

Department of Biology Newsletter



December 2006

FROM THE CHAIRMAN

Holiday Greetings, Alumni and Friends of the Biology Department!

The Biology Department as an Economic Engine

In the pages of this newsletter, we are eager to update you about the many exciting activities of the Biology Department during the past year. By all measures, our department is thriving. Although we tend to think of ourselves as scholars and teachers, consider for a moment the remarkable impact that the Biology Department has as a local economic driver. Over the past year, thanks to the hard work and brain power of our faculty and students, we have been awarded \$14.3M in research grants, up almost \$2M from last year. A recent local study has shown that every research dollar has a multiplier effect of about 3.3 as it ripples through the local economy. Viewed this way, our research activities alone provide an annual \$47M boost to the economy of Albuquerque and New Mexico! This positive impact is visible

everywhere around our buildings: undergraduate and graduate students employed by research grants are gaining invaluable skills for future high-tech jobs; single parents working as grant-funded employees; staff providing all the maintenance and service activities needed to keep the research enterprise afloat. Without the support provided by our grants, several excellent post-doctoral fellows and research faculty would not even be here—they would probably be working in another state. These talented individuals not only routinely make remarkable research discoveries, they also spend a considerable amount of time working with and training our students in research labs. The economic impact of Biology's employees—265 at last count—obviously extends far beyond the confines of our buildings as well. And this analysis does not even con-

sider the impact of our teaching mission, which continues to grow. Amazingly, for the first time, the number of declared Biology majors at UNM has surpassed the 1,300 mark, up more than 10% from a year ago. In addition, our entry-level Biology courses are a major gateway leading to professions in medicine, dentistry, veterinary medicine, nursing and pharmacy. More than 2,300 UNM students took these courses during the past year. If you consider the aggregate impact on the New Mexico economy that all of these students will eventually have, then we begin to see the Biology Department in a different light. We all know it as a place for academic excellence, but it is also an economic engine that creates jobs, provides high tech training, and launches thousands of careers.



Sam Loker

UNM is now the only university in the state classified as a “very intensive research” university, and nowhere is the intensity of research effort higher than in Biology. As noted above, the fruits of this labor are many. Our research enterprise, especially considering its intimate and inseparable relationship to our teaching mission, is a precious resource, to be nurtured and protected at all costs.

Eric (Sam) Loker
Regents' Professor &
Chairman
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*Guess which
Biology professor
has found his unique
expertise to be in demand
by the police?
See inside for details.*

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The University of New Mexico

For more information, please
visit <http://biology.unm.edu>

Generating Jobs, Training, Knowledge and Scientific Prestige

New Classrooms, Labs and Advising Facilities for Our Students

The basement of Casterter Hall is in the process of being remodeled, with an expected completion date of August 2007. Asbestos abatement, begun in mid-August 2006, was completed by mid-September. The submission of 100% Construction Documents (see floor plan below) occurred in early October, and following a final review by the University, the bidding and awarding of a contract will proceed. Construction is expected to start in December. When completed, the 17,945 sq. ft. remodel will provide three lower-division laboratories, two upper-division laboratories, an advising center, a lab prep and support area, offices for instructors, and three lecture rooms. There will be a new west-side entrance to the basement. The courtyard will be accessible and made an attractive area for students, staff and faculty to congregate.

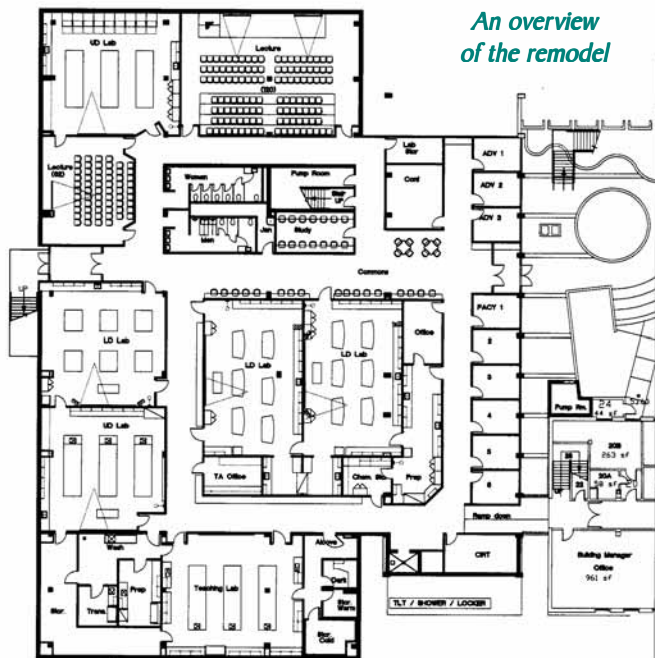
Construction underway, October 2006



Expanding our Capacities— The Casterter Addition

Along with the remodel of the basement of Casterter Hall, a 25,000 sq. ft. addition is being planned for the south side of Casterter Hall. The impact of this facility will be on our ability to expand our research activities, and thus our ability to train students in research (see drawings above and below). Thanks to the generosity of UNM's students, support from the student-funded capital bond in the amount of \$5.6M is already in hand to fund Phase I of the two-floor addition. Phase I will construct and partially build out the southwest portion of the building, which is expected to house mostly research laboratories for faculty funded by the National Institutes of Health. Currently, funds in the amount of \$5.8M are being sought from the N.M. State Legislature for Phase II. These funds will be used to complete the build-out of the southwest portion of the addition, enable a new greenhouse facility to be constructed on the addition's roof, and finish construction of the southeast portion of the addition, which will consist mostly of office and conference spaces associated with a multidisciplinary science center directed by Dr. Jim Brown, and the Sustainability Program headed by Dr. Bruce Milne.

