of the students that he mentored are still prominent in industrial and university laboratories. Other students have retired but have left their mark by passing on what they have learned to a new generation of scientists.

Rather than dwell on the enormous scientific impact of R.K., I would like to relate some of the specific experiences that demonstrate the generosity, grace and dignity of this extraordinary man.

My first significant recollection was a staff meeting a few weeks after I joined

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The Department of Zoology wants to particularly extend its gratitude to our many alumni, colleagues, and friends who have generously contributed gifts. These donations aid our enduring mission of research, education, and service, both enhancing and expanding our capabilities. If you would like to make a gift to the Department, you may do so through the UW Foundation. Options are available for contributing to any of the currently established funds, or a separate fund may be established which allows the donor to specify how the funds be used.

UW Foundation: 1848 University Ave. PO Box 8860, Madison WI 53708–8860. Phone: 608.263.4545. Website: uwfound.wisc.edu.

Currently open funds include:

Roland K. and Elva S. Meyer Fund: Used for graduate student support and Chair's Discretionary Fund.

Zoology Department Fund: General support of the Zoology Department.

Dr. and Mrs. Carl A. Bunde Fund: Dr. Carl A. Bunde was a distinguished alumnus of the Department of Zoology who received his Ph. D. in 1937 and then pursued a career in medical research. The Bunde Fund provides Summer Research Support funds to undergraduates and graduates, with preference given to graduate students in their first two years of study at UW–Madison. 3–6 graduate awards of $600–3000/yr. 3–5 undergraduate awards of $1000–3000/yr.

Eugene Jorgens Memorial Scholarship Fund: Undergraduate Zoology Majors Scholarship and Summer Honors Program. 1–2 awards of $1000–2000/yr.

John & Virginia Emlen Award/Outstanding Grad Work in Zoology: This fund commemorates John Emlen, a widely respected and valued member of the Department. The Emlen Fund supports graduate research in the behavioral sciences. Also supports the Emlen Colloquium Lecturer. One award of $1000–3000/yr.

Biology of the Mind: To support the biology of the mind research of Emeritus Professor M. Deric Bownds.

Zoology Ecotoxicology Research Fund: To support the research of the influence and toxicity of man-made chemicals not only on world environment, but also on human development and health.

Developmental Biology Research Laboratory Fund.

Zoological Museum-Osteological Collection Fund: to support field and laboratory work in the museum osteological collection. It is chiefly meant to increase the size and scope of the Galápagos Islands skeletal collection.

Zoological Museum Centenary Fund: provides database development, capital equipment, staff development and general support for the Zoological Museum. Established as a matching challenge grant by William E. and Lynn R. Reeder in our 100th year.

Harland Mossman Zoological Collection: to provide support for Harland T. Mossman's research collection of microscope slides and preserved anatomical materials for which the UW Zoological Museum is the repository.

Zoology Museum Endowment Fund: to support special museum projects and enhance research and educational opportunities for students and UWZM curators and staff.

Netzer-Brouchoud Scholarship: Undergraduate and graduate support for the study of wild birds (alternates with Wildlife Ecology).

Lowell E. and Ruth Chase Noland Memorial Fund for Zoology: Scholarships, fellowships, stipends for visiting lecturers, student prizes, assistance for research projects, teaching enrichment, and general Dept. support.

William C. Burns Teaching Enrichment Fund: Recognizes TAs who demonstrate promise and to encourage excellence in the introductory courses.

Gary Quick Memorial Scholarship in Zoology: Scholarship support of a student in zoology, with preference given to those studying animal behavior.

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☐ Please contact me about making a major gift to the Department now or as part of my estate planning.

☐ I would like to meet with the Department Chair and selected faculty to learn more about the Department of Zoology and current developments in the various fields represented at the University of Wisconsin–Madison

☐ Please contact me. I would like to be more involved in departmental activities such as giving a lecture or talk to students about my experiences as a zoologist, working in industry, or

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We greatly appreciate the support of our alumni, colleagues, and friends, which enhances our department and provides many undergraduate and graduate opportunities that would not otherwise be open to our students. Our heartfelt thanks to the following individuals who kindly contributed from 9/1/2000 through 10/7/2004:

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R.K. Meyer

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the Zoology faculty in 1957. I had been hired because R.K. had accepted a 50% funded research appointment and the money saved was enough (more than enough!!) to pay a new Assistant Professor ($5,250). At the staff meeting I cautiously worded my concern that there was not enough research space for me on the 4th floor of Birge Hall to set up the program I had planned. The faculty went into executive session and I was excused. After the meeting I learned that they had voted to abolish plans for the 4th floor conference room so that I could establish my laboratory. R.K. had the most to lose, having more than twenty students at that time. Yet it was he who had initiated the change. My next complaint was that there was not enough animal room space for me. R.K. not only immediately vacated one of his rooms on the 5th floor for my new mouse colony but also offered additional space if needed.

My first controversial action in the department was to convert the embryology course from a classical slides-to-study course to one that ranged from slime molds to teratology and from bacterial to developmental genetics. My colleague Don Bucklin and I changed the name from Embryology to Developmental Biology. Not surprisingly, R.K. seemed upset and asked me to meet with him about these radical changes to a course he had taught for years. I was not exactly looking forward to the conference. The discussion, though, surprised me: R.K. said: "Dr. Auerbach (he didn't call me Bob for years), we hired you to take over the course. I expect you to do what you think is best, and I accept what you are doing. *However*, please, please, don't be afraid to change back to the older ways if you find you are wrong." What could me more gracious?

R.K. and I were *almost* always on good terms, but there was one time when our relationship was strained – and it too was related to the new Zoology Research Building. The 4th floor included a Primate Room, designed to hold the rhesus monkeys which R.K. was going to hypophysectomize for his studies on reproductive physiology. But, as the building was new, the monkeys had not yet arrived, I owned a ping pong table, and an empty room beckoned. When NIH visitors came to Madison to inspect the new building, R.K. confidently gave them a tour of the new building. "This new room," he said proudly, "is the Primate Room." When he opened up the door there were, indeed, active primates in it, but not for NIH-funded research! R.K. did not speak to me for several months!

As I said at the beginning, R.K. Meyer was one of my heroes. The Zoology Department was fortunate to have this great person on its faculty.

By Abraham Sunshine

Abraham Sunshine, Professor of Clinical Medicine at the New York University School of Medicine did an M.A. in Madison with R.K. He remembers the experience extremely favorably and writes that: "What I learned in preparing for my MA Degree under R.K. was critical scientific thinking and scientific curiosity. This was important to me in Medical School as well as in the practice of Internal Medicine. What I learned as a graduate student is still important to me today in evaluating therapies for patient care, reading journals, and making contributions to Medicine."

Dr. Sunshine and 2 associates are the inventors on 23 patents related to oral pain relievers. They realized the advantages of the non-steroidal anti-inflammatory drugs (NSAIDS), such as Ibuprofen over aspirin. As is well known, these inventions replaced aspirin in a variety of combinations and has led to improved pain management. They demonstrated that caffeine also enhances pain relief in conjunction with NSAIDS. The majority of the patents have subsequently been assigned to the pharmaceutical industry. ■

University Communications maintains a listing of some of the stories that spotlight UW–Madison and its people, as featured in newspapers, magazines, and broadcast media. Zoology has made it into the collection a number of times.

Zoology NEWS MAKERS

GUARDIAN, THE (05/22/04)
In the past few years, research has uncovered a possible link between some common garden chemicals and health problems in humans. But **Warren Porter**, a professor of zoology, thinks we may have only seen the tip of the iceberg on the effects of pesticides. "The whole assumption with toxicology testing is that it is done at fairly high pharmacological levels, but you can get completely different effects at parts per trillion or even less," he explains. "We simply don't understand these effects—it's a different world down at these low levels." The reason some pesticides have this power is that they behave like hormones, which our bodies use in tiny amounts. This way they can interfere with reproduction or development at levels far lower than anything we test for at present.

INDEPENDENT, THE (LONDON) (05/05/04)
Humans are made to walk, according to the new research of a team of UW-Madison zoologists. Wondering about the advantage of long legs, **Karen Steudel**, a professor of zoology, designed a study in which volunteers of various sizes and shapes performed treadmill tests to confirm that people with longer legs burned less energy walking, which may explain why humans evolved with longer legs than older ancestors like Neanderthals. "Due to the larger mass and shorter legs of Neanderthals, their energetic cost of walking would have been about 30 per cent greater than that of modern humans," says Steudel. But shorter legs may have offered other advantages that were more important at the time, such as more power for climbing or less surface area to expend heat, she notes. "It seems surprising that ancient hominids never evolved to having long legs, and managed with short legs for hundreds of thousands of years or more. This strongly suggests that there must have been some considerable evolutionary pressure to keep short lower limbs," says Steudel.

COLUMBUS DISPATCH (02/10/04)
By conservative estimates, about 9,000 species died last year. Many thousands more are threatened by deforestation, overfishing, pollution and loss of habitat. The dangers are so present and widespread that some scientists have doubts that preservation efforts can do much to stem the loss of biodiversity. But **Karen Strier**, a professor of anthropology, disagrees. "The problem is not so big we can't decide not to do anything. I'm not ready to give up yet," she says. In Brazil, Strier helped conservationists bargain with local landowners in an effort to help save the woolly spider monkey. With the creation of a 2,200-acre conservation reserve, the monkey population has grown from about 60 to more than 200 animals in 30 years. "The species is still critically endangered, but it's amazing what people can do," Strier says.

KIPLINGER'S PERSONAL FINANCE (01/01/04)
As an associate professor of zoology and an expert in animal behavior, **Patricia McConnell** has great insight into the unique relationship between people and their pets. In a feature on choosing a family pet, McConnell advises taking time to learn which dogs may be right for a family's style, a deliberative process that she says will save money and heartaches in the long run. A common mistake, she says, is to overlook the characteristics of particular breeds, which makes "people try to turn dogs that are not lap dogs into lap dogs." It is a great irony, she says, that dogs bred for high energy, such as Labrador and golden retrievers, have surged in popularity just when people spend less time at home. "We're at a time in our culture when dogs get the least attention," she says.

U.S. NEWS AND WORLD REPORT (12/08/03)
New research suggests that the "runner's high" may have some biological truth—that for some, exercise can be addictive. **Stephen Gammie**, an assistant professor of zoology, and colleagues studied mice selectively bred to love running. At night, these mice run an average of 6 miles on their little exercise wheels, three times as far as ordinary lab mice. After letting normal mice and these special mice run as much as they wanted for six nights in a row, the team kept half of each group from running for a night and studied their brains. The run-loving mice showed much higher levels of activity in brain regions that also light up when mice addicted to cocaine or nicotine don't get their daily fix. Gammie says the finding "provides pretty good evidence that this could be addictive for some people."

NEW YORK TIMES (01/17/03)
A new study is raising alarm over the dwindling population of sharks in the northwest Atlantic Ocean. While biologists have noticed declining numbers of sharks in specific areas in the past, they began carefully tracking the ocean's population of predators only in 1986. The recent findings, the first comprehensive analysis of that data, suggests that shark populations have dropped by as much as half, with species such as hammerhead and great white sharks falling by 75 percent. **James Kitchell**, a professor of zoology who specializes in the role of predators in ecosystems, is among the experts saying the study shows that commercial fishing is having serious effects on marine food chains, changing the nature of ocean life perhaps permanently. "This is a very important synthesis," he says. "Like the ax and the plow, the hook and the net can create major changes in ecological structure and function. We've been fishing the top off the food web."

CLEVELAND PLAIN DEALER (10/13/02)
The sight of four bright pink-and-white roseate spoonbills in Ohio's Rocky Fork State Park this summer caused a few double-takes. The birds are tropical waders, usually found in the Gulf Coast. Add a few brown pelicans cruising for dinner over Lake Erie, and some people believe they're witnessing

the effects of climate change. While that's uncertain, experts say, it is true that Great Lakes ice records reveal a warming trend. The change is most notable within the past 20 years, says **John Magnuson**, an emeritus professor of zoology. "It is getting warmer, and it's getting warmer in Wisconsin and across the Great Lakes, based on the ice data," Magnuson says.

LOS ANGELES TIMES (09/17/02)
Research from a team of UW-Madison environmental scientists shows a potential link between common herbicides and fertility problems among the people who use them. The study, which comes as the Environmental Protection Agency prepares to review the licensing of one of the chemicals tested, identified a 20% increase in failed pregnancies among laboratory mice who were given water spiked with low doses of a common weed killer. **Warren Porter**, a professor of zoology who led the study, says that the group deliberately selected the sort of weed killer most commonly employed by American homeowners on their lawns. "We bought it in a hardware store," he says. The herbicide comprises a mix of three chemicals, he says, which are commonly blended in weed killers and "weed and feed" products designed to kill broadleaf plants while sparing grass. "We have no idea what kind of reactions might be going on once these active ingredients are formulated into products," Porter says. "You're talking about putting a lot of very reactive chemicals together in a mix, and storing it at room temperature."

NEW YORK TIMES (08/20/02)
What does it mean to love nature? Human beings, it seems, are drawn to nature by what Harvard naturalist Edward Wilson called biophilia—a natural love of things natural. For those who study the environment, biophilia is an important, if sometimes confusing, variable. It's the love of nature that draws attention to things like disappearing forests and the extinction of animal and plant species—even if people don't always act consistently with their feelings and cause some of the very problems environmental science tries to prevent. Researchers say appeals to biophilia offer a personal, expressive and optimistic spin to environmental causes. "It's unreasonable to expect that everybody will care as much about hard-core nature as do those of us who work in the field," says **Karen Strier**, a professor of anthropology who has studied woolly spider monkeys in Brazil for the last 20 years. "But if people can be convinced to think twice before buying something made of endangered tropical hardwood, or ordering a fish that's being overfished, well, that can make a real difference. A little bit of biophilia goes a long way."

