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Quantum: Research, Scholarship & Creative Works at the University of New Mexico, 2007

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The University of New Mexico

Quantum²⁰⁰⁷

RESEARCH, SCHOLARSHIP & CREATIVE WORKS



A Solution in Sight • The Secrets of the Maya • Managing Water Rights



Photo by Matt Suhre.

RESEARCH, SCHOLARSHIP, & CREATIVE WORKS AT THE UNIVERSITY OF NEW MEXICO

A Carnegie Doctoral/Research
University Very High

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On the cover: Chief of Ophthalmology
at the UNM School of Medicine Arup Das
is seeking to prevent vision loss in diabetic
patients. Story on page 7. Photo by Matt
Suhre.

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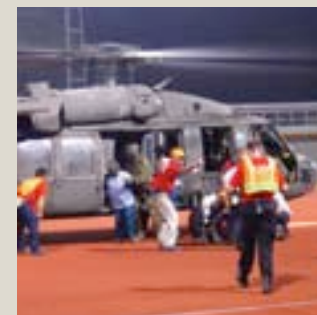
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To The Reader

Invite you to take this opportunity to learn more about the important and exciting research and creative activities that are taking place at the University of New Mexico. We are a home to stellar researchers, educators, and students who are able to engage in these activities and be part of a world class environment at this flagship institution.

Our researchers represent a diversity of interests and expertise, as well as a myriad of fields and disciplines—the arts, education, humanities, social sciences, medicine, science, and engineering. We proudly acknowledge our researchers' contributions and their enthusiasm and commitment, which foster a stimulating atmosphere of inquiry, discovery, and learning.

The University's contract and grant awards portfolio, generating a total of \$298.6 million for fiscal year 2006, is a reflection of all sectors of sponsored funding, including: federal and state agencies, industry, private and corporate foundations, and the national laboratories. UNM's contract and grant awards support critical and cutting edge projects, spanning all the colleges, schools, and centers at the University. They are the support mechanism for research that is essential to our state's economy.

By addressing challenging questions, our researchers push the boundaries, discovering creative and intriguing solutions to common and extraordinary problems, making a difference in our everyday lives. Additionally, their efforts provide extensive opportunities for our students to learn and flourish.

In this issue of *Quantum*, we share a collection of stories about UNM researchers who are pursuing innovative scholarly activity and research. Join us in becoming more familiar with our work and celebrating our achievements.

Terry L. Yates
*Vice President for Research
and Economic Development*



Jennifer von Schwerin (right) teaching undergraduate Molly Rue of St. Mary's College how to catalogue architectural sculpture from an eighth-century royal palace at Copán. Photo by Sarah Arkin.

LEARNING AMONG THE RUINS

Jennifer von Schwerin works to reconstruct an ancient Maya temple and teach students about art, history, culture, and heritage management.

By Valerie Roybal

From 600 B.C. to the sixteenth century A.D., ancient Maya civilization flourished, with the construction of sophisticated temples, urban centers, and communities in over five hundred locations, stretching from the Yucatan and Chiapas regions in Mexico, into Guatemala and Belize, and down to western Honduras. The ancient Maya people,

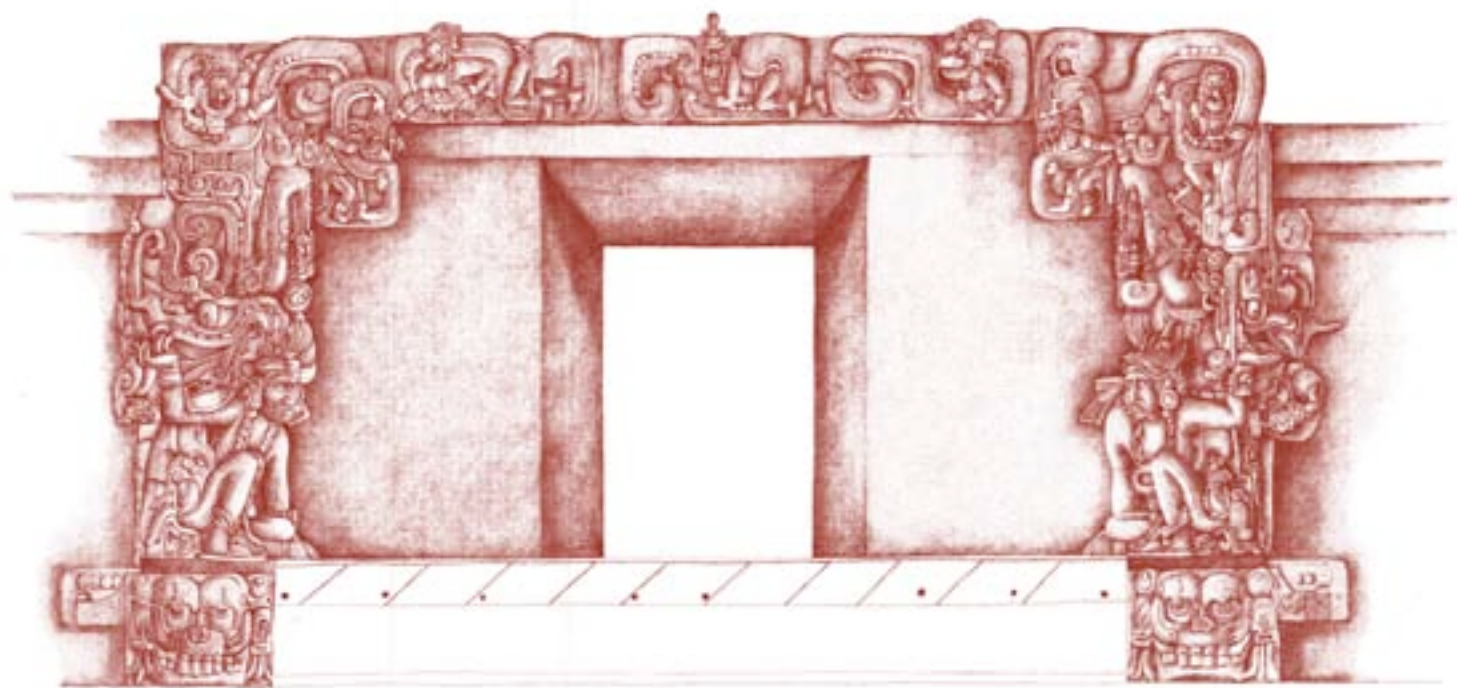
now studied through the remains at archaeological sites, were highly advanced in mathematics and astronomy, and most notably, art and architecture.