An overview of the remodel



Scott Altenbach: Outstanding Teacher, Bat Researcher, Abandoned-Mine Expert, and . . . Crime Fighter?

Many of you know of Dr. J. Scott Altenbach as a brilliant classroom lecturer. Over the past 34 years, Scott has taught introductory biology, vertebrate zoology, comparative anatomy and physiology to tens of thousands of students. His teaching excellence was honored by UNM with an Outstanding Teacher Award in 1983 and a Presidential Lectureship. His research interests have centered on bats, particularly their flight, locomotor morphology, and electromyographic analysis of their locomotor movements. His professional-level photography of bats has long been recognized, and includes *Bats of the United States* and posters of Eastern and Western U.S. bats.

In 1989, Scott combined his previous experience as a miner and his bat expertise. Working with the New Mexico Abandoned Mine

Land Program and other agencies, he has surveyed bat use in underground, abandoned mines and recommended closure and safeguarding methods to protect bat habitat in the mines. Prior to this, the standard practice was to backfill old mines or blast their entran-

“It seems like the skills I have acquired from much of a lifetime around underground mines, sharpened by the 16 years of experience with the bats-abandoned mines program, are now suddenly in demand.”

ces, which could kill the bat populations in the mines or at least eliminate their habitat. Abandoned mines have become important bat habitat, especially with increasing loss of natural habitat and the sometimes purposeful destruction of bats themselves. Scott has surveyed thousands of mines in NM, AZ, CO, UT, NV, CA, TX, WY, WI and MN. He developed bat-habitat assessment protocols for mines that have become the U.S. standard, developed methods and equipment allowing safe entry into most abandoned mine openings, and helped educate abandoned-mine programs, state and federal agencies, and the public about the importance of bat habitat preservation. His recommendations for bat-friendly structures that also reduce the mine’s public safety hazard have been adopted by the agencies with which he worked. In the course of his work, Scott has furthered the

preservation of other mine-using species, including cats, barn owls, javalina, porcupines, rattlesnakes and various birds and rodents. Along the way, he became an expert in identification of vintage mining practices and equipment, information used in archaeological studies re-

quired for Natural Environment Policy Act compliance and thus for funding of the construction of mine safeguard projects. Due to Scott’s pioneering work, New Mexico alone has more than 150 bat-compatible structures at abandoned mines, and our state has lead the nation in developing and using new engineering approaches for these structures. State and tribal abandoned-mine programs in CO, AZ, UT, CA and the Navajo Nation, U.S. Park Service and U.S. Forest Service programs, and private consultants have followed this lead. For all these reasons, Scott was presented the Aldo Leopold Award from the Nature Conservancy and the 2005 Conservation Professional Award by the New Mexico Chapter of the Wildlife Society.

Another important facet of Scott’s abandoned-mine work is assisting police by searching abandoned mines for missing people. His most recent such collaboration was in August 2006 with the



Deming (NM) Police Department in their investigation into the disappearance of a 50-year-old woman; in this case, four people have been arrested and charged variously with murder, conspiracy to commit murder, criminal solicitation of murder, and tampering with evidence. In a letter to Scott, Lt. Detective Brandon Gigante, CID, Deming Police Department, wrote, “I can’t thank you enough for everything you put into this case. . . . You have no idea what a major role you played in this investigation. . . . Thank you for your unselfishness and well deserving efforts. . . . On behalf of myself and the Deming Police Department, a very sincere and heartfelt, THANK YOU!” As a result of these criminal-investigative collaborations, a training program about safe abandoned-mine entry, run by the state’s mine inspector and Scott, was created for federal and state law enforcement personnel.

Scott and Rick Sherwin, a former doctoral/post-doctoral student, are writing a book on bats and abandoned mines.



Steven Stricker, Associate Chair

Stephen A. Stricker, Professor of Biology, has been our department's Associate Chair for two terms now, and routinely teaches classes in developmental biology and in histology. Before coming to UNM in 1989, Steve received his undergraduate and graduate degrees from UC–Santa Cruz and the University of Washington, respectively; his post-doctoral work was in Canada and at the University of Wisconsin. As a student, Steve took or taught as a T.A. various courses in marine invertebrate zoology, and as a professor, he returns each summer to a marine biology station in Washington where he conducts experiments and prepares samples for subsequent processing here in the Biology Department. His current research, which analyzes how the eggs of marine nemertean worms undergo maturation and fertilization, contributes to the general understanding of the intracellular signaling mechanisms that underlie contraception and fertility. In investigating these worms, Steve was able to provide the first evidence in a marine invertebrate for a mammalian-like sperm factor that causes multiple calcium oscillations during fertilization. In addition, in studies of nemertean egg maturation, he has uncovered many of the same signal transduction pathways that had been documented in humans and other mammals, but has found that nemertean eggs often utilize their signaling molecules in exactly the opposite way to how they



work in mammals. For example, cAMP—a well known inhibitor of egg maturation in mammals—serves to stimulate the maturation of nemertean eggs, and the underlying mechanisms of cAMP-induced maturation have been examined in several of Steve's publications. His research also has provided evidence for the maturation-associated activation of multiple egg membrane receptors, and, as detailed in his *Molecular Reproduction & Development* articles this year, one of these receptors, oddly enough, shares pharmacological properties with the HER-2 receptor that is overexpressed in many cases of breast cancer. As Steve notes, "To this day, I still marvel at the diversity of life forms and reproductive modes that can be found in the sea. In studying egg maturation and fertilization in such oddball animals as nemerteans, I enjoy the challenge of figuring out what to me is one of the most amazing questions of biology: how does a single cell egg start to become a multicellular organism?"