WASHINGTON POST (06/27/02)
Humans and dogs have a lot in common, according to **Patricia McConnell**, an assistant professor of zoology and author of the new book, *The Other End of the Leash*. A few examples: "Our babies have lots to learn while growing up; we hunt cooperatively; we play silly games even as adults; we snore; we scratch and blink and yawn on sunny afternoons," she writes, noting that the similarities help explain why "our level of connection with dogs is profound." But she also notes that dogs have many behaviors that are strange to humans. "We humans don't relish rolling in cow pies. Nor do we, for the most part, eat the placentas of our newborns," McConnell notes. As a result, owners and dogs often fail to understand each other, leading to behavior and social problems. The professor's book helps bridge the gap by offering a no-nonsense examination of the realities of the relationship between humans and dogs.

NEW YORK TIMES (06/11/02)
Forty years after one generation dammed the Colorado River at the upper end of the Grand Canyon, a new generation of engineers and scientists is struggling to deal with the consequences: colossal loss of sand, shrinking beaches, an invasion of outside fish and plants, the extinction of native species, erosion of archaeological sites and the sudden appearance of an Asian tapeworm, to name a few. They hope to stave off or reverse the damage to the river and its life forms by manipulating flows from the dam, a unique approach being tried around the country to restore eroding ecosystems. The team, representing many centers and universities, includes researchers from the UW–Madison Center for Limnology, which is helping to save a native fish known as the humpback chub, whose numbers have plummeted since the dam was constructed. "This is a bold experiment that can be stopped after a few years if it turns out the chub population is not improving," says **James Kitchell**, a professor of zoology who directs the limnology center. He says the team will try to reduce numbers of non-native rainbow trout, which feed on the chub. "Time may be short for the chub," he says. "We need to create a sense of urgency and pursue the most direct, immediate actions required to reverse the decline. That's the essence of adaptive management. You learn from experience, design new experiments, test a hypothesis and go from there."

NEW YORK TIMES (04/17/02)
Researchers in California have discovered that male frogs exposed to low levels of the weed killer atrazine can develop malformations in their sex organs—a potentially crucial discovery, given the prevalence of atrazine in groundwater and runoff. The research group observed that male frogs developed multiple sex organs when exposed to small quantities of atrazine, the most commonly used weed killer in North America. **Stanley I. Dodson**, a professor of zoology, says that these findings represent "the most important paper in environmental toxicology in decades." Dodson says he does not know if the research could mean that atrazine is dangerous to humans, but he adds, "It's like a canary in the mine shaft sort of thing." His research, he said, found that at low exposures atrazine changes the ratio of male to female water fleas.

POPULAR SCIENCE (01/01/02)
For centuries, biologists have classified animals into families by searching for commonalties in physical appearance. The logic makes a certain amount of sense - animals that look alike probably descended from common or closely related ancestors - and often is true. But new DNA research is giving scientists conclusive proof of common ancestry, and the results are often surprising. Analysis of genetics has shown, for example, that whales are more closely related to hippos, cows and sheep than to other sea mammals. **John Kirsch**, a zoology professor, led a team that, by using DNA hybridization, found similar unexpected kin among bird species. His research showed that grebes were closely related to flamingoes, a result so surprising to Kirsch that he was reluctant to publish it until another team found the same results.

FACULTY RESEARCH & HIGHLIGHTS
Spotlight on Assistant Professors

Kurt Amann

Area of Study: Cell Biology, Biochemistry

Courses Taught: Cell Biology, Biology Freshman Interest Groups, Seminar in Cellular Biology, Cytoskeletal Dynamics

Kurt Amann is an assistant professor in the Department of Zoology and Laboratory of Molecular Biology. Kurt was born in St. Louis but grew up in Phoenix and attended college in Tucson, Arizona. He returned to the Midwest to attend graduate school at UW–Madison, where he studied the biochemical basis of muscular dystrophy. He then carried out postdoctoral work at the Salk Institute for Biological Studies in San Diego, studying the protein actin, which controls cell movement and muscle contraction. Kurt and his wife, Virginia, came back to Madison in 2002 to continue this work in the Department of Zoology and to explore the recent and unexpected discovery that bacterial cells also use actin. (Although the surfing was better in San Diego, the superior bratwurst and beers of Wisconsin lured them back.) His laboratory now works on the actin polymer systems of both bacteria and eukaryotic cells. Ultimately, he would like to understand how such different cells use the same basic proteins to carry out very different tasks. His work is currently supported by the American Heart Association, who understand that such basic science work is required to understand complex diseases. Kurt teaches several courses, including upper division Cell Biology and a general interest science class for non-major freshman in their first semester at UW–Madison. When he's not working, he toys with the idea of attempting his second Ironman triathlon. Kurt is seen here, along with the result of his most successful recent experiment.

Janette Boughman

Area of Study: Evolution of behavior, animal communication, speciation, behavioral ecology, evolution, and sensory biology

Courses Taught: Evolution of Behavior, Evolution and Diversity portion of Introductory Biology, Seminar Speciation, Interdisciplinary Seminar-Animal Behavior

I arrived at UW–Madison in September 2002, coming from two NSF postdocs at the University of British Columbia where I began my studies on speciation in sticklebacks, working in the lab of Dolph Schluter. I continue to study these amazing fish here at Madison, bolstered by some talented graduate and undergraduate students, nearly all of whom have won awards or grants for their work in my lab. I love working on sticklebacks because of two equally important things: I can address very exciting and timely questions on how behavioral evolution can actually help to create new species; and I find the fish to be absolutely fascinating and easy to work with. I like to combine field experiments on behavior and ecology with lab experiments. I study the evolution of these traits primarily from a phenotypic perspective, but have become increasingly interested in investigating the genetic basis of communication traits and the genetic changes that accompany phenotypic evolution. I work at the intersection of several fields, using a highly integrative and multilevel approach.

Before my life with fish began, I studied cooperation and communication in bats. For my Ph.D. research, I combined field and lab experiments on greater spear nosed bats. These are the second largest neotropical bat, and are especially interesting because unrelated females live together in stable social groups (the same females may live together for their long lives—25 years in the wild). My work investigated benefits of vocalizations of these bats in foraging, mating, and learning.

Although they seem disparate, these studies are connected in that both are trying to understand how communication systems evolve. For the bats, the communication is between closely knit social group mates who forage cooperatively and identify their group membership with a group-distinctive call. For the fish, the communication is between potential mates who have rather specific preferences (some females like bright red males while others like black).

A stickleback (top) and a pair of spawning sticklebacks (bottom).

Stephen Gammie

Area of Study: Neurobiology, Neuroethology, Nervous System Evolution

Courses Taught: Comparative Vertebrate Physiology and Lab, Physiology portion of Introductory Biology, Seminar-Neuroethology

Michael Forster Rothbart

In 2003-04 the lab received a National Institutes of Health grant from the National Institute of Mental Health. The title of the four year R01 grant is "Neural Analysis of Maternal Aggression" and the approximate award value was $900,000.

The lab also had two papers published, one examining genetic relatedness of different forms of aggression (predatory v. intermale v. maternal) and one examining wheel running as an addictive behavior. Further, we have been studying how corticotropin-releasing factor inhibits maternal aggression in mice, and this study was accepted for publication this year. I also submitted an invited chapter on maternal aggression for a book on aggression that will be published by Oxford University Press. My service work this year included being a member of the RARC (Research Animal Resources Center) protocol review committee and the Biology majors' executive committee. I also headed the topics committee last spring for the Neuroscience Training Program and continued to act as an adviser for both Biology and Zoology majors. I also served on the faculty awards committee and the TA honors committee for the Zoology department.

Yevjenya Grinblat

Area of Study: Developmental Biology, Neural Pattern Formation

Courses Taught: Introductory Biology, Laboratory in Developmental Biology

My research lab has recently celebrated its third birthday. As I stop to think about these three years, I see that all the little steps that we've been taking, a small one every day, have taken us to a new and exciting place, even if somewhat unexpected. But that's the reason we do science to begin with—to plan one thing and then be taken on an adventure and end up somewhere a bit different.

Grinblat lab

Our research is driven by a desire to understand how the brain is made in vertebrate embryos. This is quite a tall order as the vertebrate brain is astounding in its complexity, both anatomical and functional. This complexity starts with a simple and elegant design, the initial "blueprint," early in development and is gradually elaborated. What makes our work possible is the fact that the early blueprint and the early steps of brain formation happen similarly in different vertebrate embryos, even if we compare human development to that of a frog or fish. This similarity allows us to ask all the questions in a handful of model organisms and be assured that many of the answers will be true for other vertebrates as well.

The model organism we have chosen for our studies is *Danio rerio*, a small tropical fish better known to aquarium hobbyists as the zebrafish. Zebrafish are great at surviving and thriving in suboptimal conditions. If you ever kept a fish tank as a kid, you most likely can vouch for their hardiness from personal experience. I certainly can. Zebrafish have other qualities that make them invaluable to us in research. They spawn year round and their embryos are very easy to collect in large numbers. These embryos are fertilized, develop externally, and are perfectly clear for the first couple of days of their life. This means that we can look right through them as they grow in a Petri dish, and watch their hearts beat, their blood circulate, and their brain acquire its beautiful complexity. In addition to all this, there are powerful genomic and genetic techniques we can use as zebrafish researchers. These remarkable little animals now have a place of their own in the Zoology Research Building. Our fish share this facility with those used by the lab of Dr. Mary Halloran.

For me personally, the focus on early development began in graduate school at Harvard University, where I spent a number of years looking at how fruit flies regulate cell adhesion as they develop. Having written a thesis and received my Ph.D., I felt it was time to move up the evolutionary ladder a bit, to a vertebrate model. My postdoctoral training as a zebrafish embryologist took place at the Whitehead Institute, a part of MIT. Zebrafish was just emerging as a model organism for brain development at the time, and I loved the idea of being there for its "first steps." The very first International Zebrafish Meeting was organized just after I started my postdoc. I was there with my 4 month old son, and still remember the incredible excitement of that new beginning in science added on to the excitement (and total exhaustion) of new motherhood. Much of the promise of that first meeting has been realized over the last ten years, and the power of our little fish has exceeded even our rather optimistic expectations. Recently the 6th international meeting of zebrafish researchers was held right here in Madison. I started that meeting with my three-month-old daughter to cheer

me on, together with her older brother and sister. My three wonderful graduate students were there too, showing their work to the world and making me proud. I can't wait to find out where the next three years will take us!

Mary Halloran

Area of Study: Developmental Neurobiology, Axon guidance

Courses Taught: Neurobiology, Laboratory in Developmental Biology, Developmental Neuroscience

Research in Mary Halloran's laboratory focuses on how growing neuronal axons and migrating neural crest cells are guided to their targets during development of the nervous system. The lab is investigating the function of molecules that can signal to a growing axon or migrating cell to affect its motility and direction of growth, and uses the zebrafish as a model organism. During the past year, Mary's lab has made progress in several areas of research. For example, the lab has obtained some exciting results from experiments investigating the role of a specific guidance molecule in the formation of axon pathways in the brain. These experiments involve genetic manipulation of the guidance molecule *in vivo* coupled with time-lapse imaging of living axons as they grow in the developing brain. In addition, the lab has continued work on a mutagenesis screen, carried out in conjunction with other zebrafish laboratories on campus, designed to identify new genes important for axon guidance. Investigation of several new mutants with axon guidance defects is in progress.

Spring semester 2003 Mary taught a new graduate level course in Developmental Neuroscience that she designed. The course was successful and well-received by the students, and was offered again in the spring 2004 semester. In the fall 2003 semester, Mary co-taught Zoology 523, Neurobiology, with Tony Stretton. Neurobiology is an increasingly popular subject on campus; enrollment in 523 increased to 200 students this year—and climbing!

Carol Lee

Area of Study: Evolutionary Physiology, Molecular Ecology, Population Genetics, Biological Invasions, Biogeography, Aquatic Biology

Courses Taught: Evolution portion of Introductory Biology, Comparative Vertebrate Physiology and Lab, Seminar in Evolution.

Carol Lee at a sample site in Turkey.

Last winter break I spent three weeks traveling through the Turkish countryside on a quest for populations of the zebra mussel species complex. Turkey is both the cradle of human civilization and of zebra mussel genetic diversity. Unlike populations in North America, the zebra mussels in Turkey are native, rather than invasive. Mussel populations were stranded in glacial relict lakes thousands of years ago during contractions of the Paratethys Sea (which now persists as the Black and Caspian Seas).

My interest in these noninvasive mussels stemmed from addressing questions on why some populations are invasive while others are not. Invasive species are often composed of complexes of closely related subspecies (sibling species complexes). For instance, both zebra mussels and the copepod I study, *Eurytemora affinis,* are species complexes with physiologically and genetically diverse populations, of which only a small subset are invasive. A big part of my research program is devoted to analyzing the genetic and physiological differences between invasive and noninvasive populations.

Before going, I had a bunch of old papers translated from German and Russian into English to determine locations of genetically distinct populations all over Turkey. I decided on a few key subspecies that I wished to collect, including *Dreissena polymorpha gallandi*, in large glacial relict lakes near Istanbul, *Dreissena polymorpha* sp., in Bafa Lake along the Aegean Coast, and *Dreissena polymorpha siouffi* in Eastern Turkey.