Since 2004, UNM students have had the opportunity to study on location the history, art, and culture of the Maya. The UNM Field School of Maya Art and Architecture,

established by Jennifer von Schwerin in collaboration with the UNM College of Fine Arts and the Honduran Institute of Anthropology and History, with additional support from other UNM departments including Art and Art History, the Office of the Provost, the Arts of the Americas Institute, the Latin American and Iberian Institute,



UNM student William Gassaway contemplating a life-size model of Rosalila, a sixth-century temple at Copán. Photo by Sarah Arkin.



Sculpted doorframe of the north room of Temple 22, Copán. Two figures hold up the double-headed sky serpent, whose coils contain small deities. Drawing by Edgar Zelaya and Jennifer von Schwerin.



UNM graduate student Elizabeth Olton teaching a class on site about the Hieroglyphic Stairway of Copán. Photo by Jennifer von Schwerin. Below: A maize deity bust that adorned the facade of Temple 22, and served as a visual metaphor for a cornfield growing out of the sacred mountain. Photo by Jennifer von Schwerin.

and the UNM Summer School, brings students to one of the most extraordinary Maya cities at Copán, Honduras.

Located in the valley of a tropical mountainous area, Copán is the most thoroughly excavated Maya city, having been studied for over 150 years by a number of established research institutions. Copán is also a United Nations Educational, Scientific, and Cultural Organization World Heritage site.

An architectural historian, von Schwerin holds appointments in the departments of Art and Art History, Architecture, and at the Maxwell Center for Anthropological Research. With a background in Gothic architecture and a specialization in the architecture of the pre-Columbian Americas, von Schwerin

is eager to share her passion and knowledge of Maya architecture, derived from a decade of research at Copán.

The field school, which will return to Copán in 2008, provides students the opportunity to study and live in the nearby town of Copán Ruínas. The school is open to UNM students and participants from other institutions in the United States and Latin America. “For some of our students, it is their first time out of the U.S., and this program allows them to explore their identities and responsibilities as world citizens,” says von Schwerin.

The academic content of the field school involves classes in art history, museum studies, archaeology, architecture, and Spanish language. Classes are taught by von Schwerin,

UNM graduate students, Professor Cristin Cash from St. Mary’s College of Maryland, and Honduran archaeologists. “The classes I teach in Copán are the same that I teach in the classroom at UNM, but it’s drastically different in the field. It is so much more effective to teach students about Maya architecture when you are on site amidst the remains of a Maya temple,” says von Schwerin. “I am a great believer in active learning, and the field school provides an invaluable hands on experience.”

Elizabeth Olton, a UNM doctoral candidate in the Department of Art and Art History, was a teaching assistant for the 2006 field school. “There are so many benefits to participating,” she explains. “My research was broadened just by being near and working at the site of Copán. Although this

ancient city is just part of my dissertation, the opportunity to walk around the architecture and sculpture was an immense privilege. It helped my dissertation to become more solidified, and new research questions came to mind.”

As part of the field school, von Schwerin and Olton conducted a service learning project with the aid of a UNM Partnership, Learning through Art, Culture and the Environment PLACE grant. The project, titled “La Historia de Mi/The History of Me,” involved a group of Chorti Maya children from a nearby community and students of the field school. “Our students gave tours of the ancient city of Copán to the children, and then we had an art project at the Copán Children’s Museum,” says Olton. “It was an

opportunity to give back to the community and learn about contemporary Maya. The goal was for the Chorti children to learn about their ancestors, and hopefully the program acted as a catalyst for our students to think about their own history and role in the world.”

One of the focuses of the field school is a virtual reconstruction of the ancient Temple 22. Dated to 715 A.D., this temple is considered to be one of the most skillfully crafted Maya temples. Seeing it in its current state—grey, tuff volcanic rock masonry, and deteriorating walls—it is difficult to imagine it in its prime, standing over three stories tall, with ornately carved facades, covered in stucco, and painted in tones of deep red, with accents of green, blue, and black.



“I am a great believer in active learning, and the field school provides an invaluable hands-on experience.”



View of Copán. Photo by Jennifer von Schwerin.

Remains of its facade are carefully conserved, documented, and are placed, like a giant jigsaw puzzle, in an enormous sandbox by von Schwerin and student researchers. This enables them to carefully determine the position of each ornate piece and form a larger section of the facade. “Because we can now read Maya hieroglyphs, which are phonetic, we can read the building’s dedication texts, sculptural imagery, and associated artifacts, and learn about the socioeconomic situation during the time of the temple’s construction. We know the name of the rulers who commissioned the temples, and can marvel at the work of the Maya artists who created the

facades and shaped the city’s form. We can see the stylistic differences in the stone carving and know that, like the Gothic cathedrals, it took many skilled artists to create such elegant works of architectural design,” notes von Schwerin. Another emphasis of the field school is the importance of conservation and heritage management. “The artifacts at Copán are in danger of further or complete destruction without proper conservation, documentation, and storage,” says von Schwerin. “Students learn to handle and work with the artifacts they are studying in a laboratory setting. They learn about what happens to the objects once they are excavated and how they can be

preserved for future study.”

In addition to classes, service learning projects, and lab and field work, students learn from lectures given by visiting archaeologists, conservators, and art historians working and traveling in Copán. Students also have the opportunity to visit museums, other archaeological sites, and travel to the Caribbean coast to experience the culture of the Afro Caribbean Garifuna people of Honduras. Says von Schwerin, “It’s important for the students to not only learn about and experience the ancient cultures and monuments, but also to understand the relationship of the past to the living peoples and cultures of today.”