Distinguished Professor James H. Brown Has Been Elected as an Honoraria Member of the American Society of Mammalogists, the highest honor conferred by the oldest and largest professional society devoted to the study and preservation of mammals in the world. Among the many contributions noted by the Society was Jim's impressive record of mentoring over the years: 50 Ph.D. students and 23 post-doctoral fellows, many of whom have become luminaries in their own right.

Bruce T. Milne, Professor of Biology, Honored as the 2006 Distinguished Landscape Ecologist by the U.S. Regional Association of the International Association of Landscape Ecology. This prestigious award recognizes distinguished scientific contributions to the field of landscape ecology. Bruce's research focuses on ecology; landscape ecology; multivariate statistics and fractal geometry.

Terry L. Yates Becomes a Member of the Board of Life Sciences, National Research Council, National Academy of Sciences. Terry is UNM's Vice President for Research and Economic Development, a UNM Professor of Biology and Pathology, and the Curator of Genomic Resources in UNM's Museum of Southwestern Biology. The Board of Life Sciences serves as a focal point for a wide range of technical and policy topics in the area of life sciences, including bioterrorism, genomics, biodiversity conservation and key topics in basic biomedical research, such as stem cells. The Board also organizes and oversees studies that provide advice to government and the scientific community on the biological sciences and their impact on society, and has oversight of important studies on the improvement of biology education, particularly at the undergraduate level.

Dr. Clifford N. Dahm Selected as The University of New Mexico's 2007 Annual Research Lecturer. This award is the highest research commendation made by the University. Cliff will be the 52nd presenter of the UNM Research Lecturer, joining Drs. James H. Brown, Edward Castetter, Randy Thornhill, Kathryn G. Vogel as biologists having received this honor.

Professor Donald W. Duszynski Honored as the 2006 Distinguished Alumnus of the Colorado State University Department of Biology. Don, in receiving this honor at the award ceremony, gave a retrospective lecture about his career in science and some of his research over the last 35 years. Don also participated in a Sloan Foundation workshop, "To Resolve Microorganism Taxonomic and Cultural Collection Problems Arising from the New Barcoding Initiatives." The Sloan Foundation workshop addressed problems that arise as species DNA barcodes are generated for protists.

Dr. Christine Hice, Research Assistant Professor, Awarded the First Robert E. Shope, M.D., Fellowship in Infectious Diseases by the American Society of Tropical Medicine and Hygiene (ASTMH). The fellowship provides international training opportunities in arbovirology and emerging diseases for those with an M.D., D.V.M., Ph.D. or related doctoral degree. The \$10,000 award funds travel costs, living expenses and/or research abroad for the study of arbovirology and/or emerging diseases.

Felisa Smith

Felisa Smith grew up in Laguna Beach, California, where she was distinctive for being about the only one in class when the surf was up. From this nerdy and not so auspicious beginning, she went on to earn her bachelor's degree in biology from the University of California–San Diego in 1980.

Largely due to the influence of several charismatic and inspiring science teachers in high school, Felisa entered the graduate program in Education at UC–Irvine and spent the next four years teaching high school classes in chemistry, biology, environmental science and algebra. Her free time was spent serving on district science curriculum committees and coaching generally unsuccessful varsity and junior varsity softball teams.

After a year's hiatus of living in Germany and traveling around Europe while her husband was a post-doc at a research institute there, Felisa returned to the U.S. and entered graduate school in the department of Ecology and Evolutionary Biology at University of California–Irvine. She worked with Dr. Rich Lenksi (although not on microbes) and was his first completed Ph.D. student when she received her degree in December 1991.

Felisa soon moved to UNM's Biology Department. Initially, she was a National Science Foundation Post-doctoral Fellow with Dr. James H. Brown (1993–96), then she became a Research



Professor (1997–2005), and she is now an Associate Professor. During this time, she had two daughters (now 10 and 14), who continue to provide humor and a sense of proportion to life.

Felisa also developed her paleoecological research program, which uses packrat middens as a way of examine the response of mammals to late Quaternary climate change (the last 25,000 years). Her current projects (although at a variety of hierarchical and methodological scales) all deal with the central issue of why things are the size they are and what the evolutionary and ecological consequences are of being a certain size.

Current lab research ranges from field studies of life history and physiological tradeoffs in Death Valley, one of the most stressful environments on Earth, to paleoecological studies of rodents' response to climate change over the late Quaternary, to large-scale macroevolutionary patterns of mammalian body size across the Cenozoic and across different continents.