Sites near Istanbul were incredibly polluted. In two of the glacial relict lakes nearest to Istanbul it was difficult to find signs of life. Lake Sapança was so polluted that I could not open my eyes near the pink acrid water. Industry around the urban areas explodes into a vast apocalyptic sprawl. The factories—American, Japanese, and Korean—cut into the once beautiful landscape. We were always aware of upcoming cities on our drives from the foreboding smog and sharp stench.

The third of four glacial relict lakes south of Istanbul, Lake Uluabat, was somewhat more remote from the urban headache. It had a long peninsula jutting into the lake with the ancient Greek town of Apollonia at the tip. This town is a steep hill with a round perimeter surrounded by water. The bottom of the hill was dotted with wooden boats, painted blue and pink on the shores of a thin strip of beach. On the hill itself windy steep roads led to houses of brick and wood covered with white stucco. Ancient ruins, walls and temples were scattered about. Of about ~1000 inhabitants, many were fishermen.

Although nearly no one we met spoke English, almost everyone was kind, friendly, and extremely helpful. I walked into a teahouse of all men (women don't hang out in public places), and asked them, "pansyon var mi?" (Is there a hotel here?). "Yok" (none) they said, but the tea house owner invited us to stay at his place. I then proceeded to ask, "Mydia nerede?" (Where are there mussels?). A balik çilik (fisherman) proceeded to tell us a story about how all the wildlife went extinct in the 1970s and 80s due to pollution. The fisheries collapsed,

threatening their livelihood. They claimed that all the current wildlife in the lake was reintroduced from Lake Egridir (to the south) in recent years. We did obtain a sample from this lake. I'm hoping that it represents the last remnants of *Dreissena polymorpha gallandi*, as none of the other lakes in this region contained any live mussels.

An interesting pattern I discovered was that the distribution of zebra mussels in Turkey differed greatly from all the previous sites. In the sites I'm familiar with, the mussels are abundant along the shores and on the docks. In contrast, the populations in Turkey tended to be deep, and were not present near the shore.

The most difficult collection occurred at Lake Bafa. We dove for a week and were frustrated by the fact that we could find hundreds of mussel shells on the shore, but could not find live mussels underwater. We stayed at the ancient town of Herakleia, near the Greek temple of Athena. This lake was surrounded by grey granite mountains with huge boulders, reminiscent of *Lord of the Rings*. Ancient stone tombs were carved into the rocks, and covered with stone slabs. Several islands on this vast lake were embedded with Byzantine castles and fortresses. The town had about 700 inhabitants, and many goats and cows.

The balik çilik (fishermen) Emin and Guray took us out on our daily dives. Guray was a darkly tanned dynamic fellow who knew the lake very well. All the shallow rock up to 20 feet was covered with another species, *Mytilaster* sp. On our last day there, we conducted two dives to the bottom of the lake at 60 ft. At the end of the second dive, my dive buddy was hypothermic. So I made the third dive alone on a 45 ft reef. While staring at the rock, covered with shrimp, fish, and what I thought might be zebra mussels (though they probably were *Mytilaster*), I got ensnared in a Japanese (effective and insidious) fishing net. This net had sticky, thin gossamer fibers that kept on re-engaging each time I tried to free myself. When the nylon cords became wedged into my buoyancy compensator, I drew out my very sharp dive knife. 'Well, if I drop this knife, I'm dead,' I thought to myself, and spent 15 minutes cutting myself out. I filled up my buoyancy compensator to the max, in hopes that when I was sufficiently free, I would shoot up to the surface. 'Thank god I'm only at 45 feet, I thought." When I did come to the surface, I nearly kissed my knife. My dive buddy was very happy to see me, and exclaimed, "I see you brought the whole net!"

The food was great, not because of its complexity or fanciness, but because of the freshness of the material. At one lake in Central Anatolia, we spent time in a tiny remote village of adobe houses. Here we were invited to stay at a home that kept cows and chickens. We had a wonderful meal of fresh boiled milk, homemade flatbread, jam of some unknown fruit, cheese, and potatoes. This village and three others are scheduled to be relocated by an American company that plans to raze the villages and build factories on the lake.

The topography, color of rock and soil, houses, and people changed dramatically across the landscape. Houses ranged from brick, marble, adobe, to irregular stone. Rocks on the mountains changed in hue from deep red, to green, grey, and pink. One location had churches and castles carved into volcanic chimneys. Turkey is definitely the most interesting place (or array of places) I have encountered.

Andy Peters

Area of Study: Evolution, Host parasite co-evolution, Evolution of genetic systems and population genetics.

Courses Taught: Evolutionary Biology, Population Genetics, and Seminar - Population Genetics.

According to my parents, my interest in biology started the moment I was old enough to explore the shores of the lake in Michigan where I grew up, collecting crayfish, snails, and slower vertebrates. I can't say for sure whether my parents are happy or disappointed that I didn't precisely fulfill their prediction of becoming a grizzled field biologist studying wolves in Alaska (the one thing I'm sure of, given the fate of most of the crayfish and snails I collected, is that it's a good thing for the wolves).

Andy and his dog, India, at Tricounti Park near Squamish, BC.

Instead, in high school I discovered evolutionary biology, when I was assigned an essay on natural selection by my biology teacher as punishment for some misbehavior. Interestingly, my interest in the computer programming that forms the basis of much of my theoretical work began at precisely the same time, when I programmed my early Apple II to print out three-inch-high letters, allowing me to technically fulfill the requirements of the "two-paged, single spaced essay" with about 30 words. (I actually wrote two essays, one of which fulfilled the requirement in a more conventional way, though I held that one back until my teacher threatened further punishment. I consider the whole episode an instructive precursor to the font size requirements that are a fixture in writing assignments nowadays.)

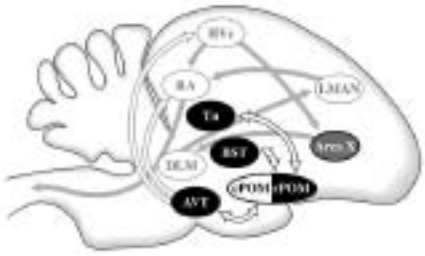
I earned my undergraduate degree from the College of Wooster (Ohio), and my Ph.D. from Indiana University. At Indiana, I focused on theoretical questions surrounding the evolution of sexual reproduction and recombination, particularly in the contexts of host-parasite coevolution and fitness-reducing mutations. As a postdoctoral fellow at the University of Edinburgh, I used the nematode *Caenorhabtitis elegans* to test the assumptions behind several

theories of recombination; and in a second postdoc at the University of British Columbia I expanded the scope of both my theoretical and empirical work, integrating stochasticity into models of host-parasite coevolution and extending my *C. elegans* work to questions of genetic integration and compensatory evolution. My research at UW–Madison will focus on theoretical and empirical investigations of the evolution of genetic systems.

Lauren Riters

Area of Study: Animal behavior, neuroethology, neuroscience, and neuroendocrinology

Courses Taught: Animal Biology, Endocrinology, Behavioral Neuroendocrinology



This year has been very productive and exciting. In spring 2003 I was offered an assistant professor position in the department, which I began in fall 2003. We currently have a new assistant scientist, and three graduate students in the laboratory. The two students who joined the lab last year applied for, and received NSF graduate fellowships. The third student worked in the laboratory as an undergraduate and came on board as a graduate student this year. Additionally, two undergraduates ran senior thesis projects in the laboratory. Both of these students applied for and received scholarships for their senior thesis work, and one of them won the Zoology Department best senior thesis award last spring. Several other students have been volunteering or receiving credit for participation in various aspects of different research projects, making the lab a very active place. As a result of their efforts, three undergraduates have been on papers submitted to peer-reviewed journals. Broadly, the research focus of the laboratory is on how environmental stimuli, hormones, and the brain interact to produce complex social behaviors using songbird model systems. The main research projects involve:

1. *Exploring neuroendocrine and environmental factors regulating the motivation to communicate*

   Little is known about neurobiological mechanisms regulating the *motivation* to communicate. Research implicates the neurotransmitter dopamine (DA) and opioid neuropeptides within motivation and reward neural systems in the regulation of rewarded, motivated, goal-directed responses to various stimuli including food and opposite sex conspecifics. However little is known about the neural regulation of motivation and reward associated with more complex social behaviors, such as vocal communication. In European starlings, during the breeding season when testosterone concentrations are high, song is highly sexually motivated and elicited by the presence of a female. In contrast, outside the breeding season when testosterone is low, males continue to sing at high levels when in large flocks, but the presence of a female does not affect song production. Thus the same behavioral output is motivated by very different stimuli depending on an animal's endocrine state. Data that we have collected and recently published in three separate papers indicate that motivation and reward neural systems differentially regulate sexually motivated versus non-sexually motivated male starling song. Our pilot data indicate that both DA and opioids influence male song production. Both of these neurochemicals are affected by steroid hormones, suggesting that opioids and DA might participate differentially in song produced in sexually motivated males with high testosterone, compared to non-sexually motivated males with low testosterone. The specific aims of our current research are to extend these preliminary findings to test the hypothesis that DA and opioid activity within motivation and reward neural systems is critically involved in the regulation of vocal communication, and to explore the possibility that these neural systems participate differentially in song produced within and outside a breeding context, using European starlings (*Sturnus vulgaris*) as a model system. A grant proposal based on data collected this year was submitted to NIH in March 2004, titled "Neuroendocrine Control of Vocal Communication."

2. *Exploring neural mechanisms and environmental stimuli that affect female mate choice*

   Mate choice often involves a female attending to, perceiving, and selectively directing motivated behaviors to cues provided by an opposite sex conspecific. In songbirds, females choose mates based on variation in acoustic features of male song. Breeding condition females attend to and perceive differences in male song structure, and display motivated approach behaviors in response to certain songs. The catecholamines, dopamine (DA) and norepinephrine (NE) regulate attention, arousal, and motivated / goal-directed behaviors-behaviors critical for mate choice. In songbirds, catecholamine manipulations influence female responses to male songs, but where in the brain catecholamines act to influence female responses to mate choice cues is not known. We are currently running several studies in the laboratory to test the hypothesis that female responses to mate choice cues are regulated by catecholamine activity in the brain in female European starlings, *Sturnus vulgaris*. We have recently published data (Riters, L.V. and Teague, D.P., 2003) highlighting specific catecholamine-rich brain regions as involved in female preferences for different males' songs. In additional preliminary studies, compared to birds in a non-breeding condition, breeding condition females presented with male song had higher catecholamine synthesis within brain areas involved in song perception and areas involved in sexual motivation. These data suggest target regions in which catecholamine activity regulates female responses to male song. We submitted a grant proposal to NSF in July 2004 to develop a separate line of research funding, which will allow us to inves-

tigate further the involvement of catecholamine activity in differential female behavioral responses to male mating cues.

Jake Vander Zanden

Area of Study: Limnology, food web dynamics, aquatic invasive species, ecological restoration, benthic production

Courses Taught: Limnology and Lab, Ecology of Fishes and Lab, Conservation Biology, Seminar-Limnology, Problems in Oceanography

Jake Vander Zanden joined the Zoology department and the Center for Limnology in the summer of 2001. Research programs are focused on the following topics: the dynamics and impacts of invasive species (rusty crayfish, rainbow smelt, spiny water flea) in Wisconsin lakes; food web structure and restoration of native fish communities in lakes of Sierra Nevada mountains (California) and the Great Lakes; the ecology and conservation of *Hucho taimen* (the world's largest trout species) in Mongolia; and the role of benthic production pathways in lake ecosystems.

His research has led to four publications in 2002, three in 2003, and four so far in 2004, with a number of other papers *in press* and *in review*. A paper published in *Limnology and Oceanography* (Vadeboncouer et al. 2003) documented compensatory shifts in benthic energy pathways along a lake eutrophication gradient. This paper was highlighted as the feature article in that issue of *L&O*. A paper that was published in *Ecosystems* (Vander Zanden et al. 2003) used stable isotopes in museum preserved fishes to reconstruct 130 years of food web change in Lake Tahoe, CA. A paper in *Ecological Applications* (Vander Zanden et al. 2004) developed models for predicting the occurrences and impacts of bass invasions in Ontario lakes. A book chapter (Vander Zanden et al. 2004) synthesized the impacts of exotic and invasive species on Boreal Shield lakes. Other publications for 2004 include two book chapters in a book entitled *Food Webs at the Landscape Level*, as well as a paper in *American Scientist* on the ecology and conservation of fishes of the Mekong River Basin.

Jake is on the board of directors of the Taimen Conservation Fund (TCF), an international non-profit conservation organization dedicated to sustainable use of fisheries resources. He has also been actively involved in the Wisconsin Buffers Initative, a statewide organization developing a science-based policy for riparian buffer implementation for Wisconsin. In 2003, he also served on a NSF Doctoral Dissertation Improvement Grants panel.

While not pursuing limnological questions, Jake spends his time traveling and participating in a variety of outdoor activities such as hiking, cross-country skilling, and biking. Most recently, Jake and his wife, Helen, have been working on fixing up their newly purchased east side Madison home. Music has also been a life-long passion. Jake played bass guitar on two recently released studio CDs, *A Terrible Beauty* by Berkeley, CA based recording artist, Jeff Pitcher, released in 2001, and *Star Witness* by Montreal's The Snitches, released in Spring of 2002 on Universal Records.'