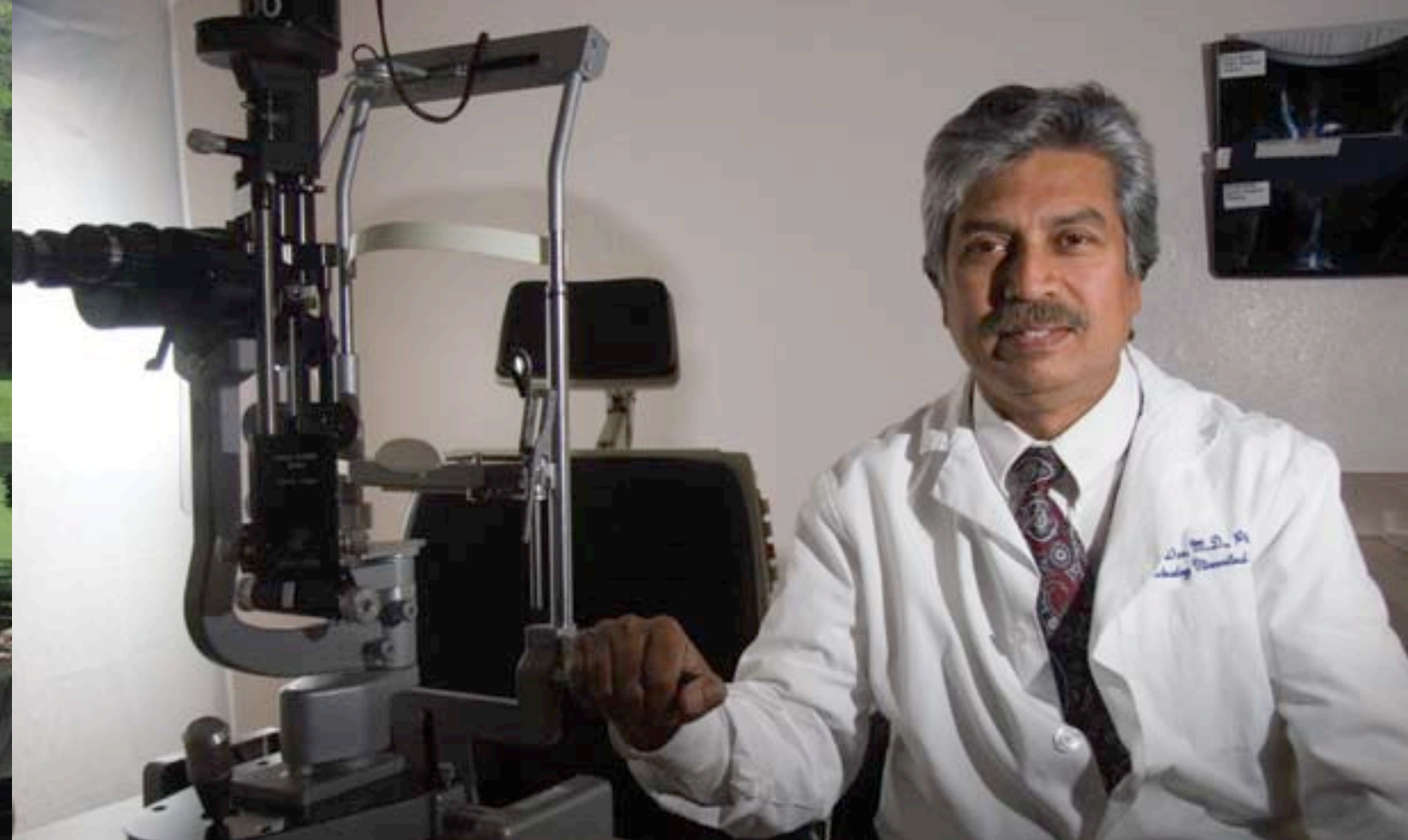


Photo of Arup Das by Matt Suhre.

A Solution in Sight

School of Medicine researchers are seeking ways to prevent vision loss in diabetic patients.

By *Cindy Foster*

Physicians know that tightly monitoring glucose, cholesterol, and blood pressure in diabetic patients can slow or halt a number of disease complications. Doctors routinely prescribe medications to keep these complications in check. Arup Das, chief of ophthalmology in the UNM Department of Surgery and Paul McGuire, chair of the UNM Department of Cell Biology and Physiology, hope their research will add new medications to that arsenal medications that physicians can

use from the first day of a diabetic diagnosis against one of its most devastating complications blindness. Diabetics are twenty five times more likely than the general population to become blind, and most cases of blindness result from diabetic retinopathy, a disorder characterized by microvascular changes and hemorrhages within the eye’s retina. The condition is responsible for twelve to twenty four thousand new cases of blindness each year, making diabetes the leading cause of new cases of

blindness in adults between the ages of twenty and sixty four. Researching diabetes related blindness is important for the state. Diabetes is increasing at epidemic proportions nationally, but New Mexico Hispanics and Native Americans are acquiring the disease at an even faster rate. To a great extent, diabetic retinopathy is a silent, progressive condition. Few diabetics show any evidence of changes five years after being diagnosed, but almost all dia



Photo of Paul McGuire and lab assistant by Matt Suhre.

“This is an exciting, multidisciplinary research project. If these findings can be replicated in humans, there is a great potential for the use of new drugs to prevent or treat macular edema in patients with diabetic retinopathy.”



Photo of lab assistant by Matt Suhre.

betics will have some retinal changes after fifteen years.

“It’s important that a patient’s vision be monitored routinely,” says Das. The first evidence of retinopathy will appear as “dots and blots,” tiny hemorrhages that show as spots on the retina. It is at this stage that medications to control glucose, blood pressure, and cholesterol are very important in slowing the progression of the disease. Some patients will begin to display some ‘macular edema’ as microvessels in the retina start leaking in the eye. This can lead to a gradual loss of vision. Macular edema is the most common cause of vision loss in diabetics.

At this point a physician might start to treat the eye with lasers to repair the damage; however, this treatment can lead to complications.

Additionally, the retina of the eye begins to create a network of tiny new blood vessels. What both doctors and patients fear is an episode of hypoxia when these new, fragile vessels within the retina can hemorrhage, leading to sudden vision loss.

Diabetic high blood glucose levels seem to be the key in the progression of the disease. Having glucose in the blood stream makes it more difficult for it and oxygen to enter the eye. Over time, the eye begins to react to this by degenerating in a number of ways, causing swelling and bleeding. What scientists hope to discover is the exact mechanism by which that degeneration happens.