Marcy Litvak

Marcy Litvak is an ecosystem ecologist who studies how changes in plant cover alter how carbon, water and energy cycles through a variety of ecosystems. She considers both natural disturbance (wildfire) and man-made disturbances (land use, introduction of non-native species) as triggers for community-wide shifts in plant cover from one plant functional group to another (e.g., replacement of herbaceous grasses and forbs with woody species, shifts between annuals and perennials, shifts between plants with different photosynthetic pathways). Her lab uses a variety of physiological, ecological, and micro-meteorological techniques to elucidate patterns and processes in ecosystem function that occur in response to these community shifts.

Marcy received her bachelor's degree in biology from Colorado College in 1988, and her Ph.D. in biology from the University of Colorado in 1997. Her post-doctoral research was carried out at the University of California–Irvine, where she worked with Professor Michael Goulden to learn the micrometeorological technique eddy covariance, to measure directly whole-ecosystem carbon, water and energy exchange. She used this technique to determine the role of fire in altering ecosystem function in North American boreal forests.



In August 2001, Marcy joined the faculty of the Section of Integrative Biology at the University of Texas–Austin. Her research in Texas focused on using an interdisciplinary approach to understand the role of fire in altering ecosystem function in central Texas savannas. She collaborated with Professors James Heilman, Kevin McInnes and Keith Owens at Texas A&M University to quantify the impact of juniper and mesquite encroachment into Texas grassland ecosystems.

Marcy joined UNM's Biology Department as an Assistant Professor in the spring of 2005. She is part of the NSF-funded EPSCoR Hydrology Program (see page 8 of this newsletter). Her research contribution to the program is to extend the ground-based ET network to include measurements made in desert grassland, shrubland, juniper savanna and piñon–juniper woodlands at the Sevilleta LTER and conifer forests at the Valles Caldera National Preserve.

New Ways of Doing Science

PIBBS is not a new soft drink. It is the newly created “Program in Interdisciplinary Biological and Biomedical Science” at UNM that is a collaboration among the departments of Biology, Anthropology, Computer Science, Physics, Math and Statistics at UNM, Los Alamos National Laboratory and the Santa Fe Institute, with funding from the Howard Hughes Medical Institute and the National Institutes of Health. This program recognizes that progress on fundamental problems in biology and biomedical science requires new ideas, methodologies and investigative strategies from the physical sciences, engineering and mathematics. It will develop new training opportunities for Ph.D. students that provide them with the skills and knowledge needed to conduct leading-edge interdisciplinary research. Focusing on language, culture, technology, literature and different perspectives and approaches used by various disciplines, PIBBS introduces students to the disparate ways in which various scientific disciplines tackle and solve scientific problems. Its students learn the communi-



cation, scientific and social skills necessary to work effectively in small, interdisciplinary research teams.

PIBBS plans to offer four to six new fellowships each year. The 2006–07 PIBBS fellows are: **Erik Erhardt** (Math), **Jordan Okie** and **Wenyun Zuo** (Biology), **Sushmita Roy** (Computer Science and Biology), **Paul Hooper** (Anthropology), and **Ziya Kalay** (Physics & Astronomy). The advisory board of faculty from the five core departments chose these students from among many promising candidates proposed by the participating departments. Its Fall 2006 semester “Topics in Interdisciplinary Biological and Biomedical Sciences” course is being taught in four separate units by Professors **James H. Brown** (Biology), **Felisa Smith** (Biology), **Blair O. Wolf** (Biology), **Edward Bedrick** (Math & Statistics), **Terran Lane** (Computer Science) and **Geoffrey West** (President of the Santa Fe Institute), and is cross-listed in other departments. More than 30 students from Anthro-

polo, Physics, Computer Science, Math & Statistics, and Biology are enrolled, and an equally successful Spring semester is anticipated. If you know of a promising young student who has an itch for interdisciplinary scholarship, or if you want to “Get PIBBS,” visit PIBBS.unm.edu to learn more!

Exploring the Origins and Diversity of the Immune System

The Center for Evolutionary and Theoretical Immunology (CETI) was established in September 2003 when **Dr. Eric S. (Sam) Loker** was awarded a \$10.4M Centers of Biomedical Research Excellence (COBRE) grant from the National Center for Research Resources at the National

Institutes of Health (NIH). CETI brings together researchers from across New Mexico who are conducting innovative and cutting-edge research on evolutionary and theoretical immunobiology, and provides a collaborative environment where they can share ideas, listen to lectures from leading scientists in their field, and use CETI’s core facilities that house state-of-the-art equipment.

In April 2006, CETI was awarded Category I Center status from UNM’s College of Arts & Sciences. This classification recognizes CETI’s importance within the UNM community and reinforces the University’s commitment to CETI’s

success. With this designation, **Dr. Robert D. Miller**, a Biology Department Professor, was appointed as the director of CETI, while Sam remains the director of the COBRE CETI program. Rob has been a part of COBRE CETI since its inception as the co-principal investigator of the COBRE grant, as Director of COBRE CETI’s core facilities, and as a mentor to the junior investigators of the program. Rob, a comparative immunologist, studies the evolution of maternal–fetal interactions and immunity; he brings to the program more than 20 years of research experience and important continuity.