Helen Sarakinos, Jakes's wife, and a 49 inch taimen caught in Mongolia. This fish was tagged with both radio and accoustic tags and will be tracked by Wisconsin and Mongolian scientists for the next five years.

From the Chair

continued from page 1

overseeing the completion of their retirement home in beautiful northern Wisconsin and can't wait to spend more time with their grandchildren. They hope to travel, and Nancy wants to volunteer in local nature groups and the K–12 schools. For those of you wondering what will happen to Zoology 101 in the absence of Nancy, we're pleased to report the hiring of Dr. Sharon Thoma. Dr. Thomas was a part of the Edgewood College faculty for nine years, and also taught Zoology 101 for our department this summer. We're very excited to have her on the team! ■

A Fish Tale

continued from page 2

Stefan Schwarz and his team of 3 others flew over from Germany and met the freight shipment that arrived in mid–December 2001. They spent only about 2 weeks constructing a >1000 tank facility that fills two rooms and covers over 700 sq.ft. Water flowed through the completed system for approximately 3 weeks before the first fish were introduced to their new home. Fish were added gradually to allow for the parallel growth of the "biofilter," which are bacteria that break down the ammonia in the fishes' waste to harmless by-products. The system has stabilized well over the last year and now holds too many fish to count.

We wish our fish the best of health at Zoology Research, so they can help us on our way toward discovering new genes that make the brain—in fish and other vertebrates, including our favorite one, the human. ■

FACULTY RESEARCH & HIGHLIGHTS
Spotlight on Associate and Full Professors

William Bement

Area of Study: Cell biology, development

Courses Taught: Cell Biology and Cell Biology Laboratory, Seminar in Cellular Biology, Cytoskeletal Dynamics

Bill Bement's lab has received the fourth year of an NIH grant titled: Control of Actomyosin of Microtubules, for $229K. He submitted a new NIH proposal this fall with the same title. Graduate students Hélène Benink and Brian Burkel are working on cellular mechanisms of wound healing. Elsie Yu, another grad student, is focusing on regulation of actin cage formation during Xenopus egg activation. Besides having a very active and productive research program and a well received Cellular Biology course (enrollment of 200 this fall), Bill helps us relax under the pressures of academe by providing much needed comic relief, surprise, and entertainment. Bill Bement—also known as the "Pork Man" during Spirit Week (a special welcome back event for students in the Bement lab), keeps it light with the following submission for this newsletter.

In addition to being deeply committed to research and education, Bill Bement has a very fulfilling life outside of the University of Wisconsin. Bill is actively involved in his neighborhood and is affectionately known as the short, annoying guy with the bad hair. He is a modern dance aficionado and was one of the first to fake the funk in the greater Madison area (but with rather limited success). He is currently at work on his first novel, which concerns the life and times of a faculty member at a large midwestern university. It is tentatively entitled "I was hired to research and teach, yet I seem to spend all my time filling out reports."

Seth Blair

Area of Study: Developmental genetics, cell signaling, neuronal development

Courses Taught: Animal Biology, Introductory Biology, Development of the Nervous System, Neurobiology, Seminar in Developmental Biology

The Blair laboratory is interested in the cellular and molecular mechanisms by which tissues are patterned during embryonic development. We use as our model system the developing wing of the fruitfly, *Drosophila melanogaster*, because of its simplicity and the wealth of molecular and genetic tools that are available. The laboratory is especially concerned with the development and maintenance of boundaries between adjacent groups of cells, and the ways in which these boundaries act as reference points for subsequent patterning. Recent work has focused on three different issues: the formation and maintenance of "compartmental" lineage boundaries, the specification of stereotyped neuronal tissues near one of those boundaries, and the formation of wing veins. All of these involve signaling via pathways that are conserved in mammals (e.g. the BMP (Dpp/Gbb), EGF, Hedgehog, and Wingless-Wnt pathways) and that play important roles in human health and disease. The work has revealed novel details of these signaling pathways, and the manner in which these signaling pathways combine to pattern large groups of cells.

The lab recently published an in-depth study of a novel signaling pathway that uses the cadherin-like products of the *fat* and *dachsous* genes to regulate growth, proximo-distal patterning and the so-called "planar" polarity of cells in the wing (Matakatsu and Blair, 2004). A series of research studies have been submitted which examine novel secreted modulators of BMP signaling and their roles in vein formation (Ralston and Blair, submitted; Serpe et al., in prep., Shimmi et al., in prep.) We are also about to submit a study identifying and characterizing the *shifted* product, which regulates a secreted modulator of Hedgehog signaling (Glise et al., in prep).

Seth and his wife, Cathy, have also been rearing their own developmental biology projects. Gillean Patrick Blair was born on June 24 in 2001, and Rosalyn Gallagher Blair was born on March 9, 2004. Seth's folk-rock band, the Reptile Palace Orchestra, just released their fifth cd, titled *We Know You Know*.

Robert Bleiweiss

Area of Study: Molecular systematics, DNA evolution, color vision, sexual dimorphism

Courses Taught: Comparative Anatomy of Vertebrates, Seminar - Morphology, Introductory Biology

The lab completed work on two field studies, both funded by Fundación Antisana/The Nature Consevancy/US-AID. One was a three year project to study the importance of hummingbird pollination for conservation of Andean biodiversity. This project was conducted over a range of habitats at all elevations on the Amazonian slopes of the Ecuadorian Andes, particularly around

the headwaters of the Rio Napo, a major tributary of the Amazon River. Project participants included Dr. Bleiweiss, graduate student Josh Erdman, and Juan Carlos Matheus of F.E.I.C.E. (Ecuador). A second project, on Andean condors, used satellite and radio telemetry to obtain data on population structure and movement patterns of condors in northern Ecuador, where the species is currently threatened with extirpation. Participants in the condor project included graduate student Sher Hendrickson, Drs. Bleiweiss and Mike Wallace, and Juan Carlos Matheus. The condor studies complement genetic investigations being undertaken in the lab by Ms. Hendrickson.

Two papers based on our genetic studies of South American birds (Hendrickson et al. 2003, Bleiweiss et al. 2003) were featured articles when they appeared in print last year. Additionally, my work on sexual dimorphism in hummingbirds was discussed in a recent *Natural History* article. Ms. Hendrickson earned her Ph.D. studying condor biology and conservation genetics in fall 2003.

Stephen Carpenter

Area of Study: Aquatic and ecosystem ecology. Ecology and economics of ecosystem management

Courses Taught: Seminar-Limnology, Ecosystem Analysis, Ecosystems Concepts, Seminar-Ecology, Oceanography and Limnology Seminar

It was a busy year for travel, due to international activities such as the Millennium Ecosystem Assessment and Resilience Alliance. In 2003, I traveled to the Czech Republic, Costa Rica (twice), Denmark, Italy, Sweden (twice) and Switzerland. With friends and colleagues in Sweden, I have started a project to compare aquatic ecosystem management systems around the world. I am looking forward to completion of the Millennium Ecosystem Assessment report in early 2005.

Our scenarios for the future of Wisconsin's Northern Highland Lake District were released (http://lakefutures.wisc.edu). The scenarios were widely reported in Wisconsin newspapers, and were the subject of several lively radio call-in shows. We developed a computer game based on the scenarios, which we hope to field-test in late 2004. An early version of the game (for Windows only) can be downloaded from http://limnology.wisc.edu/ecogame.

My book *Regime Shifts in Lake Ecosystems: Pattern and Variation* was published in November 2003. The book reviews case studies and models for large changes in lakes that are very difficult to reverse, and are often the result of human actions. The style is rather technical, so you may not find this book in the best-seller racks very soon. Those who are interested can download the chapters from http://limnology.wisc.edu/regime.

A paper with Jim Kitchell and other colleagues in *Nature* was the subject of many newspaper articles. In that paper, we showed that lake food webs are heavily subsidized by organic carbon from surrounding landscapes. Contrary to conventional wisdom, internal primary production was often a minor component of the carbon that found its way into fishes. The paper was based on novel whole-lake experiments, in which entire lakes were labeled with carbon-13, a stable isotope of carbon.

Stanley Dodson

Area of Study: Aquatic ecology, community and population ecology, species interactions and community structure, environmental contaminants, limnology

Courses Taught: General Ecology, Internship in Ecology, Ecology portion of Introductory Biology, Summer Limnology

Stanley is a freshwater ecologist, focusing on community ecology of zooplankton and population ecology of *Daphnia* (the water flea). His lab is currently investigating effects of environmental contaminants on *Daphnia* development and sex determination. They have developed a whole-animal bioassay using *Daphnia* sex ratio and morphology-characteristics sensitive to environmental contaminants including common agricultural and industrial chemicals. He is exploring the possibility that some herbicides disrupt a hormone-like system in *Daphnia*. His field research is focused on questions about the relationship between land use

Stanley Dodson with his summer Limnology class.

practices and zooplankton community structure.

Stanley directs and coordinates an Ecology Internship and Zoology Directed Study program which brings service learning opportunities to undergraduates. This program has flourished, growing nearly 20% each year for the past two years.

In 2003, after teaching Summer Limnology to 35 eager and desperate students, Stanley flew to Belgium to deliver two papers in honor of Henri Dumont, who was retiring from the editorship of *Hydrobiologia*. One of his papers described a new family of water fleas, which he and Charlie Santos-Flores named after Henri—*Dumontia oregonensis*, in the family Dumontidae. He encountered lots of extremes in Antwerp: incredibly hot weather, great papers, outstanding food, and beer almost as good as in Wisconsin.

During the fall 2003 semester, Stanley taught General Ecology with the assistance of Colleen Flaherty (who got her Master's and is now working for the EPA) and Mike Hoffmann (who intends to get his Master's this Spring, and find a job in Madison). Jeff Shell completed his PhD program during the summer, and immediately submerged

into teaching at Wood's Hole. Bobbi Peckarsky (Ph.D. in Dodson lab, 1979) is currently at Cornell, but is considering a return to Madison. Stanley, with welcoming arms, is working to find her space and an appointment here in Birge. Laura Torrentera (Ph.D. in Dodson lab, 1993) visited a couple of times in the last year—she continues to publish her work on brine shrimp of Yucatan. Dodson's new text *Introduction to Limnology* (McGraw-Hill) appeared in January, and is beautiful.

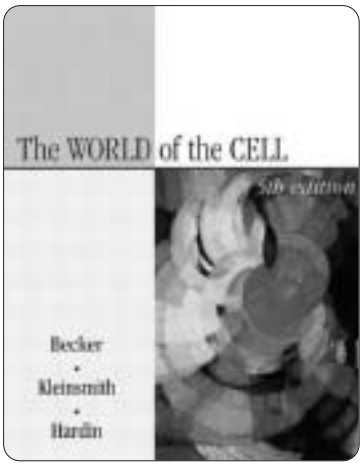
Stanley continues to teach (or at least organize) weekly T'ai Chi push hands sessions, tends orchids, and gardens.

Jeffrey Hardin

Area of Study: Developmental Biology, morphogenesis, cell motility during gastrulation

Courses Taught: Intro to Animal Development, Cellular Biology

Dr. Hardin's laboratory studies morphogenesis, the cellular events that transform a fertilized egg into an animal, using the nematode, *C. elegans*, as a model organism. They use computer-assisted microscopy, genetics, and molecular biology to study how proteins within epithelial cells allow such cells to adhere, move, and change shape. The molecular mechanisms they are investigating are important for understanding common birth defects such as spina bifida, and for understanding how cellular processes are misregulated in cancer cells.



Dr. Hardin is the Faculty Director of Biocore—an award-winning intercollege honors program, comprised of a challenging four semester introductory biology sequence that provides a broad, in-depth, and integrated background for students interested in any area of biological science. Jeff teaches in the second semester of this program, Biocore 303-Cell Biology. He also teaches Introduction to Animal Development (Zoology 470). Dr. Hardin has been involved in numerous teaching activities, including his participation as a founding member of the UW Teaching Academy, and his selection as a Lilly Teaching Fellow.

Dr. Hardin is currently an editor of the journal *Cell Biology Education*, and he is a coauthor, along with Wayne Becker and Lewis Kleinsmith, of *World of the Cell, 5th ed* (Benjamin-Cummings). Dr. Hardin's web-based materials on early embryonic development have won numerous awards, and have recently been featured in *Science* magazine.

Anthony Ives

Area of Study: Theoretical ecology, experimental ecology, predator-prey interactions, terrestrial insect systems

Courses Taught: Ecology Seminar - Professional Development, Introductory Ecology, Theoretical Ecology, Biology Interests Groups

I have become heavily involved in the BIGs (Biology Interest Groups) program spearheaded by the Center for Biology Education and Lillian Tong. BIGs attempts to catch undergraduate students early, to expose them to collaborative learning approaches, and to demonstrate to them how biology, mathematics, and chemistry are conceptually and academically linked. In the fall of 2002, the first BIGs were tried as a pilot. Two cohorts of 12 and 18 students were co-enrolled in the same sections (with the same TAs) of Math 221 (Calculus), Chem 109 (General and Analytical Chemistry), and one of two BIGs seminars. Jon Woods (Medical Microbiology & Immunology) taught one of the BIGs seminars on Infectious Diseases, and I taught the other on Ecological and Environmental Issues.

Photo from Tony's January trip to China.