Das and McGuire began collaborating more than ten years ago when the two discovered they were interested in the possible role proteinase enzymes might have in causing

new vessel formation and vascular leakage in the retina. McGuire was originally studying the role of proteinases in heart development. Das was interested in the possible role these proteins played in diabetic retinopathy. The two teamed up to test a hypothesis that these enzymes are instrumental to the formation of new vessels in the diabetic retina. This hypothesis has proven correct and they are now testing a variety of agents that may inhibit the process of new vessel formation, possibly preventing the devastating effects of this condition on the retina. Their work is being funded by the National Institutes of Health and the Juvenile Diabetes Research Foundation.

When hypoxia develops in the diabetic retina, the abnormal new blood vessels grow. “It’s a self defense mechanism,” says Das. “Mother Nature is

trying to bring in more oxygen to the retinal tissue of the eye.”

New blood vessel formation sounds like a good thing. However, new blood vessels are fragile and the risk of their hemorrhaging in the eye is very high. Unlike the “dots and blots,” these bleed outs can be almost instantly damaging to vision, with losses ranging from peripheral and night vision loss to full blindness.

A second area of investigation looks at the factors and mechanisms which regulate the permeability of the blood retinal barrier in response to diabetes. Recent studies have shown that proteinases can damage blood vessel walls to the extent that they can leak in the retina of a diabetic patient. The good news is that there are inhibitors that can act on these enzymes. In the lab, Das and McGuire have found that these

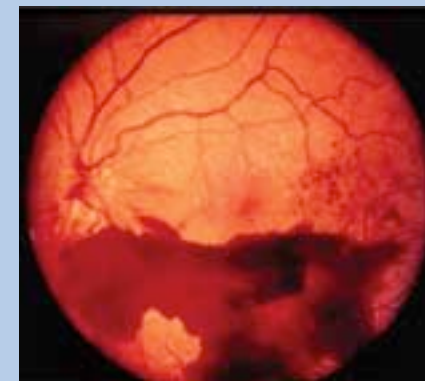


Photo courtesy of Arup Das.

New blood vessel formation sounds like a good thing. However, new blood vessels are fragile and the risk of their hemorrhaging in the eye is very high.

inhibitors can prevent the leakage seen in the retinas of diabetic animals. Now the research is looking at how well those results can translate into treatment for humans.

Das and McGuire will begin researching the role of proteinases in the development of early diabetic retinopathy and the possibility that inhibition of these enzymes may be a suitable new target to reduce edema inside the retinas of diabetics.

“This is an exciting, multidisciplinary research project,” says Das. “If these findings can be replicated in humans, there is a great potential for the use of new drugs to prevent or treat macular edema in patients with diabetic retinopathy. It could change the way physicians treat diabetics in the future.”

Fascinated by Lasers

Professor Jean Claude Diels has made tremendous advances in the field and study of lasers.

By Steve Carr

Twenty years ago, when Physics and Astronomy and Electrical and Computer Engineering Professor Jean Claude Diels came to the University of New Mexico, he helped open the door to a field of study that has since experienced enormous growth—lasers. These days, the laser is one of the most useful and powerful tools in science and engineering.

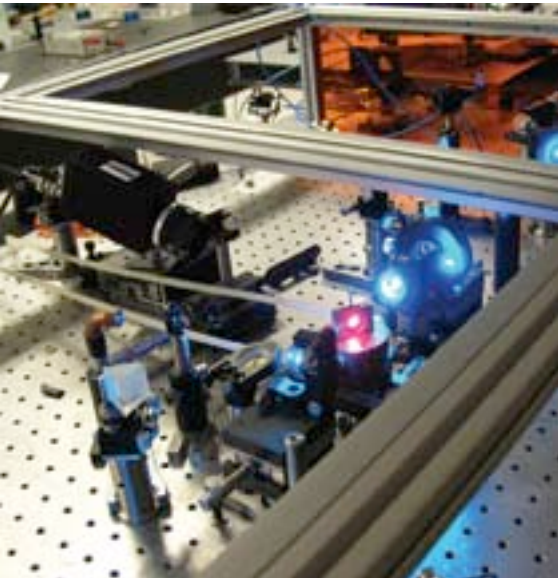


Photo courtesy of Jean-Claude Diels.

Chosen as the recipient of the 51st Annual Research Lecture Award, one of the highest honors for research and creativity awarded at UNM, Diels has made a remarkable impact on the field.

It all started innocently enough for Diels.

“I always wanted to compete,” he quips in his Belgian accent. “First I participated in competitive rowing. Then after the invention of

lasers, I found out that they were faster—that’s when I started work on semiconductor lasers in Philips Laboratories.”

One of the many challenges of working with lasers involves lining up the beam. Success comes with luck and patience.

“I remember I made what was, at the time, the world’s shortest pulse with a dye laser; it took me one year just to reproduce it,” Diels recalls. “Can you imagine fiddling, for one year, with the alignment of a laser until you get the same condition back? It takes a lot of persistence.”

Today, the laboratories where Diels conducts his experiments are filled with amplifiers, oscillators, isolators, beam expanders, and almost anything else associated with electronics and the study of lasers.

“There are fascinating things we can do inside the laser—such as a measurement inside the laser cavity,” explains Diels. “The traditional way to use a laser is to measure the trickle that comes out of the laser cavity. But measurements inside the laser cavity can be very sensitive. It is like sensing a change of one micron in the distance from moon to earth.”

Diels is an internationally recognized scientist and research pioneer with well established connections and collaborations with a number of worldwide organizations. He recently received the 2006 Excellence in

Engineering Award from the Optical Society of America in recognition of his work in the development of femtosecond sources, solid state laser gyros for navigation, fiber lasers, and diagnostic methods for amplitude and phase measurement of femtosecond pulses. A femtosecond, which equals one millionth of a nanosecond, is a measurement of the sensitivity required when working with lasers.

A Fellow of the Optical Society of America, Diels has also investigated the use of lasers for triggering and guiding lightning, and creating light filaments.

Additionally, Diels has advised and guided more than fifty PhD and master’s students at UNM, providing them with the opportunity to work on original experimental projects.