In March 2007, CETI will host a symposium on “Evolutionary Medicine” in collaboration with the UNM Center for Human Evolutionary Science. A broad range of topics will be presented within the scope of evolutionary medicine. The meeting participants will include members of other COBRE programs from across the western U.S., members of UNM’s community, and NIH representatives.

For more information on CETI or the upcoming Evolutionary Medicine conference, please go to biology.unm.edu/ceti.



BEMP: Excellence in UNM–Community Collaboration

As the **Bosque Ecosystem Monitoring Program** (BEMP) enters its 10th year, it continues its mission of collaborative long-term ecological monitoring of key abiotic and biotic processes and characteristics. It promotes continued education, understanding, and stewardship of the Middle Rio Grande riparian ecosystem for scientists, teachers, students, policy makers and the public. Starting with three sites in 1997, there are now 22 BEMP sites in Albuquerque, in smaller communities, and in two pueblos. Teacher surveys indicate that teachers value BEMP as a means of providing their students with opportunities to participate in real science, with meaning beyond the classroom.

BEMP is a partnership between UNM Biology and Albuquerque’s Bosque School. BEMP now employs **Kimberly Scheerer**, an outreach specialist at the Bosque School, as its classroom outreach educator. Activities and presentations pertaining to the bosque, the river, the basin aquifer, and the role of BEMP are presented to K-12 classes before their monthly monitoring trips are made to BEMP sites. Following field monitoring, follow-up activities

are brought to the classroom, helping students understand the data they’ve collected, their role in the program, and the ecosystem they are helping to study.

Each spring, BEMP hosts a Student Congress in which

BEMP involves more than 2,000 K–12 students from 40 schools each year in year-round data collection and lab processing, helping to increase their understanding and appreciation of science and the ecosystem.



***Cliff Crawford**
BEMP Program Director*

all students involved are invited to present to each other what they’ve learned from their monitoring or from special projects done in the bosque through BEMP.

BEMP has developed long-term data sets that provide insight into the biological quality and hydrologic connectivity of the riparian forest along 280 km of the Middle Rio Grande. These data are used by federal, state and local resource management agencies. BEMP funding comes from a variety of federal, regional and local organizations.

Dr. Cliff Crawford is BEMP’s Program Director; **Kim Eichhorst**, a UNM Biology Dept. Research Assistant Professor, is BEMP’s Science Director; **Daniel Shaw** is its Outreach Director; **Jennifer Schuetz**, a UNM Biology Dept. research technician for many, is BEMP’s Field Coordinator; and **Melanie Keithley**, a UNM Biology undergraduate, is BEMP’s assistant.

STUDENT PROFILE

Wade D. Wilson, Ph.D. Candidate

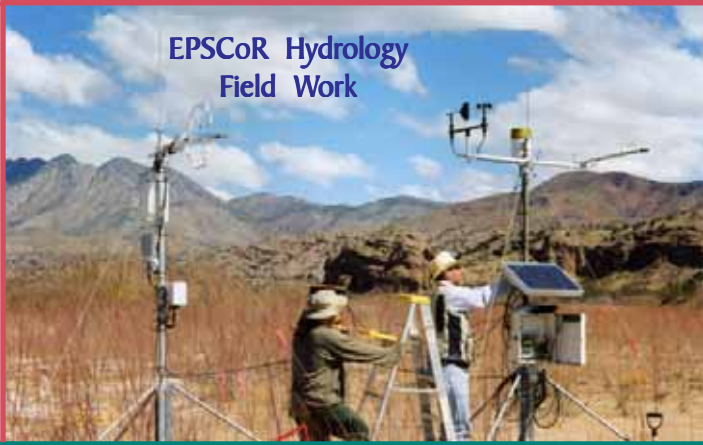
As a Biology graduate student, Wade Wilson’s work has lead him to study a number of intriguing organisms—from bot flies infecting desert rodents to flukes that cause deformities in frogs, to his current work, which comprises the subject of his Ph.D. dissertation, on how immune genes of Rio Grande cutthroat trout are influenced by, and limit, the impact of intestinal parasites

harbored by these endangered fish. Whatever the task Wade undertakes, his performance has been outstanding. The National Science Foundation must agree—they recently awarded him a prestigious Dissertation Research Improvement Grant. Wade’s dissertation work is of interest not only to scientists studying the role of parasitism in driving host evolution, but also is poten-



tially of direct value to state and federal conservation workers seeking to improve the chances for survival of the Rio Grande cutthroat trout, one of the southwest’s many distinctive and endangered endemic species. Wade is typical of the many outstanding graduate students we are fortunate to have in our department!

EPSCoR Hydrology Field Work



The Sevilleta Long Term Ecological Research (LTER) Program

investigates how environmental change and climate variability interact to affect ecosystem dynamics at the boundaries of major biomes in southwestern North America. The LTER site, located about 50 miles south of Albuquerque in and around the Sevilleta National Wildlife Refuge, is positioned at the intersection of several major biotic zones: Chihuahuan Desert grassland and shrubland, Great Plains grassland, mountainous piñon-juniper woodland, Colorado Plateau shrub-steppe, and riparian vegetation along the middle Rio Grande Valley. The goal of the latest phase of the program's research is to understand how abiotic factors affect species interactions, community structure and ecosystem processes in these aridland ecosystems.