As part of a UW-Madison initiative to foster research collaborations in Asia, a group of colleagues and I are trying to develop a graduate training program for US and Chinese students. This led to a trip I took to Yunnan Province, China, last fall. A group of six faculty from UW–Madison, and faculty and graduate students from several research institutes in China, traveled to villages within and surrounding the newly created Baimaxueshan Nature Reserve. We were interested in both establishing research contacts, and exploring research possibilities addressing how the creation of the Nature Reserve affects the livelihoods of the surrounding people and how management policies could ensure the effectiveness of the Nature Reserve in conserving endangered species. This trip provided a fantastic opportunity to talk with local people about conservation, farming, and the pressures of development on rural communities.

As a follow-up, last January I traveled with my wife to Guizhou Province, located to the east of Yunnan. Interviews similar to those we conducted in Yunnan revealed striking similarities and contrasts in livelihoods and economics. Both trips uncovered numerous research projects suitable for Ph.D. theses.

John Kirsch

Area of Study: History, theory, and practice of systematics, especially of vertebrates

Courses Taught: Introductory Biology

Sometimes rather modest papers have unexpectedly far-reaching implications. In the *Journal of Palaeontology*, Sue Hand of Sydney and I extend our earlier phylogenetic analysis of horseshoe bats to a series of distinctive and remarkably well-preserved 20-million-year-old fossil genera from Riversleigh Station in Queensland, Australia. One of these, which we have dubbed *Archerops* (stereograms of skulls shown below) is undoubtedly closest to certain horseshoe bats (both living and extinct) that are found well outside Australia-many in Africa.

The importance of this newly demonstrated relationship is that in 1995, as part of a study of the genetic relationships of the quite separate family of old world fruitbats, my research group documented an unexpected association of African species which seems to have originated from a southeast Asian migrant. Now it appears that such migration may provide a general explanation for the source of the African bat fauna-and perhaps of other mammalian groups-as well. Moreover, the evidence is building that the origin of most, if not all, bats may have been in Australasia, and not in the northern hemisphere, as many have supposed.

Our tree thus adds to a growing body of evidence that the southern-hemisphere continents were vitally important in the evolution of all modern mammals, and not just of the marsupials (kangaroos, possums, and suchlike) as had always been thought.

Outside of the laboratory, I continued as halftime volunteer instructor at the Memorial Union's Hoofer Sailing Club during the summer. Much of this work represents outreach to the wider non-university community, such as cruises for kids from Centro Hispano and visitors attending scientific or other conferences, as well as providing opportunities for the differently-abled to participate actively in the sport of sailing.

James Kitchell

Area of Study: Aquatic Ecology, Food Web Interactions, Bioenergetics

Courses Taught: Earth System Science Seminar, Ecology of Fishes and Lab, Oceanography and Limnology Seminar, Problems in Oceanography

The research work we (Steve Carpenter and I) began back in the 1980s focused on the role of fishes and fisheries in ecosystem dynamics of little lakes up north. Generally known as "top-down" effects, that work has growing applications to Lake Mendota, the Great Lakes and, most recently, several of the world's oceans. My new project on the central Pacific is a direct extension of the results developed through experimental studies in Peter and Paul lakes which is where Art Hasler began the field of experimental limnology back in 1951. In a more general application, I was part of a team commissioned by Congress to create a report on "Ecosystem Principles in Fisheries Management." That document provides guidance to the development of ecosystem-based and sustainable fisheries management programs for the National Marine Fisheries Service. This progression of ideas is an example of the ways that basic research contributes to real-world applications of benefit to society.

On a local level, I continue my catch and release efforts on trout streams in Wisconsin. I seem to have been releasing a lot of trout flies, too, so I'm sure that my supplies expenditures have helped bolster the Wisconsin economy.

James Pawley

Area of Study: Interface between biological specimens and physical instrumentation, generally microscopes, particularly 3D microscopes

Courses Taught: Biology and Society, Honors Seminar and Proseminar, Thesis Progress Seminar

Methods of 3D light microscopy assume that the specimen has a uniform refractive index. I have recently shown that this is not the case when the specimens are alive. In fact, nuclei in particular, produce serious distortions in the location of the optical section. This recognition sets serious limits on the ability to image small structures in living cells using confocal or multiphoton microscopy. This information has now been published in the journal SCANNING.

There are 4 major methods of 3D fluorescence microscopy. All depend on photodetectors to provide the signal to be digitized into the image memory. There used to be two major types of photodetectors; cooled CCDs and PMTs. Now there is a third type detector: the charge-multiplier CCD, a device that combines the best features of both. Unfortunately, different types of specifications are used to characterize the performance of these three devices. To facilitate proper decision-making, I have developed a new metric of overall photodetector performance called the Intensity Spread Function (ISF). Several equipment manufacturers have supported the ISF concept by implementing the software changes needed to measure this parameter on a number of CCD cameras. In the Spring of 2002 I went to Europe to support this idea, visiting BioRad, a confocal company, and E2V a major CCD manufacturer, to discuss the development of a special version of the charge-multiplier CCD to

replace the PMT in the confocal light microscope. I followed this up with a trip to Belfast in September 2003. Agreements to cooperate emerged and we presented our first results at the Focus on Microcopy Meeting in Philadelphia in March 2004.

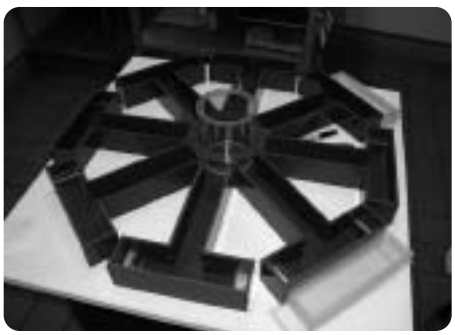
In addition, I have continued with a major revision of the Handbook of Biological Confocal Microscopy. The Third Edition (Plenum/Kluwer, ~48 chapters, over 120 authors) will go to the printers at the end of the summer 2004. I have also rewritten drafts of an additional 6 chapters of another new book called "3D Microscopy of living Cells", that I started in Australia and in collaboration with Heide Schatten, I have signed a contract for a third new book on LVSEM for Plenum/Kluwer.

Warren Porter

Area of Study: Biophysical ecology, physiological ecology, population dynamics, toxicology, infectious disease

Courses Taught: Modeling Animal Landscapes, Animal Biology, Environmental Toxicology, Biological Effects of Global Climate Change

I am very concerned about the rapid rise in children's learning disabilities, behavioral disorders, and birth defects of children virtually everywhere you look. We suspect that some of this might be being driven by low-level environmental contaminant mixtures exposure to children *in utero* and in early postnatal development. This past year we developed a new process for measuring learning abilities in mice utilizing their natural tendencies for exploration and finding food. We are exploring impacts of a very common herbicide on learning abilities, hormone levels, and immune function at levels well below those tolerated currently in foods. Preliminary data suggest there may be cause for concern.



Radial T Arm maze, used to test learning in mice exposed to environmentally relevant levels of toxicants.

We are also continuing to develop and test under field conditions generic microclimate and animal models that are now allowing us to explore a variety of biodiversity questions involving rare and endangered species in Australia, the Arabian Peninsula, Hawaii, Yellowstone National Park, and the Central Valley of California. The species we are studying range from honeybees and bumblebees to amphibians to lizards, to orange-bellied parrots, to the Arabian Oryx. We have been creating "topographic" maps of metabolic costs, water requirements, and activity hours for the species on their native landscapes. We expect that this will be useful in exploring consequences of climate change, changes in land use, introduction of disease, and other applications.

We have been able to demonstrate that a new state-of-the-art laser spectrometer we have been testing can detect isotopic ratio changes in breath due to catabolic events on a continuous, noninvasive flow-through basis. Our early data indicate that we can detect such changes within approximately two hours of the time of administration of an infection. This would have immense benefits in intensive care units and many other applications where patients who are unable to communicate either because of a breathing tube down the throat or because they are too young to speak can be monitored for infection, or hunger and the need for food.

Emily Stanley

Area of Study: Ecosystem ecology of rivers, streams, and wetlands; biogeochemistry of nitrogen, phosphorus, and carbon in aquatic ecosystems. Effects of management and restoration on rivers.

Courses Taught: Animal Biology, Ecology of Rivers and Streams, Limnology, Oceanography and Limnology Seminar

Research in my lab addresses ecosystem dynamics of human-dominated rivers, with a focus on nutrient cycling and how it is affected by the physical structure of these systems. This has led us to become increasingly interested in how restoration and management activities influence ecosystem processes. Much of our work is centered on two major projects: (1) nitrogen dynamics in a large floodplain river (the Wisconsin River), and (2) geomorphic and ecological effects of dam removal.

Our Wisconsin River work focuses on the potential for floodplains to affect riverine water quality through nutrient reduction, and how nutrient cycling is affected by long-term changes in forest composition or by restoration activities. Investigations of the ecological effects of dam removal have been ongoing over the past three years, and have included studies of geomorphology, nutrient cycling, and responses of plant, macroinvertebrate, and mussel communities.

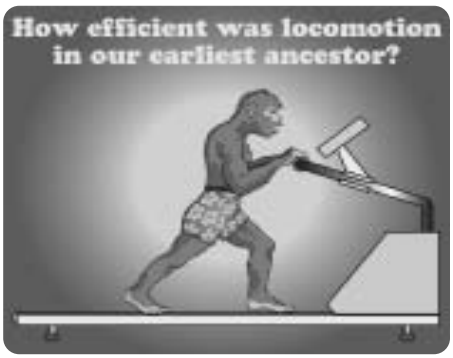
Karen Steudel

Area of Study: Functional morphology, mammalian locomotion, primate paleontology, evolution of human locomotion

Courses Taught: Animal Structural Design, Introductory Zoology, Honors Seminar and Proseminar, Thesis Progress Seminar

The past year in my life has been dominated by two substantial changes: taking

on the chairship of the department and shifting the focus of my research more towards human evolution. Many human ancestors had much shorter legs than found in modern humans. Over the last year, I have been determining whether this would have any impact on their energetic efficiency. To do this I have measured the energetic cost of locomotion in a variety of human subjects differing in leg length to determine whether I can detect an effect of leg length on cost. In January I submitted a manuscript showing that longer legs



result in more economical walking, which is now in press. Thus the relatively short legs of our earliest hominid ancestors would have compromised their locomotor efficiency. This is particularly interesting because Australopithecus retained short legs for at least a million years, in spite of its energetic disadvantage. We suggest that this strongly suggests retention of some arboreal adaptation. Neanderthals also are well known to have considerably shorter legs than modern humans. Our calculations suggest that this, along with their larger body size, would have resulted in their energetic costs being approximately 30% higher than those of the anatomically modern humans who ultimately replaced them! I'm currently running a similar series of experiments on human running as well as using these results to help understand the energetic differences between human walking and running. It's very difficult to describe being chair. The upside is that it has made me very aware of what a wonderful department this is, both in terms of the quality of research and teaching done by the faculty, and in terms of extremely competent, proactive and supportive classified and academic staff. The downside is that one's ability to plan one's life is almost nil. One simply never knows what tomorrow will bring.

Antony Stretton

Area of Study: Neurobiology

Courses Taught: Neurobiology, Neurophysiological Techniques Laboratory, Neurosciences Seminar

The Stretton lab is interested in how the nervous system controls behavior, and we are using the apparently simple nervous system of the nematode worm *Ascaris suum* in order to determine the magnitude of the description needed before we can say we understand it. This nervous system has only 298 neurons, so it should be easy. Not so. Our recent work has shown an additional layer of complexity that is frankly scary. The activity of each of the neurons in the nervous system can be changed by the chemical environment-and the number of relevant chemicals, the so-called "neuromodulators," is large. Neuromodulators are chemical signaling molecules that are released by one neuron, and affect the activity of other neurons, often at a distance from the release site, so they act more like hormones than the regular chemical transmitters that are used at synapses, where transmission from cell to cell is highly discrete and focused. We are concentrating on one family of modulators, the neuropeptides, and have found more than 200 different peptides in this nervous system. At the moment, we are in discovery mode, using a variety of techniques, including mass spectrometry, molecular biology and immunology, to chemically characterize the peptides (i.e. determine their amino acid sequence), and to determine which cells contain and release each of them. We are also finding which cells respond to each peptide by using electrophysiological methods, and it is clear that neuropeptides can have extremely potent activity—some are active at picomolar concentrations—and that they can have a variety of actions on the responsive cells, sometimes exciting them or making them more sensitive, and sometimes inhibiting them and removing them from the overall neural circuitry. In principle, each peptide can reconfigure the whole assembly of 298 neurons in a different way, and this increases enormously the number of possible activities that the nervous system can produce. We are nowhere near a complete description yet!

Tony Stretton's other major preoccupation is teaching, and he continues to teach the Neurobiology course that he and Deric Bownds first gave in 1972, and that he now co-teaches with Mary Halloran or Seth Blair. For the last 10 years he has also taught the animal physiology section of one of the sections of Zoology/Botany 152, and (somewhat to his surprise) he loves it.

His outside activities now include ocean sailing every summer in the UK with his oldest friend David Gebbels (friends since each of them were 6), and segment hiking the Ice-Age Trail in Wisconsin (481 miles down, 519 to go, as of July, 2004). He would welcome company on the trail. If interested, please call 608 262-2172 (office) or 608 233-2565 (home).