“It’s very rewarding,” says Diels about advising students. “I have been mentoring students from all over the world, and it has been like having a home in as many countries. Many of these students have gone on to be quite successful. The students keep me here in higher education, and the satisfaction of working with them is quite high.”

This alone may be the one of the best measures of a great scientist. □

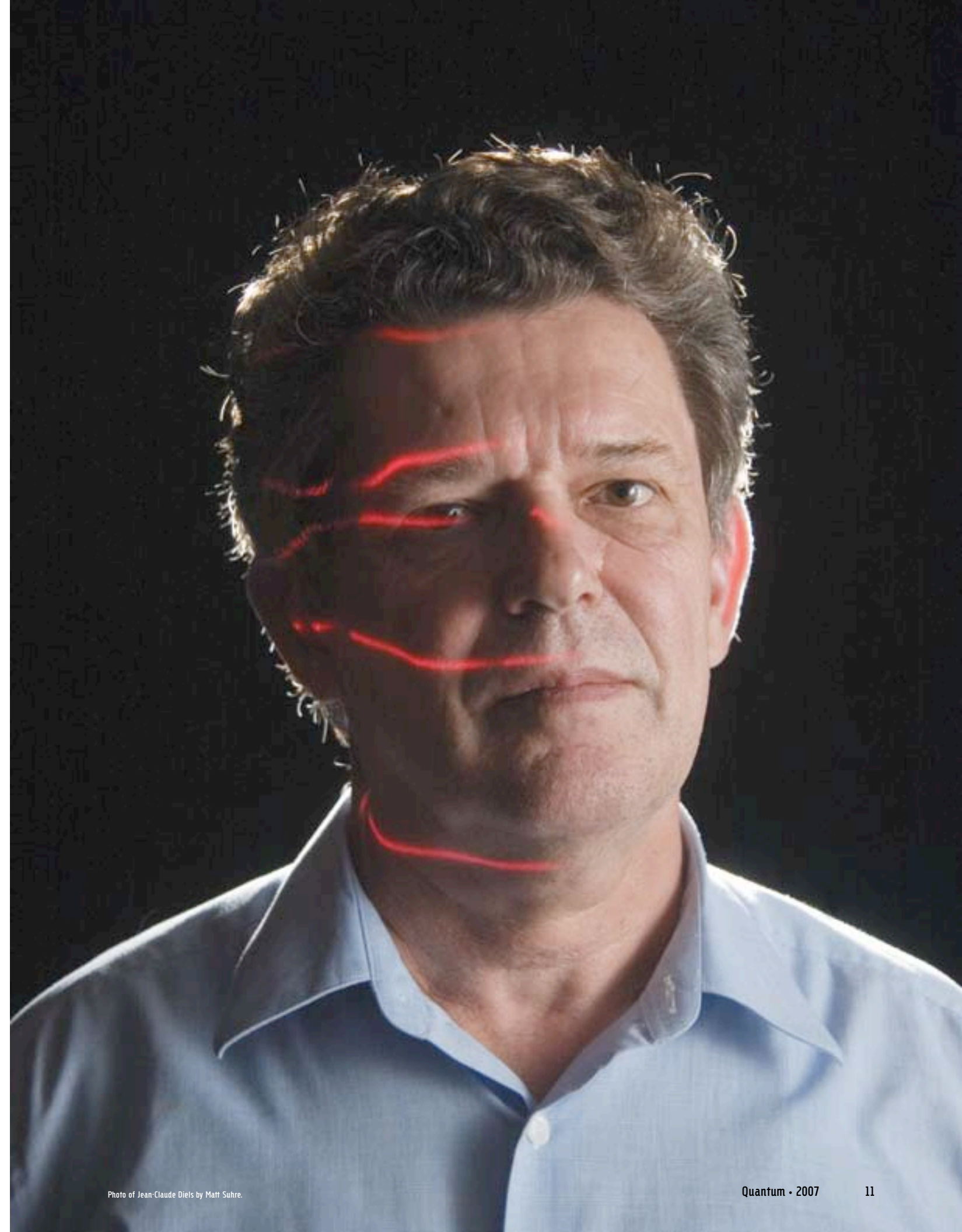


Photo of Jean-Claude Diels by Matt Suhre.



Photo by Thompson Chicarello.

Creating a New Generation of Speakers

Christine Sims has dedicated over thirty years working to help tribes with their efforts to maintain their native languages.

By Larry Walsh

Since the arrival of Europeans in North America, hundreds of Native American languages have disappeared. A number of factors have contributed to this loss. Some languages died due to the onslaught of measles, small pox, and other diseases brought upon American Indians, while others disappeared in the twentieth century when tribes were removed from their homelands and relocated to places where their languages were not spoken. Additionally, the U.S. government aimed to suppress indigenous cultures and languages by placing Native American youth into boarding schools such as the Carlisle Indian School.

By 1995, fewer than two hundred American indigenous languages were still being spoken. Almost 90 percent of these languages have been classified as being moribund, meaning that fewer and fewer children are learning their heritage languages. Too often, the only native speakers are a handful of elders. Linguists project that by 2050, only twenty American Indian languages will still be spoken. Linguists, however, have not taken the work of Christine Sims into account. An assistant professor in the College of Education's Department of Language, Literacy, and Sociocultural Studies, Sims has dedicated over thirty years of her life working to help tribes with their efforts to maintain their languages.

A member of Acoma Pueblo, Sims began

“There continues to be a need for training speakers in methods and strategies for language teaching as well as providing technical assistance to tribes in planning language initiatives.”

her teaching as a Keres language spoken by some New Mexico Pueblo people instructor before becoming a bilingual/bicultural specialist with the tribe's bilingual program. Bilingual education, however, had its limitations. “The ultimate goal of these programs was to transition students into English based curricula, not to preserve or maintain their native languages,” she explains. “What American Indian communities needed was a way to create new generations of speakers.”

In 1981, Sims co founded the Linguistic Institute for Native Americans, a non profit organization that provides training resources to Native American communities engaged in language retention efforts. She first came to UNM in 1999 and joined the College of Education on a full time basis in 2003. She joined other Native American faculty in the college to create the Institute of American Indian Education.

During her career, she has helped prepare Native American language instructors and community members throughout New Mexico, Arizona, Colorado, California, and Alaska to teach their languages. In 2003 and again in 2006, she was invited by the U.S. Congress to provide expert testimony on the decline of Native languages and the need to teach these languages to American Indian children.