The U.S. LTER Network, whose overall mission is to support fundamental, long-term, geographically large-scale ecological research, celebrated its 25th anniversary this year. Supporting this Network is the **LTER Network Office (LNO)**, which, since mid-2004, has been located in UNM's Center for Environmental Research, Informatics and Art (CERIA) Building across from Castetter Hall. The LNO, operated under a cooperative agreement with the National Science Foundation to provide support and coordination for the entire U.S. LTER Network and directed by **Dr. Robert Waide**, consists of 26 site-based research projects and the collaborative effort of more than 1,800 scientists and students. A primary goal of the LTER is to integrate science and education for students, teachers and researchers at all levels, nationally and internationally, through a wide range of educational opportunities at participating institutions or partner organizations.

The Museum of Southwestern Biology (MSB) has a new director, **Dr. Donald W. Duszynski**, a long-time UNM Biology Professor, in July 2005. Upon becoming MSB's director, one of Don's top priorities was to deal with unfinished aspects of the newly renovated CERIA Building. The CERIA Building was officially dedicated in October 2006. Another priority was to reinvigorate the MSB Publication Series, a peer-reviewed journal; to this end, **Diana E. Northup**, a Biology faculty member, was appointed the Series editor. In other news, the MSB has "adopted" the Monte Vista Elementary School. The MSB faculty and staff collected and donated new school supplies for one child in each grade from kindergarten through fifth. Additionally, gift cards were given to the teachers.

PROGRAM UPDATES

UNM Biology on the Forefront of Water Studies in New Mexico

The hydrology component of the **Experimental Program to Stimulate Competitive Research (EPSCoR)**, supported by the NSF, is dedicated to strengthening the New Mexico's infrastructure for research in hydrology. This will position New Mexico to be a national and world leader in instrumentation and algorithm development for evapotranspiration (ET) estimation and regional hydrologic modeling for semi-arid environments such as New Mexico.

The first objective of the hydrology program is to extend and integrate a network of state-of-the-art telemetered instruments that provide ground-based measurements of ET. Ground-based estimates of ET in different ecosystems (riparian, upland and agricultural) are provided by flux towers and scintillometers in the Rio Grande corridor.

The second objective is to develop appropriate algorithms to provide ET estimates on a regional scale based upon multispectral satellite imagery. Satellite imagery, along with selected ground-based measurements, is being used to develop models for regional-scale estimates of ET. The primary product is high-frequency, high-resolution ET maps for the Rio Grande watershed between Cochiti Reservoir and the Mesilla Valley.

The third objective is to develop high-performance computing, data archiving, and integrated hydrologic modeling to produce estimates of runoff, soil moisture, and ground-water recharge. Efforts are concentrated on coupling and extending appropriate models for climatic and hydrologic predictions within the Rio Grande region by integrating into a single framework remote sensing, ground-based data, and hydrologic modeling. Data products, including high-resolution ET maps, will be prepared and distributed via the Internet in a form accessible to researchers, water managers, and water users.

Drs. Clifford N. Dahm, Marcy Litvak and James Cleverly, Mr. Jim Thibault, and Biology Department undergraduate and graduate students participate in this program. The focus of Biology's efforts is on the measurement of ET and carbon dioxide (CO₂) fluxes between the atmosphere and land surface in various types of ecosystems. A total of 10 flux towers have been or soon will be established along the Rio Grande and at the Sevilleta National Wildlife Refuge. Measurements of water and CO₂ are being made in desert grasslands, desert shrub lands, salt cedar dominated bosque, cottonwood bosque, Russian olive dominated bosque, and the river channel of the Rio Salado. Soon, sites will be completed in juniper savannah, piñon-juniper woodland, and alfalfa. All sites are part of the overall network of sites in the Rio Grande basin. Measurements at these sites allow for the estimation of water and carbon use by these different ecosystems and contribute to the production of enhanced maps of water use in the basin and better prediction of stream and river discharge.

Improving Access and Opportunities for Our Minority Students

UNM's Initiatives to Maximize Student Diversity (IMSD) is a continuation of the Biology Department's former Minority Biomedical Research Support (MBRS) program, which has been supported by the National Institutes of Health for almost 35 years and which has supported more than 800 undergraduate and graduate students doing biomedical research all over campus. Currently, almost 30 undergraduates and graduate students are supported in the departments of Biochemistry & Epidemiology, Chemistry, Math, Psychology, and Biology.

IMSD is a preparatory program for students interested in attending graduate school or obtaining an M.D. or Ph.D. degree. The program's goal is to train researcher leaders in academia or industry. The undergraduate students often publish scientific papers, and take a variety of classes that help them understand the ethical issues involved in research, prepare for the Graduate Record Examination, and assemble their graduate application. The students also attend national meetings where they present their research; this year, a rain-

bow coalition of about 30 people attended the annual meeting of the Society for the Advancement of Chicanos/Latinos and Native Americans in the Sciences.

The current program director is **Dr. Margaret Werner-Washburne**, Professor of Biology, researcher, and recipient of two Presidential Awards. Maggie has been in the Biology Department for more than 18 years and has long worked to diversify the people working in science. **Lupe Atencio** is the Group Administrator who holds everything together; she is a great mentor to the students, a visionary for the program, and the program's accountant. IMSD also is assisted by **Dr. Steve Phillips**, Adjunct Professor of Biology at UNM and Professor Emeritus from the University of Pittsburgh Medical School. **Dr. Susan Tiano**, from Sociology, and **Chalane Lechuga**, a Sociology Ph.D. student, aid in program evaluation. Also assisting the office is undergraduate **Josh Van Landingham**.