Monica Turner

Area of Study: Landscape ecology; ecosystem ecology; fire ecology; simulation modeling; natural disturbance dynamics; role of spatial heterogeneity; scale; succession; land use

Courses Taught: Ecology, Introductory Biology, Seminar-Ecology, Advanced Landscape Ecology

My research emphasizes ecological dynamics at broad scales and the influence of spatial heterogeneity on ecological processes, and I attempt to forge a strong linkage between theoretical and empirical approaches. My empirical studies now focus on several geographic locations: (1) Yellowstone National Park, where I am studying the effects of fire on postfire vegetation dynamics and ecosystem processes, especially carbon and nitrogen cycling; (2) the Southern

Appalachian Mountains, North Carolina, where I am focusing on effects of land-use changes on vascular plants; (3) on the north-temperate lakes of Wisconsin, where I am collaborating with a number of UW scientists and focusing my attention on questions associated with the causes and consequences of land-use change and biocomplexity, the long-term dynamics of the northern lakes, and the hydrologic and biogeochemical interactions in the overall land-water mosaic; (4) landscapes of northern Wisconsin and Yellowstone, where we are studying the movement and habitat use patterns of

How do elk respond to heterogeneity in their environments?

elk as part of a larger study of elk in North America, and (5) central Alaska, where our understanding of the effects of fire in the Yellowstone region are being compared with fires in the boreal forest. Although these studies reflect diverse questions, approaches, and locations, they share a common theme of examining the causes and consequences of spatial heterogeneity in ecological systems. I spend the bulk of my personal field effort in Yellowstone National Park each summer, with my two children (Devin, age 12, and Deirdre, age 7) coming along. Devin and Deirdre have grown up thinking that it's just normal to spend a good part of each summer in the world's first national park, whereas I never even went west of Virginia until I was 19!

I was on sabbatical during the 2002-03 academic year, and several accomplishments from that period. At the World Congress of Landscape Ecology held in Darwin, Austalia in July 2003, I was also honored to receive the 2003 Distinguished Scholarship Award. I wrote two major empirical papers, one on postfire vegetation and ecosystem function in Yellowstone National Park, and one on floodplain forests of the Wisconsin River. I also wrote a new paper synthesizing 13 years of research in Yellowstone National Park, and a new conceptual paper on the causes and consequences of spatial heterogeneity in ecosystem function. I initiated a new collaborative study with one of the leading terrestrial ecosystem ecologists in the US (F. S. 'Terry' Chapin, III) at the University of Alaska-Fairbanks, as planned in my sabbatical proposal. Because of my sabbatical, I was also able to participate as both a co-organizer and the lead-off speaker for a major ecological conference that is held every two years at the Institute of Ecosystem Studies, Millbrook, NY. The conference focused on "Ecosystem Processes in Heterogeneous Landscapes," exactly the merger of ecosystem and landscape ecology that I am trying to forge. This conference brought together about 75 ecologists to spend a week addressing the topic, and the conceptual thinking for the conference was invaluable. A book from this conference will be published by Springer-Verlag.

Several Zoology alumni from my lab group have moved on to new positions. Sarah Gergel began a tenure-track position at University of British Columbia in fall 2003. Mark Dixon (PhD 2001) is in his 3nd year as a postdoctoral associate at Arizona State University, Tania Schoennagel (PhD 2002) began an NSF postdoctoral fellowship at the University of Colorado-Boulder, and Dan Kashian (PhD 2002) is continuing research on fire ecology as a postdoctoral associate at Colorado State University. Mark Smith (PhD 2002) is a Major in the US Army and currently working with NATO and stationed in Naples, Italy; Mark will begin an appointment teaching at West Point in summer 2005.

Zero-Time Zoology Faculty

Robert Jeanne

Area of Study: Behavioral ecology of social insects—especially wasps
Courses Taught: Behavioral Interdisciplinary Seminar, Insect Behavior

William Karasov

Area of Study: Nutritional physiology and ecology, physiological ecology, ecological toxicology
Courses Taught: Ecotoxicology, Toxicant Effects on Ecosystems, Physiological Animal Ecology

Richard Lindroth

Area of Study: Chemical ecology, trophic interactions, global environmental change.
Courses Taught: Insect Ecology, Ecotoxicology: Toxicant Effects on Ecosystems

Catherine Marler

Area of Study: Territorial aggression, mating behavior and parental behavior using approaches ranging from behavioral ecology to neuroendocrinology
Courses Taught: Interdisciplinary Seminar in Animal Behavior

Charles Snowdon

Area of Study: Primate communication, reproductive biology and behavior, captive breeding of endangered primates
Courses Taught: Animal Behavior, Animal Communication, Interdisciplinary Seminar in Animal Behavior

Karen Strier

Area of Study: Biological anthropology, primate social behavior, primate ecology conservation.
Courses Taught: General Anthropology, Interdisciplinary Seminar in Animal Behavior, Primate Behavior and Ecology, Ecological Models of Behavior, Human Biobehavioral Ecology, Field Methods and Hypothesis Testing

Retirements

A number of zoology faculty and staff have made the transition to retirement since the last newsletter. Luckily, we still get to visit with some of them at our numerous departmental events. Still others have moved far away, and some don't stop by often enough! We miss them all, are grateful for their many years of service, and wish them the best in their retirement.

Jeffrey Baylis, *Professor Emeritus*

Jeff Baylis has served the Department of Zoology for 27 years, coming from the Peter Marler Laboratory at Rockefeller University in 1976 after completing a postdoctoral fellowship there and earning his MS and PhD from UC–Berkeley. He revised and taught an ethology laboratory course (Zoo 531) which became an archetypical writing intensive course before the official designation was created. Sociobiology (532) was another creation of Jeff's, marking the first course in this emerging field on campus. Together with Don Waller of Botany, Jeff also created a 4 credit Capstone sequence in Field Biology, taking students to places such as the Everglades and Costa Rica to conduct group experiments. Jeff has been pivotal in securing joint and adjunct faculty appointments in Zoology for animal behavior faculty in other departments and colleges, which has given Zoology a central role in animal behavior studies on campus. He and Jack Hailman, Chuck Snowdon, and Bob Jeanne established the first cross-campus interdisciplinary graduate seminar course in animal behavior at this campus (Zoo/Psych/Ent/Anthro 950), which has been in continuous existence ever since and forms an intellectual focus of the animal behavior group on campus.

Jeff's research has been in the field of reproduction in fishes, especially in the area of evolution of parental care in fishes. His synthetic reviews of the evolution of parental care are widely cited in behavior textbooks. His long-term population level research on smallmouth bass is an unequaled data set on individual reproduction in a closed population.

Jeff has served on the Biological Sciences Divisional Committee, the Executive Committee of the Graduate School, and a number of college and campus-wide committees dealing with undergraduate instruction in the biological sciences. He has been chair of the Biological Aspects of Conservation major and advised undergraduates in that major as well as Zoology and Biology. Jeff has served as Chair of the Zoology Department for two years, during a time when its infrastructure was threatened by staff retirements and departures. We are extremely grateful for his efforts in rebuilding the department and recruiting new faculty members.

Jim Bruins, *Faculty Associate Emeritus*

Jim began working at UW-Madison in 1964 as a Project Supervisor at the Laboratory of Limnology, where he assisted the director, Prof. Hasler, with the preparation, administration and reporting on research grants. He was also involved with orienting graduate students and introducing them to facilities and sites associated with the Trout Lake Biological Station. However, Jim's first love was teaching and in 1970, he left the Lake Lab to become an Assistant Faculty Associate in charge of Zoology's Introductory (102) Labs. His scheduled starting date was to be August 24, 1970, the day that the Army Math Research Center was bombed by the Armstrong Brothers et al. Birge Hall suffered significant damage so it was a couple of weeks before Jim was allowed in to begin shoveling up what remained of the Introductory Zoology's stockroom. For the next 29 years, Jim successfully directed this critically important program, writing and updating course manuals; overseeing its numerous teaching assistants; teaching sections of his own; and imbedding himself in the administration of these offerings. Through the 80's and 90's, Jim assumed additional departmental responsibilities, including preparation of TA budgets, assignment of TAs to courses, and assisting with TA training. He successfully took over Zoology's timetable exercises, TA instructional reports, and was counted on for general

Jim and a silver salmon caught near Cordova, Alaska.

supervision of TA's. In 1999, Deric Bownds, Chair, instituted a major reorganization of Zoology's infrastructure and Jim accepted a position as instructional administrator. In that role, he became the key interface person for most all instructional activities as well as the supervisor of Zoology's nine instructional staff. From 1999 to his retirement in August of 2002, he was instrumental in administrating the department's instructional program and for insuring that related instructional services were in place to meet the needs of students, TAs, instructional academic staff and faculty.

After two years in retirement, what he misses most are the people in the department and across the university community who were part of his regular interactive routines. He's been stopping by Noland to visit and work in the shop, and continues to help out with some of the department's social events. However, he's now able to spend lots of time with his wife, Nancy, two daughters and six grandkids, all in the Madison area, teaching them the skills of camping, fishing, boating and hunting. Also, Jim's been helping out his 89-year-old mother who lives alone in Oshkosh, Wis. He's taken a couple of trips—Cordova, Alaska, and the San Juan Mountains of S. Colorado (successful elk hunt)—and spends time with his friends and family at his cabin in Ontario, Canada. He's also been helping a couple of friends with new house construction/destruction, and spends free time fishing the Madison lakes, and in his woods building up a major supply of oak firewood to both use and sell (767–2214, if you're in need for this winter). He and Nancy had a busy summer making black raspberry jelly (170 jars) and dehydrating lots of shitake mushrooms for future cooking. What's up for the future?...More of the same with perhaps more time given over to travel and volunteer work. The Canada cabin is in need of attention!!! "Hello" and best wishes from Jim.

Timothy Moermond, *Professor Emeritus*

Tim Moermond earned his PhD from Harvard University in 1974 and began his scholarly career at the University of Wisconsin–Madison as an Assistant Professor in the Department of Zoology. In those 30 years, Tim made notable contributions in teaching, research and graduate student training, and university service. Along with Stanley Temple, he established one of the first courses in biodiversity conservation in the world in 1982, titled Extinction of Species. In 1989, Stenley Temple, Don Waller and Tim created another course, Conservation Biology, again one of the first of its kind. Tim also created a new graduate seminar course, Practice of Conservation Biology and Sustainable Development, providing a forum for the active participation of conservation and development professionals from outside the university, making a two-way learning exchange between faculty and students with government and private professionals and public activists. In 1987, Tim organized and led a campus-wide initiative to create a new M.S. program in Conservation Biology and Sustainable Development (CBSD), which was officially established in 1990. This program was one of three among 35 US universities to have received implementation funding from an initiative of the Pew Charitable Trusts. The CBSD program was quickly recognized as one of the best of such programs in the country.

Tim's early research studied resource partitioning and feeding behavior of Anolis lizards in the West Indies and wood warblers and fruit-eating birds of Wisconsin, contributing significant papers to the disciplines of community ecology, eco-morphology, and behavioral ecology. With Judy Denslow, Tim developed integrated studies of the tropical animal-fruit dispersal, pioneering field laboratory behavioral studies of feeding selection in fruit-eating birds in Costa Rica. This contributed to a growing new paradigm of controlled field-laboratory studies of food selection in fruit eating birds. Tim's recent research has expanded to encompass the integration of conservation and development through the creation of a new mix of interdisciplinary, participatory, community-based approaches to sustainable rural development, including the integration of sustainable agriculture. Tim was the P.I. and principal coordinator for a three country, seven-year AID-funded project, Community-based Planning for Sustainable Livestock-based Ecosystems in Latin America (Project PLAN), which included participation of thirteen different institutions and over 160 collaborators from the US, Mexico, Ecuador, and Bolivia. This project has successfully created a new model approach to this field, and Tim is planning to continue working on Project PLAN with his UW and host-country partners.

Tim plans to continue participating on a volunteer basis in graduate seminars, and to continue collaborating with UW faculty and students in ongoing and future projects focused on integrated conservation and development and sustainable development.

Ken Olesen, *Electronics*

Ken Olesen retired in January 2002 after serving the Zoology Department since 1969. He began as a Laboratory Technician 4 – Electronics, and ended his career as an Electronics Supervisor 3. In the course of his 33-year career, Ken was instrumental in developing the department's technical and physical infrastructure. As

a supervisor, Ken had a knack for calming situations and focused on making sure people were happy and contented. Ken has always been conscientious and attentive to detail. You could be sure that when he put your request in the little spiral notebook, it would not be forgotten and would be taken care of in short order. In 2002, Ken was presented with the highly competitive Classified Staff Career Service Award, in recognition and appreciation of his innumerable contributions to the university community. Ken, we hope you are enjoying a well deserved retirement!

Nancy Raffetto, *Faculty Associate Emeritus*

Nancy came to the University of Wisconsin in 1976 to complete graduate degrees in Zoology, after obtaining her BA in Psychology/Sociology from the University of Wyoming. Nancy's graduate work was in the field of reproduction in fishes, including the timing of brood births in the guppy (*Poecilia reticulate*) and the reproductive ecology of smallmouth bass (*Micropterus dolomieui*). She served as a Graduate Teaching Assistant in Zoology 101/102 and several upper level courses until receiving her PhD in 1987. Nancy joined the Zoology department in 1989 as an Assistant Faculty Associate, responsible for teaching 50% of Zoology 101, creating curriculum, and coordinating participating faculty. She also supervised and trained TAs involved in the course, mentored WISPIRG internship students; supported at-risk students associated with TRIO, and arranged field trips. Nancy was committed to enhancing the large lecture experience for students.