Sims' current research includes the examination of perspectives held by tribal communities, language teachers, and school administrators regarding heritage language



Photo of Christine Sims by Matt Suhre.

“From a tribal point of view, languages are integrally intertwined with cultural survival. If languages go, then so do most aspects of a people’s culture, including its values, its belief systems, and its traditional practices.”

teaching in public school settings. In 2003, New Mexico created alternative certification for the Native American language speakers teaching language and culture in public schools. This provides New Mexico tribes the opportunity to develop their own internal tribal certification processes.

“Some tribes are making substantial progress in developing these new processes,” she says, “but there continues to be a need for training speakers in methods and strategies for language teaching as well as providing technical assistance to tribes in planning language initiatives.”

American Indian communities are highly motivated to maintain their heritage languages, as they know that the loss of language means the loss of culture. As Sims notes, “From a tribal point of view, languages are integrally intertwined with cultural survival. If languages go, then so do most aspects of a people’s culture, including its values, its belief systems, and its traditional practices.”

One challenge in maintaining Pueblo languages is that many of these languages are not written. “This is not to discount tribes that have established literacy, but there has to be a function and use for literacy in a language if it is to be learned and embraced by the community,” says Sims. “Within the Pueblo communities, our languages have continued to be oral because of a sense of privacy that arose because of the history of outside intrusions and the direct tie to sociocultural and socioreligious functions. Therefore, most Pueblos want to first ensure that their native languages remain as spoken languages of the community.”

This sense of privacy is by no means new. In 1920, anthropologist Franz Boas reported that one of his Pueblo contacts told him: “Long ago her mother had to sing this song and so she had to grind along with it. The corn people have a song too. It is very good. I refuse to tell it.”

Christine Sims is helping to ensure that these songs, prayers, and stories of American Indian communities will endure long into the future. □

A Different Dilemma

A new agreement will help provide the Navajo Nation with adequate infrastructure to manage its water rights.

By Steve Carr

From the days of the Wild West to modern times, water rights in the arid southwest have been a difficult issue. But the people of the Navajo Nation have a different dilemma they have ample water rights but inadequate infrastructure to fully access the precious commodity.

To solve this quandary, the State of New Mexico and the Navajo Nation have signed a water rights settlement agreement that includes a proposed one hundred mile long build out of a pipeline in northern New Mexico, giving the Navajo Nation increased access to water.

UNM Professors Craig White, Steven Walsh, Dante DiGregorio, and Doug Thomas of the Anderson Schools of Management worked on a study for the State Engineer’s Office and the Interstate Stream Commission examining the economic and socioeconomic benefits of the Navajo Gallup Supply Water Project. The study includes agreement related benefits in market flexibility, construction period economic development, improved household living standards, tax revenues, and stability in development.

“The Navajos have rights to a tremendous amount of water, but those rights are a little bit murky, and infrastructure to meet all their water needs is inadequate,” says DiGregorio.

“That’s one of the reasons the settlement is so important, because it helps define water rights for a large

portion of the state,” adds Thomas. “It creates certainty and reduces the possibility of litigation.”

The construction of the pipeline, a fourteen year project, will provide a large economic stimulus to the region. It is estimated to provide roughly one thousand jobs associated with the project through the construction phase alone.

Additionally, construction expenditures are estimated to generate 65 million in state and local tax revenue, while the direct operation of the pipeline infrastructure is estimated to produce 125 or more permanent jobs, and more than 10 million of annual economic activity.

“We took a multi faceted approach to determining the benefits, starting with construction and operation impact on the region,” explains White.

“The first value is simply getting water to the people,” says Thomas. “Beyond that, with secure water storage, you may attract more people or companies to the region that may not otherwise move there.”

“This water rights settlement agreement allows the Navajos to use water to either continue to grow their agricultural work, shift it to other purposes, or sell it within New Mexico. It makes things a lot more flexible and we think it provides a better infrastructure for economic growth,” says White.

Economic growth is just one



Illustration by Jeff Toste.

positive aspect of the project. The socioeconomic benefits are enormous as well.

“In terms of where money can be spent to improve people’s lives, you’d be hard pressed to find another place in the country with greater need,” says DiGregorio. “Within the Navajo Nation, the chapters most directly impacted by the pipeline currently exhibit the highest levels of poverty, unemployment, and percentage of population lacking piped water and other basic services, along with the lowest levels of population growth and educational attainment. Therefore, the pipeline appears to be reaching many of the areas on the Navajo Nation that need it most.”

He continues, “The economic side is a compelling story, but I think the social side is just as compelling. You have people who have to drive an hour or more to get water that they haul back to where they live. We’re not talking about dozens of people. We’re talking about thousands of people. I think the parties involved recognize that this is an opportunity to develop a long term solution that’s really going to help sustain development in the state.” □



Terminal Digit Singularity, 1978, Patrick Nagatani.



Genetic Modification, 2004, Patrick Nagatani.

Chromatherapy

Professor of Photography Patrick Nagatani explores the healing practice of color therapy.

By Valerie Roybal

“Hell is the color of intense red and fleshtones. Heaven is colored in blues and nurse uniform white. Greens suggest growth, and the land of the living in which anatomy, biology, physics, and medicine are the theatres of survival,” says UNM Professor of Photography Patrick Nagatani, describing his photographic series *Chromatherapy*. For nearly three decades, Nagatani has explored the symbolism and idea of color in relationship to promoting bodily healing and salvation from afflictions. This body of work involves the use of concentrated color as a primary compositional element of

staged photographs.

“Red, blue, and green these are the primary colors in the light system of the sun, photography, computer monitors, and television. All the other millions of manifestations of color are made of varied intensities and mixtures of these primaries. Color, divinely mutant and relative, and sometimes slippery to describe in words, has nonetheless been domesticated for its vast symbolic associations with gender intentioned children’s toys, feng shui decorations, and various cultural rituals, especially holidays,” he says.

Nagatani began the *Chromatherapy*

series in 1978 while working on film sets in Los Angeles. It was during that time that he found a publication by Mary Anderson titled, *Color Healing: Chromotherapy and How it Works*. In it, Anderson describes the psychological effects of color on people, as well as a “revolutionary” healing method “by which the rays of colored lamps are applied to diseased organs of the body, with amazingly beneficial results.”