For more information about the IMSD program, please visit biology.unm.edu/IMSD/home.htm.

Preserving New Mexico's Natural Heritage

A Diversity of Collaborations to Protect Our Flora and Fauna

In 2006, Natural Heritage New Mexico (NHNM) served the people and biodiversity of New Mexico in new and exciting ways. In this year of fire and flood, NHNM's data manager provided emergency information on locations of endangered species threatened by wildfire. Their zoologist collaborated with the Pueblo of Isleta to understand the effects of drought and flooding on the endangered southwestern willow flycatcher. At the Rio Grande Botanic Garden, their botanist planted a public demonstration garden featuring the endangered Sacramento prickly poppy, and placed another endangered New Mexico plant, the Holy Ghost Ipomopsis, in its Butterfly Exhibit. NHNM also created a new population of Holy Ghost Ipomopsis in Indian Creek Canyon in the Santa Fe National Forest. In the Pecos watershed, interpretive hikes for school children of the San Juan Pueblo were led; information on the state's plants and animals is available on their web page for kids.

NHNM helped private ranchers acquire federal funding to support ranching activities that also conserve habitat for native plants and animals. It is actively transferring geographic information system (GIS) technologies and techniques to the Heritage Land Conservancy and Heritage Preserve, which manages and protects more than 140,000 acres in New Mexico. This unique partnership of non-profits and private landowners helps preserve large, natural landscapes for wildlife.

NHNM is collaborating with the Navajo Nation and the Hopi Tribe to survey more than 1,700,000 acres for Gunnison's prairie dog colonies, to supply GIS and remote-sensing technologies, and to provide technical training to support tribal natural resource management. They also conducted rare-plant surveys for the Navajo Nation and the Pueblo of Isleta.

NHNM's ecology department continued its long-standing involvement in restoration of the Middle Rio Grande with studies of plant-insect-bird interactions along the river corridor. It also continued its assessment of the effects of high and low river flows on biodiversity and ecosystem change on the Middle Rio Grande.

To support scientifically sound restoration of New Mexico's forests, NHNM is working with the New Mexico Forest and Watershed Restoration Institute at New Mexico Highlands University.

NHNM provided data and consultation to state and federal land managers on threatened native New Mexico species, such as the Allen's big-eared bat, lesser prairie-chicken, Chiricahua leopard frog, sand dune lizard, loach minnow, and Gila springsnail. Their data are being used by county planners to guide land use and development that considers sensitive habitats, thereby avoiding legal challenges. The number of people obtaining information from its web site doubled in 2006, as did the number of data downloads.

BioCast: “Biology That Affects Your Life”

Be sure to tune into **BioCast**, heard on Tuesdays, Wednesdays, and Thursdays at 8:25 a.m. on KANW (89.1 FM), Albuquerque Public School’s public radio station! BioCast is written, produced and aired by **Dr. Bruce V. Hofkin**, a Lecturer in the Biology Department. Whether it’s genetically altered crops, a new killer virus unleashed from the rain-forest, or the use of melatonin to cure jet lag, not a day goes by without some new story from the world of biology. Keeping up can be difficult, but because recent breakthroughs affect us in so many, ever-increasing ways, it pays to know what’s going on in the laboratories and research institutions around the world. Each two-minute BioCast feature about “Biology That Affects Your Life” combines education and entertainment to provide the public with information about current biological topics. The programs are written and delivered in a light, humorous manner, which often simplifies the subject matter for the everyday listener.

BioCast began as a volunteer project of Bruce’s in March 1992, and UNM Biology began underwriting the program in 2002. The idea for BioCast came from a 1985 summer job Bruce had at a radio station in Taipei, Taiwan, when he was filling in as a news writer while the regular employee was on summer leave. There was a weekly program called “Science and the Environment,” and the fellow who wrote it was not a scientist and didn’t enjoy the job. When he heard that Bruce was a biologist, he offered it to him for the summer. That program served as the prototype for BioCast.



Bruce Hofkin

Community Outreach With Diana Northup

For the past two summers, **Dr. Diana E. Northup**, Visiting Associate Professor of Biology, has hosted high school students from Sandia Preparatory High School and one of their teachers, **Helen Haskell**, to participate in field and laboratory research concerning the bio-diversity of the lava tubes near Grants, NM. These experiences actively engage the students in research, allowing them to learn about microbiological and molecular biology techniques in the context of a research project, and have culminated in their giving presentations about their research and experiences to their parents. Their data have been used in national laboratories.

Diana, in collaboration with **Tamara Montoya**, Public Information Representative for UNM’s Experimental Program to Stimulate Competitive Research (EPSCoR) Program, has created a web site with content and instructional materials for kindergarten through 12th-grade students. The growing web site (www.caveslime.org/cavejourney/) seeks to teach earth and life sciences through content and activities.

Diana and **Janet Yagoda-Shagam** received a curriculum-development grant from UNM’s Office for Policy, Security and Technology to develop “Communicating Science to the Public.” Janet is an Adjunct Research Assistant Professor in the Biology Department and a Part-time Instructor in the English Department, thus this course is offered through both the English and Biology Departments. It promotes writers and scientists working together to engage the public in an appreciation and knowledge of science, and to further this aim, different public speakers are brought into the classroom.