Nancy was among the first to incorporate online computer technology to aid out-of-class learning as a result of an L&S Learning Support Services IN TIME Program Grant awarded her. She also received a grant from the New Innovative Course Initiative to develop the wildly popular Biology of Emerging Diseases course. This evolved into an interdisciplinary web-based course, the only of its kind in the department. Nancy guided the department's Web site through its early stages of development and into the rapidly changing internet scene of today, helping individual faculty to design course pages that best supported their course needs.

Nancy reports that she has survived her retirement (as well as her 60th birthday), and hasn't had a lot of time for it to sink in yet. She and her husband are busy with a new house being built in Douglas County and selling the house in Sauk City. They hope to have lots of time for visiting with their grandchildren.

David Sonneborn, *Professor Emeritus*

David Sonneborn retired from UW–Madison in November 2003 to take up a position as a "volunteer researcher" in Tom Schilling's lab at the University of California-Irvine. (Retirement pensions *are* sufficient to continue working without pay, especially if there is a well-equipped lab to work in!) David has finally "graduated," in the sense of doing research with an organism that is not only zoological, but is also a vertebrate! In further contrast to his 39+ years of research at UW-Madison, the UCI research already appears to have some human relevance. The research area is spatial patterning during craniofacial development, using zebrafish embryos as the research partner. A few mutants are already available that display altered phenotypes and a new screen is currently being set up. As Jenya Grinblat, Mary Halloran and their coworkers know full well, several useful molecular markers and reporter constructs are available, along with a versatile "tool kit" of experimental/analytical techniques.

In addition to access to the zebrafish lab, David has a small office/bench space where he can do desk work as well as finish up the lab projects with water molds that he was doing during the frenetic last few months at UW–Madison. On clear days, he can see the distant San Gabriel mountains, snow capped in winter, from his office window. He and his wife, Ann DeVaney, who is a Visiting Professor of Education at UCI, have a beautiful home, complete with a variety of trees (including orange, lemon and peach trees), many perennial (in California!) flowering plants and a small swimming pool, near the base of foothills east of the Anaheim/Santa Ana area. The 30-minute freeway trip to UCI (without traffic pileups!) continues to be a challenge. The return trip is okay for David, since he has continued his night owlish work habits, thus avoiding traffic congestion.

It may come as a surprise to both the "cell smashers" and the "eco freakos," and sometimes even to David himself, to learn that he has become something of an environmentalist, including membership in several local, state, national and international environmental organizations. In addition, a hybrid car is on order.

Obituaries

Dr. John Talbot Robinson, 1923–2001

Dr. John Talbot Robinson, Professor Emeritus of Zoology, died on October 12, 2001. An internationally preeminent scholar, Professor Robinson was among a handful of excavators—investigators who established the nature of some of our earliest human ancestors and the broad outline of human evolution.

Professor Robinson was born on January 10, 1923, in Elliot, South Africa. He entered the University of Cape Town, from which he received a B. Sc. in 1943, a M. Sc. in 1944, and a D. Sc. in 1955, all in zoology. He began at the Transvaal Museum in Pretoria, becoming assistant director until 1963 when he came to Madison as professor of anthropology and zoology. In 1967 he moved full time into the Department of Zoology, where he remained until his retirement in 1983. He served as director of The University of Wisconsin Zoological Museum from 1979–1981.

Robinson's contributions to the field of human evolution were immense. In 1946, when he began his collaboration with Dr. Robert Broom, the scientific community was just beginning to accept that the South African fossils were ancestral to modern humans. The famous "Mrs. Ples" skull, excavated by Broom and Robinson in 1947, was the first essentially complete skull of an adult australopithecine discovered; it played a pivotal role in understanding this evolutionary link. Robinson put the individual morphological characteristics of australopithecines into a comprehensive picture of hominid adaptation and evolution, establishing that two lineages of hominids had existed in the past, one vegetarian, the other omnivorous and ancestral to Homo. He also established that they were committed bipeds, like their human descendants.

Professor Robinson in survived by his wife, Professor Emerita Sybil Robinson of the University of Wisconsin Department of Theatre and Drama.

Gayle Davis, 1948–2001

The UW Zoological Museum is sad to report the loss of Gayle Davis, Zoology Department alumnae and museum research partner in the Galapagos Islands, Ecuador. Gayle passed away on Sunday, 27 May 2001, in the company of family and friends in Quito, Ecuador.

Gayle was born in Chicago, IL, on February 7, 1948. After receiving her degree in Zoology at UW–Madison, she traveled to Galapagos as a volunteer with the U.S. Peace Corps in 1976. After her tour of duty ended in 1979, she stayed on the island of Santa Cruz to design exhibits at the Charles Darwin Research Station (CDRS) Visitor's Center and Galapagos National Park. By this time she had also become indispensable to the long-term UW Zoological Museum research project "Conservation and Preservation of Anatomical Specimens of Ecuador, Particularly of the Galapagos Islands," initiated by former museum director Dr. William G. Reeder and Curator of Osteology E. Elizabeth Pillaert in 1976. Gayle coordinated collecting efforts in the islands, obtained permissions and permits for UW museum staff to work in protected lands of the Galapagos, and maintained specimen data for carcasses and prepared museum specimens housed in CDRS collections.

Gayle remained in Galapagos for the rest of her life, devoting herself to education and research of the unique flora and fauna of the archipelago. In 1987 she was appointed Head of the Library and Publications Collection at CDRS. She was a tireless advocate for conservation of the island habitats and protection of its species. We continue to remember her smile, generosity, knowledge, and her love of nature and books.

Persons who wish to make a contribution to the CDRS library in Gayle's memory may send donations to the Charles Darwin Foundation Inc., 407 North Washington Street, Suite 105, Falls Church, VA., 22046. Please note that your donation is for the CDRS library expansion fund.

Tom Frost, 1950–2000

Modified from ESA Bulletin, Vol 28, No. 2

Dr. Thomas M. Frost lost his life on August 25, 2000. Tom drowned in Lake Superior after saving the life of his son who had been swept from shore by a strong current. Tom began his service at the University of Wisconsin–Madison in 1981 as an Associate Director of the Center for Limnology, responsible for the Trout Lake Station. Here he was ready with a helping hand and warm smile to those who visited and researched at the station and became the catalyst for many collaborative research efforts. One of the scientists involved with the North Temperate Lakes Long Term Ecological Research program, the station became a center of internationally recognized science under Frost's direction. Also known for his teaching, Tom taught limnology and marine ecology at the undergraduate level and mentored six students through their Ph.Ds. He enjoyed the natural world, canoeing, cross-country skiing, playing sports, traveling, politics, and most of all, time with his family and the company of friends. Tom is survived by his wife, Susan Knight, and their two sons, Elliot and Peter.

Art Hasler, 1908–2001

Modified from obituary by Brian Matmiller, UW Communications

After a long illness, Arthur Hasler died on Friday, March 23, 2001 at the age of 93. Art spent 41 years on the faculty at

the University of Wisconsin–Madison, having served as an adviser to 52 doctoral students, authored more than 200 publications and seven books. John Magnuson remembers, "He was a big thinker and had grand ideas. He believed you were not done in research until you dealt with its applications in society." Hasler's most famous research addressed the question of how salmon were able to journey thousands of miles to find the stream of their birth for spawning. In the 1940s he demonstrated "olfactory imprinting," a concept not far removed from his own experience of returning to a mountain stream near his hometown with childhood memories rekindled by the scents of native vegetation. Art Hasler received many lifetime service and achievement awards and has been president of the American Society for Limnology and Oceanography, the American Society of Zoologists, and the Ecological Society of America. In 1969 he was inducted into the National Academy of Sciences. Art is survived by his wife, Hatheway, and his children, Sylvia (Thatcher), A. Frederick, Bruce, Mark, Galen, and Karl.

Nedra K. Klein

Nedra Kathryn Klein, PhD passed away at Barnes-Jewish Hospital in St. Louis, MO on May 12, 2001 after a brief illness. Dr. Klein received a BA in biology from the University of Colorado. She did graduate work at Louisiana State University and received an MS in zoology from the University of Montana–Missoula. She received a PhD in Biology from the University of Michigan-Ann Arbor and did postdoctorate work at the Museum of Natural History in New York City. She began her teaching career at the University of Wisconsin Zoology department as a Guyer Fellow, before becoming Assistant Professor of Biology at Lewis & Clark University in Lake Oswego, Oregon. She became Assistant Professor of Biology at Truman State University in August 1997.

Nedra loved birds, nature, travel, research, and teaching. Her first love was bird watching and she gained great pleasure in introducing her students to the study of ornithology. Memorials may be made to the Nedra Klein Memorial Scholarship Fund, Advancement Office, McClain Hall 100, Truman State University, Kirksville, MO 63501.

Dick Ganje, 1939–2003

Richard John Ganje, age 64, died on Saturday morning, September 27, 2003, after a courageous battle with leukemia. Dick was born on May 18, 1939 in St. Paul, Minn., to John and Florence Ganje. Dick attended the Mechanic Arts High School in Saint Paul and continued his studies at Saint Paul Area Vocational Technical School. He relocated to Milwaukee in 1960 where he worked at Harley Davidson, Bucyrus Erie and served in the Marine Corps Reserves. He married Karen Gustafson in 1961, and through the years they had four children. The family relocated to Stoughton in 1970 where Dick accepted a position with the Zoology department at UW–Madison as a technical machinist (Instrument Maker). A caring and compassionate man, he enjoyed gardening, camping, biking and weekend drives. Dick is survived by this wife Karen; sons, Michael, Brian, and Jason; and daughter, Melissa. He is also survived by a brother, Donald Ganje; and a sister, Kathleen Bekkum Victor; mother-in-law, Esther Gustafson; and sister-in-law Ora Kettenbeil.

Lisa Dent

By Steve Carpenter and Elena Bennett

Dr. Lisa Dent, a postdoc at the Center for Limnology, died in Toronto on July 11, 2002. Her death is a loss to her family and friends, her colleagues at the CFL, and to the field of ecology. Lisa was a lively, engaged member of the lab. She was an excellent listener who was generous in sharing her considerable quantitative skills. Lisa also provided her colleagues with insightful, tough-minded reviews of draft manuscripts. At CFL, she organized the MAPLE research group which gave rise to a current project on the future of the Northern Highlands Lake District. We never figured out just what MAPLE stood for, but surely it had something to do with Canada, Lisa's homeland. Her own research focused on hydrology and biogeochemical change in lakes of the Northern Highlands, continuing themes that she developed during her doctoral work with professors Stuart Fisher and Nancy Grimm at Arizona State University. Her paper on alternate states in stream and lake ecosystems* showed how differences in spatial heterogeneity between streams and lakes affect the kinds of regime shifts that occur in these ecosystems. In her spare time, Lisa enjoyed the outdoors, rock climbing and ultimate Frisbee. She is sorely missed.

*Dent, C.L., G.S. Cumming and S.R. Carpenter. 2002. Multiple states in river and lake ecosystems. Philosophical Transactions of the Royal Society of London Series B 357:635–645.

Asher Treat

Some of you may remember Asher Treat, Philippa Claude's stepfather, who spoke at one of our departmental banquets a few years ago. He died on June 8, 2004, a few weeks short of his 97th birthday, in Lenox, Mass., and Philippa was with him. He was born in Antigo, WI, and attended UW–Madison, graduating from the Zoology department in 1929 (he took courses from a youthful Lowell Noland, and knew Birge). He was in the marching band, and in the UW Orchestra, led by Morphy. He TA'd for Mills. Music was a lifelong

passion, and he played the French horn until he "lost his lip" a few years ago. He earned his PhD from the College of Physicians and Surgeons of Columbia University in New York. He was an aviation physiologist with the US Army Air Corps during World War II. His wife, Julia Gilder Treat (Joy), died in 1987, after a long struggle with MS, during which he nursed her at home. For many years he was a faculty member in the biology department of the City College of New York, and was a teacher whose students really loved him; many stayed in contact with him long after they had graduated. Professionally he was an acarologist, and his most well-known work was on moth ear mites. He worked out the strategy the mites use to make sure the moths can still hear and evade bats; the mites raise their brood in the moth's ear, which deafens it, so they have evolved a behavior that ensures that only one ear is infected. He did his research during the summers, in the attic of his house in Tyringham, MA, and it was completely self-financed. As was common in those days, he did all his own illustrations for his papers; he was a very accomplished artist. He had an old typewriter, but his handwriting was so copperplate perfect that when he wrote his book, *Mites of Moths and Butterflies*, he took the word "manuscript" literally, and wondered why the editor asked him for a typescript. Philippa gave him a computer, but he never took to it. Philippa and I renewed the paradichlorobenzene crystals (to keep the infesting beetles out) in his many boxes of insects, an appropriate way of preserving his memory.

Brian Hoffman

Hoffman, age 23, of Stoughton, died on Sunday, August 1, 2004, from injuries sustained in an auto accident. He was born on October 23, 1980, in Madison, to David (Zoology Shop) and Nancy (Skelly) Hoffman. Brian graduated from Stoughton High School in 1999, and UW–Madison in 2003, receiving his B.A. in Spanish. He worked at Pick N Save since he was 16 years old. Brian was a sports enthusiast and an avid golf and hockey fan. He was a Badger Boys State Representative, and he lettered in baseball and cross country. Brian played saxophone in the high school band. He is survived by his parents, David and Nancy Hoffman; a brother, Trevor, all of Stoughton; maternal grandmother, Charlotte Skelly of Milton; and many aunts, uncles and cousins. Brian was preceded in death by his paternal grandparents, E. William and Phyllis Hoffman; and maternal grandfather, Chester Skelly. Brian was a very special young man and will always be loved and dearly missed.