Nagatani was captivated. With this idea he began extensive research and work on the use of color in healing, finding numerous sources of information and influences. He also drew from his knowledge of set design lighting and color, and his fascination with the emotional

and symbolic powers inherent in color.

“The idea of using colored light as a tool of non invasive medical treatment is really powerful. Using light over the body rather than cutting into the body or medicating the body with pharmaceuticals might be a dream more than reality, but perhaps some dreams should be reality,” he says.

In his research, Nagatani found that chromatherapy is not entirely a modern idea. “It’s a practice of healing that extends back in time to ancient Egypt and China, and into the future. Think of the light tool used by Dr. Beverly Crusher in the television show *Star*



Tap Water, Distilled H₂O, Vodka - Absorbing Chroma Rays, 2004, Patrick Nagatani.

Trek: The Next Generation; it almost instantaneously healed wounds and miraculously cured various illnesses.

“Red is thought to promote energy and improve circulation and blood cell production. Blue is thought to promote communication and knowledge and eliminate toxins. And green, located in the middle of the color spectrum, is associated with calmness and balance, and is used to heal ulcers and bacterial infections,” explains Nagatani. Within the practice of healing, the perceptions and feelings of color become vitally important.

In creating photographs, Nagatani’s portrayal of chroma therapy becomes theatrical and cinematic in tone, intensely saturated with color and ideas, exploring various imaginings of healing, including the miraculous, the surreal, the fake,

and the sometimes sinister. With the eye of a filmmaker, Nagatani carefully constructs his images, creating backgrounds, settings, and lighting, while arranging people and objects so that they appear to be in suspended and dream like states. Compelling and inventive, his images challenge the more traditional ideas of photography as a mode of impartially capturing reality.

The *Chromatherapy* series, recently shown at the Andrew Smith Gallery in Santa Fe and at Kenyon College in Gambier, Ohio, is part of a larger thirty year artistic career. In 2009, a survey of Nagatani’s work will be shown at the UNM Art Museum with an accompanying publication, *The Desire for Magic Patrick Nagatani, 1975 2008*.

Each of the thirty pieces of the series is a complex constructed nar

rative, with Nagatani as a consummate story teller, unfolding stories and ideas much like the fiction of his favorite author, Haruki Murakami.

A master of tableau photography, Nagatani has investigated a number of topics including Japanese internment camps, nuclear energy and waste, and fictional archaeology, often using a similar combination of film like elements to construct his own realities.

“I have made a career of working in the directorial mode of artistic photography,” explains Nagatani. “With *Chromatherapy*, I have juxtaposed social and political issues with new theories in medicine, anatomy, astronomy, biology, and physics all within the context of color and light as a mechanism for growth and healing.”

The Movement of the Rift

Researchers study the Rio Grande Rift for clues to understanding the forces that are pulling the North American plate apart.

By Steve Carr



Photo by Steve Carr.

On a clear, spectacular autumn day at the Philmont Scout Ranch in northern New Mexico near Cimarron, technicians and engineers assemble the pieces of a global positioning system GPS designed to precisely measure the ground movement at that point along the Rio Grande Rift, which stretches from Colorado to southern New Mexico.

The Rift represents a zone where the North American plate has been stretched and thinned. In this region,

the crust is thinner than in surrounding areas and is marked by a chain of basins where the Rio Grande deposits sediments.

In the landscape, the Rio Grande Rift is marked by the course of the river through these low lying basins as it continues its work of deposition and erosion.

The Rift measurement project is part of a 600,000 grant awarded to a team of researchers at the University of New Mexico and the

University of Colorado at Boulder CU from the National Science Foundation’s EarthScope initiative, a partnership with the U.S. Geological Survey and NASA to study the structure of North America.

EarthScope is an extensive undertaking, applying modern observational, analytical, and telecommunications technologies. It is designed to investigate the structure and evolution of the North American continent and the physical processes



Technicians and engineers set a metal pole in concrete to support an equipment enclosure containing global positioning satellite wiring and electronics designed to measure the movement of the Rio Grande Rift. Photo by Steve Carr.



The Philmont Scout Ranch, where equipment is installed to aid researchers in recording data from the Rio Grande Rift. Photo by Steve Carr.

controlling its geologic evolution, earthquakes, and volcanic eruptions.

The primary goal of the UNM CU project is to determine what the stretching rates are in the Rift and what the rates measured at the surface suggest about the stretching of the North American plate at deeper levels. Using state of the art GPS instruments at twenty four sites from Colorado to southern New Mexico, the research team will track the Rift's movement with millimeter accuracy over the course of the next five years. The study will provide unprecedented geologic data about the

volcanically active and earthquake prone region of the Rio Grande Rift.

“Our goal is to try and understand the rates of motion today,” says UNM Earth and Planetary Sciences Assistant Professor Mousumi Roy. “The information we gather will tell us about how the North American plate is breaking apart at the Rift and if any earthquake hazards are posed by the Rift.”

The Rio Grande Rift is the easternmost deforming province within the tectonically active western margin of North America. It is currently undergoing stretching and extension

manifested by higher probabilities of earthquake occurrence than in surrounding regions.

“The Rift extends hundreds of miles from Colorado’s central Rocky Mountains down to Mexico. Geologists have estimated it spreads apart at rates up to one or two millimeters each year,” says Professor Anne Sheehan, who is affiliated with CU Boulder’s Cooperative Institute for Research in Environmental Sciences.

Eight GPS sites in central and southern Colorado have already been built, while in New Mexico, the site at the Philmont Scout Ranch

was the first of thirteen sites that will be set up in three different areas throughout the state. Five sites will be built near the latitude of Taos, four sites in central New Mexico near Albuquerque, and four sites in southern New Mexico near Las Cruces.

“Sites are built where there is bedrock and where there is a good open view of the horizon in order to obtain accurate readings from satellites without interference,” says UNM Field Assistant Amy Luther. “The desert is a great place to set up the sites because it is non wooded and fairly wide open.”



Photo of Mousumi Roy by Matt Suhre.