STUDENT PROFILE

Beth Belding is earning a B.S. in Biology, with minors in Chemistry and Math. She plans to attend graduate school to pursue a career in mathematical biology. Currently, Beth runs **Dr. Astrid Kodric-Brown’s** pupfish conservation lab, where she works with many threatened, endangered, and

locally extinct fish species. She loves her job because she is able to work with threatened species and is able to augment their numbers by rearing them in captivity. Beth’s research and conservation efforts also have helped several Ph.D. candidates with their dissertations. This semester Beth was awarded

two scholarships, the **Cocalina Memorial Scholarship** and the **Michelle Jemenez Memorial Scholarship**; she is honored to have been chosen for these memorial scholarships.



Cindy Mortensen Joins Our Graduate Program Staff

As you may recall from last year's newsletter, for the past 15 years, Vivian Kent was the Biology Department's Graduate Program Coordinator. In March, Vivian decided to retire after 30 years of service to UNM. In mid-May, **Cindy Mortensen** was hired as the Coordinator of Program Advisement for our graduate program. Cindy was born and raised in Stur-

gis, SD, and received her bachelor's degree in mathematics from the University of South Dakota. She was a computer programmer for six years before entering a career in higher education. Prior to joining our department, Cindy worked in the Registrar's Office at the Black Hills State College in South Dakota, at Sheridan College in Wyoming, and at Northern Arizona University

in Flagstaff. She enjoys working in an academic atmosphere, and is pleased to be part of our department. Cindy has adjusted easily while becoming oriented to all the aspects of her new job.

Carol-Ann Griffin, who has worked in the department's Main Office for more than five years, has provided the necessary continuity for coordination of the graduate program. Cindy also supervises our new Front Desk



Cindy and Carol-Ann

Administrative Assistant, **Patricia Baca**. We are most fortunate to have such a dynamic team working on behalf of our graduate students and the department as a whole.

SCHOLARSHIPS

Congratulations to all of this year's scholarship winners! Best wishes for great success in your academic endeavors!

Undergraduate Scholarships

The Catalina Memorial Scholarship was established in memory of Catalina Garbielle Costanzo to assist female undergraduate biology students in their pursuit of science. This year's recipient is **Beth Belding**.

The Rosalie Doolittle Scholarship was established for undergraduate New Mexico residents pursuing careers in biology with an emphasis in botany. This year's scholarship winner is **Rene Aquilera**.

The Maurice L. Hughes Scholarship is a shared scholarship between the Departments of Biology and Chemistry for undergraduate students who show academic achievement. The recipient this year is **Treyvon Davis**.

Graduate Scholarships

The Melinda Bealmer Memorial Scholarship is awarded to Biology graduate students to attend and present at conferences. The award winner for this year has not yet been announced.

The Cramford Rio Grande Scholarship is awarded to Biology graduate students conducting research on or related to the Rio Grande Bosque. The award is based on scholastic ability and research potential. The winner this year's award is **Daniella Swenton**.

The Alvin and Caroline Grove Scholarship awards graduate students who show scholastic and academic achievement in their primary research field. Funds allow students to further

their research goals. This year's award recipient for the Doctoral scholarship is **Heather Bateman**. The award winners for the Summer scholarship are: **Kristina Anderson**, **William Burnside**, **Armand Dichosa** and **Joanna Redfern**. The Grove Research scholarship winners are: **Melanie Barnes**, **Angela England**, **Hilary Lease** and **Daniela Swenton**.

The Dr. Lynn A. Hertel Graduate Research Award was established to support the research program of a current graduate student so as to assist the student in completing their thesis or dissertation research. The recipient of this year's award is **Ryan Schwarz**.

The Dr. Harry Wayne Springfield Scholarship provides funds to support a graduate student conducting research in plant ecology. The year's winner is **Melanie Barnes**.

Undergraduate–Graduate Scholarships

The Joseph Gaudin Scholarship is awarded to both graduate and undergraduate students studying in mammals, in particular members of the cat family (Felidae). The scholarship winner is **Natalie Dawson**.

The Thelma Evans Trust Scholarship provides support for undergraduates and graduates pursuing a career in veterinary medicine. The recipients this year are: **Julie Blossom**, **Consuela Conley**, **Melissa Smith** and **Brianna Wildgoose-Lister**.



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You can be part of the success of the Biology Department by supporting the Biology Department Chair’s Fund. This fund, through the generous support of alumni and friends, provides the resources needed to sustain students and faculty through scholarships, research funding, and other general needs the Chair can provide on an “as needed” basis. If you are interested in having a new classroom or laboratory named after you or a relative, please contact us. To learn more, please visit our website at <http://biology.unm.edu>, where you also can make an online donation; or contact *Heather Paulsen, Accountant III, 2C Casterter Hall, MSC 03 2020, 1 University of New Mexico, Albuquerque, NM 87131-0001*, tel. (505) 277-1714, e-mail: hpaulsen@unm.edu.

We want to most sincerely thank our donors for their generous gifts in 2005–06. Your continued support to the Department of Biology allows us to provide resources needed to sustain students & faculty through scholarships, research funding, capital project improvements, & other general needs the Chair can designate on an “as needed” basis.

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