Professor Hans Ris

Hans Ris, Professor Emeritus at the University of Wisconsin in the Department of Zoology, died on Friday, Nov 19, 2004. He was a world-renowned cell biologist and microscopist, known for his work on cell structure, which has contributed significantly to our knowledge of chromosome architecture and many aspects of cellular function. He was born in Bern, Switzerland in 1914. His father ran a coal and wood delivery business and his mother owned an elegant hat shop and was a photographer. His love for nature began as a child, when he spent many hours alone in the woods observing nature. At 15, Hans built his first microscope from a kit and cigar boxes which awakened his passion for the unseen world. His undergraduate degree was in zoology at the University of Bern. In 1938, Hans obtained a fellowship to teach and study in Rochester, New York. He then went to Columbia University where he received a Ph.D. in zoology in 1942. He became an instructor in biology at Johns Hopkins University, then spent five years at the Rockefeller Institute investigating the structure of chromosomes. In 1949, he joined the faculty of the Zoology Department at UW-Madison. Hans was a recipient of a lifetime research grant from the National Institute of Health. In 1971, he established and was the founding director of the High Voltage Electron Microscopy Facility (HVEM) in Madison, a position he held until his retirement in 1984. The HVEM housed highly specialezed microscopes, maintained by Dr. Jim Pawley, to visualize biological structures. It was a national resource, one of three in this country, which was used by scientists from all over the world. Mentoring of graduate students was very important to Hans. He promoted the careers of many junior scientists, and particularly helped women enter the scientific world. He is survived by his wife, Theron C. Ris (a painter in Madison; her six children; his daughter, Anet (formerly a modern dancer, now a primary school teacher in Portland, Oregon); and his son, Christopher, (a musician and piano technician in Fairfax, California). A celebration of his life will take place in the spring. Donations may be made in his name to HospiceCare Inc., 5395 E. Cheryl Pkwy, Madison, WI 53711.

Reader's Corner

What do you have on your bookshelves? The zoology department has been busy making original resources that many are adding to their collections and bookbags! Here are some of their most recent efforts:

Introduction to Limnology

Dodson, Stanley I.
2005. McGraw-Hill. 416 pages
ISBN: 0–07–287935–1
http://www.mhhe.com/catalogs/sem/ecology/index.mhtml?file=/catalogs/0072879351&newcat=yes

Overview: This text includes the basic foundation information of limnology in an appropriate length for a one-semester course. It is written for intermediate undergraduate college students with some science background, including an introductory biology course. The text is especially well-suited for undergraduate majors in zoology, botany, conservation biology, biology, environmental studies, ecology, aquatic biology, and related fields.

Introduction to Limnology contains more biology, ecology, and human-environmental connections than other such books on the market. The text emphasizes aquatic ecology, with a wide range of ecological fields represented, including: landscape, ecosystem, physiological, population, community, and biome.

Regime Shifts in Lake Ecosystems: Pattern and Variation.

Carpenter, S.R.
2003. Ecology Institute, Oldendorf/Luhe, Germany.
http://limnology.wisc.edu/regime/

Overview: Steve Carpenter's book *Regime Shifts in Lake Ecosystems* was published in November 2003. The book is about big changes that sometimes occur in lakes, such as outbreaks of toxic algae, collapses of fish populations, and trophic cascades. Regime shifts, thresholds, tipping points and related phenomena are attracting more attention in ecology and other sciences. Some of the best-studied examples come from lakes. Using long-term data sets, whole-lake experiments and models, the book shows that it is extremely difficult to predict regime shifts in advance. However, there are precursors of regime shifts that create "accidents waiting to happen." The book suggests that researchers and lake managers can make progress by focusing on risk factors that make ecosystems vulnerable to regime shifts.

Landscape Ecology in Theory and Practice

Pattern and Process
Turner, Monica G., Gardner, Robert H., O'Neill, Robert V.
1st. ed. 2001. Corr. 2nd printing, 2003, XII, 404 p. 154 illus., 98 in color. With CD-ROM., Softcover
ISBN: 0–387–95123–7

Overview: Environmental problems such as global climate change, land use change, habitat fragmentation and loss of biodiversity have required ecologists to expand their traditional spatial and temporal scales and the widespread availability of remote imagery, geographic information systems, and desk top computing has permitted the development of spatially explicit analyses. In this new text book, landscape ecology is given the first fully integrated treatment suitable for the student. Throughout, theoretical developments, modeling approaches and results, and empirical data are merged together, so as not to introduce barriers to the synthesis of the various approaches that constitute an effective ecological synthesis. The book also emphasizes selected topic areas in which landscape ecology has made the most contributions to our understanding of ecological processes, as well as identifying areas where its contributions have been limited. Each chapter features questions for discussion as well as recommended reading.

Learning Landscape Ecology

A Practical Guide to Concepts and Techniques
Gergel, Sarah E.; Turner, Monica G. (Eds.)
1st ed. 2002. Corr. 2nd printing, 2003, XIX, 316 p. 61 illus. With CD-ROM., Softcover
ISBN: 0–387–95254–3

Overview: This practical guide provides a "hands-on" approach to learning the essential concepts and techniques of landscape ecology. The fundamental knowledge gained will enable students to usefully address landscape-level ecological and management issues. It is an ideal companion to the text *Landscape Ecology in Theory and Practice* by Monica G. Turner, Robert H. Gardner, and Robert V. O'Neill, also published by Springer-Verlag. The book is organized into nine sections comprising 20 chapters, each of which consists of a lab focusing on an important point in the text. A variety of approaches are presented: group discussion, thought problems, written exercises, and modeling. Each exercise is categorized as to whether it is for individual, small group, or whole class study. Appendices of additional exercises using specialized technical tools of landscape ecology (for example, GIS) are supplied for instructors with appropriate equipment. The book includes a CD-ROM containing spatial data sets and modeling software for use with a number of the exercises.

Parasitoid Population Biology

Edited by Michael E. Hochberg and Anthony R. Ives
Paper | 2000 | ISBN: 0–691–04982–3
384 pp. | 6 x 9 | 1 halftone, 60 line illus.
Princeton University Press

Overview: Extraordinary in the diversity of their lifestyles, insect parasitoids have become extremely important study organisms in the field of population biology, and they are the most frequently used agents in the biological control of insect pests. This book presents the ideas of seventeen international specialists, providing the reader not only with an overview but also with lively discussions of the most salient questions pertaining to the field today and prescriptions for avenues of future research.

The Other End of the Leash

Patricia McConnell, Ph.D.
April 2003. Ballantine Books.
ISBN: 0–345–44679–8

Overview: *The Other End of the Leash* shares a revolutionary, new perspective on our relationships with dogs, focusing on our behavior in comparison with dogs. Zoologist Dr. Patricia McConnell looks at humans as just another interesting species, and muses about why we behave the way we do around our dogs, how dogs might interpret our behavior, and how to interact with them in ways that bring out the best in our four-legged friends.

Combining compelling stories, the natural history of dogs and humans, and advice about how humans can become better dog trainers by understanding their own behavior, *The Other End of the Leash* will help you make the most of life with your dog.

Handbook of Biological Confocal Microscopy (The Language of Science)

Pawley, J.B.
Second, expanded edition, 37 chapters plus index, 650+ pp.
Plenum Press, New York, New York (1995). Second printing, (1996). Now in 7th printing.
ISBN: 0–306–44826–2

Have you written a book recently? Please tell us about it by sending an email to the Chair – Karen Steudel, at ksteudel@wisc.edu.

NEW ACADEMIC STAFF

Please join us in extending a warm welcome to our recently hired academic staff members. We again have attracted outstanding individuals and are happy to introduce Brian Manske, Sharon Thoma, and Sharon Stern.

Brian Manske

Brian is now a full-time course coordinator and instructor for the Biology 151–152 program, having been involved in the course for the past five years. His teaching philosophy emphasizes training biologically literate citizens equipped to make decisions about science and technology both from a personal and political perspective. Educated decisions require basic biological knowledge, conceptual understanding of biological principles and the ability to ask good biological questions. Brian views his teaching role as more of a facilitator, engaging students in the learning process by giving them the responsibility of learning, and teaching them to be life-long learners beyond the classroom. He creates this classroom environment through the use of diverse pedagogies including active, cooperative and inquiry-based learning, and also by relating important biological principles to real-life examples.

Brian grew up in Milwaukee, Wisconsin, and one of its suburbs, Germantown. After spending time at Rutgers University, he returned to Wisconsin and received his BS and MS in Bacteriology at UW–Madison. Outside of the classroom, Brian spends time with his fiancée, Kerry, who is just staring vet school on this campus. Beyond education, his passion is music, and he spends an ample amount of time in his basement studio singing, playing keys and guitar, and writing music.

Sharon Stern

Two years ago, Sharon joined the Zoology Department as Instructional Program Manager, a position previously held by Jim Bruins. By education, Sharon is a geologist. She completed her undergraduate work in geology at Carleton College, went on to complete an M.S. at the University of North Carolina, and a Ph.D. at the University of Kansas. After teaching high school math and chemistry in Kentucky for two years, and finding that geology faculty positions were scarce, she decided to find a different route into academia. Sharon moved to Madison and got her start on campus as a Student Services Coordinator in the School of Pharmacy. She then moved on to the Office of Admissions as an Assistant Director. Sharon is enjoying being back on an academic calendar, working with science faculty, students, and curriculum.

Sharon Thoma

Sharon is the new Zoology 101 coordinator and instructor, officially beginning this fall. She grew up on a farm in northeast Iowa, and earned a B.S. in biology from Iowa State University. Her PhD is in Botany from Michigan State University, where she focused on characterizing lipid transfer proteins in Arabidopsis. Sharon moved to Madison in 1993 for a postdoctoral position and worked on characterizing a family of proteins involved in protein degradation in *Arabidopsis* and on rhodopsin transport in *Drosophila*. Sharon was on the faculty at Edgewood College here in Madison for the past six years. There she taught nearly every course in the catalog, many at the same time. She spent several summers teaching the summer offering of Zoology 101 in our department.

Sharon has two daughters, Madeline (5) and Bridget (1.5), and her husband, Mike Sullivan, is a scientist for the USDA Dairy Forage Research.

NEW GRADUATES

Name	Degree	Year
Benjamin Greenfield	MS	2000
Wei-Ching Huang	MS	2000
Jona Hull	MS	2000
Douglas Kramer	MS	2000
Christopher Mitchell	MS	2000
Anne Carlson	PHD	2000
Catharine Conley	PHD	2000
Ramon Diaz-Uriarte	PHD	2000
James Gillooly	PHD	2000
Jennifer Klug	PHD	2000
Cristina Lazaro-Perea	PHD	2000
Eduardo Santana-Castellon	PHD	2000
Jefferson Hinke	MS	2001
Melanie Holton	MS	2001
Gregory Sass	MS	2001
Jonathan West	MS	2001
Dean Anderson	PHD	2001
Kevin Bonine	PHD	2001
Erica Cochrane	PHD	2001
Mark Dixon	PHD	2001
Sarah Gergel	PHD	2001
Jeffrey Houser	PHD	2001
James Hutcheon	PHD	2001
Thomas O'Keefe	PHD	2001
Brian Weigel	PHD	2001
James Forester	MS	2002
Guo Li	MS	2002
Katharine Predick	MS	2002
Thomas Beard	PHD	2002
Min-Hwang Chang	PHD	2002
Donna Kashian	PHD	2002
Daniel Kashian	PHD	2002
Justin Rhodes	PHD	2002
Tania Schoennagel	PHD	2002
Mark Smith	PHD	2002
Christopher Tracy	PHD	2002
Karen Wilson	PHD	2002
Colleen Flaherty	MS	2003
Kenneth Forshay	MS	2003
Kenneth Howard	MS	2003
Mohammed Al Kahtani	PHD	2003
Mark Berres	PHD	2003
Andrew Bouwma	PHD	2003
Kevin Gross	PHD	2003
Sher Hendrickson	PHD	2003
Auston Kilpatrick	PHD	2003
Jeffrey Schell	PHD	2003
Liying Su	PHD	2003
Kari Weber	PHD	2003
Michael Hoffmann	MS	2004
Anna Sugden-Newbery	MS	2004
Amy Ralston	PHD	2004
Mariano Sironi	PHD	2004
Gemma May	MS	2004
Elizabeth Jones	MS	2004

UW swimmer Carly Piper, a senior majoring in zoology, won a gold medal in the 800-meter freestyle relay at this summer's Olympic Games in Athens, Greece. Piper is the first Badger woman to win a medal since 1984.
— Athletic Communications Office

Zoology department "fitness" increases!

Back row, left to right: Asst. Prof. Kurt Amann and his daughter, Julia; Asst. Prof. Jenya Grinblat and Maya; Prof. Seth Blair and his daughter, Roslyn; Katia Albright and graduate student Tom Albright with their daughter, Mia; graduate student Erica Smithwik and her daughter, Anna. Seated on the couch, left to right: graduate student Christine Hurd's daughter, Lauren, and her son, Dave; Manuel, son of Research Assistant Kimberly D'Anna; Gil Blair, and Avery, the son of Asst. Prof. Stephen Gammie and Asst. Prof. Lauren Riters. Since this picture was taken, Lauren and Steve have had another son, Jack, and Erica has had another daughter, Leighton. Welcome to the Zoology Family!

Zoology NEWS

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This report is published by the Department of Zoology at the University of Wisconsin-Madison for alumni, colleagues, and friends. Please send comments, ideas, news and any historical articles, pictures, or documents to:

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