GPS equipment used for measuring the Earth's movement. Photo by Steve Carr.

“The Rift extends hundreds of miles from Colorado’s central Rocky Mountains down to Mexico. Geologists have estimated it spreads apart at rates up to one or two millimeters each year.”

The sites are built by UNAVCO University Navstar Consortium, a non profit, membership governed consortium that supports and promotes Earth science by advancing high precision techniques for the measurement and understanding of deformation.

“Supporting GPS science is the purpose of our organization,” says UNAVCO field engineer Nicole Feldl. “We help researchers get as much data as possible. Each site includes an antenna monument box, which is connected to the GPS receiver, two 12 volt batteries for power, and a solar panel to keep the batteries going.”

Over the course of five years, different teams will compare their measured rates of motion with all other available datasets, including seismic velocities in the crust and mantle,

gravity, surface heat flow, and geologic data. The data will be reviewed and used to build computer models of the processes that control how tectonic plates undergo rifting.

“What’s intriguing to me is why north of Socorro the Rift is a narrow feature, whereas to the south we get a broader region of extension comparable to the well known Basin and Range province of Utah and Nevada,” says Roy. “We will combine what we learn from the GPS measurements with other geophysical and geologic data to try and understand the forces that are pulling the North American plate apart and creating the Rift, and what this means for the future of the continent.”



The Cross-Disciplinary Connection

International projects at UNM inspire faculty to work together to address healthcare solutions for people around the world.

By Greg Johnston

When UNM faculty come together to exchange stories about their international experiences, Paul Nathanson says the resulting chemistry is fun to watch. Nathanson is associate provost for academic affairs and teaches in the School of Law Economic Development Program. He has also chaired a task force to develop a plan for strengthening and broadening UNM international programs.

Nathanson has found that international activities bring together faculty from main campus and the Health Sciences Center to share their experiences. “All of a sudden people are talking,” he says. “Dr.

Dale Alverson was describing a boat he uses on the river in Ecuador to deliver healthcare to indigenous people. And while he was describing that, a photographer said ‘I want to be on that boat.’ And then another faculty member, who was building village water systems in Honduras said ‘I ought to be on that boat.’”

Nathanson continues, “What you find is that UNM is a fertile place for this cross disciplinary connection. An added value is that most international projects at UNM are driven by faculty who bring students into the picture. These are people who care about students having good experiences.”

In addition to connecting faculty, another aspect of international initiatives is the creation of innovative programs with global applications. Nathanson points to north campus, home of UNM’s Health Sciences Center, and a number of people including Arthur Kaufman, professor and chair of Family and Community Medicine, for recognizing commonalities in healthcare delivery between New Mexico and other parts of the world. “Kaufman believes that if we solve something here, it’s relevant to the rest of the world, and we can learn from what others are doing.”

Alverson shares the same belief. He directs the UNM Center for



“Students began to realize that primary health issues are related to similar primary problems anywhere, same as New Mexico. The problems that lead to health issues are poverty and lack of education and knowledge.”

Previous page: Medical boat on the Amazon River in Ecuador. Photo courtesy of Dale Alverson. Left: Photo of Paul Nathanson by Matt Suhre. Dr. Dale Alverson in Ecuador on the banks of the Amazon River. Photo courtesy of Dale Alverson.

Dr. Dale Alverson brought three UNM students to Ecuador to learn about issues affecting healthcare and to work with local lay health professionals. Ming-Jai Liu shown above. Photo courtesy of Dale Alverson.

“What you find is that UNM is a fertile place for this cross-disciplinary connection. An added value is that most international projects at UNM are driven by faculty who bring students into the picture.”

Telehealth, which is an example of a UNM program making strong connections. Alverson plans to use satellite technology to visually connect the medical boat on Amazon River tributaries with specialists in Quito, Ecuador, or in some cases, far away in Albuquerque, and in real time. “We have surgery capabilities on the boat and can use telemedicine to reach a UNM trauma surgeon for advice on how to stabilize a patient.” Additionally, he has been working with the Universidad Tecnológica Equinoccial in Quito on programs to bring medical students to regions of the Amazon where they conduct research and provide treatment.

Alverson noticed that clinics in the rain forest jungle were addressing problems such as Hepatitis C and tuberculosis, that are similar to growing concerns in New Mexico and at UNM Hospital. One of Alverson’s projects involved his team investigating high levels of cancer resulting from groundwater contamination by petroleum corporations. Formal agreements between UNM and the university in Quito were signed to work on the problem. For students, the experience was an eye opener. In July of 2006, Alverson brought three UNM students to Ecuador: Erika Mendoza,

Ming Jai Liu, and Kevin Henry. They worked together to develop a questionnaire to better understand what health professionals in the region felt were major issues. “Then we drilled a little deeper to learn their feelings about cancer and what they thought about petroleum companies,” elaborates Alverson. As a result, they were able to form a baseline of knowledge about local attitudes and beliefs. “Participating in this international experience solidified my commitment to serve international communities in

the near future,” says Liu, who had an opportunity to interact with Ecuadorian lay health professionals called *promotoras*. “I’ve learned so much from the local medical personnel. Learning about the indigenous healer’s view of healthcare and way of life certainly broadened my horizons.” Alverson adds, “Students began to realize that primary health issues are related to similar primary problems anywhere, same as New Mexico. The problems that lead to health issues are poverty and lack of education and knowl

edge. The students said it was a life changing experience, and in the future, they will have a better understanding of what to do when they have limited resources.” Nathanson agrees. “It’s clear to me that when you travel it becomes very challenging, it never works out the way you want or things work out unexpectedly, and one way or another, you deal with it. Getting students out of their comfort zone is always a learning experience.”



Invention and Patent at UNM

By Karen Wentworth

When a UNM researcher discovers something new that might be of commercial value, the Science and Technology Corporation @ UNM STC can help file a patent disclosure, beginning the process of formally applying for a patent. Last year, STC filed ninety six patent disclosures on work that ranged from ways to better view parts of cell walls to new devices that deliver cancer drugs more efficiently inside the body.



Illustrations by James Steinberg

A Wellspring of Bioengineering Ideas

As Jingkuang Chen explains his latest idea for a very tiny medical device, he leans forward, his eyes glow, and he speaks so fast that hearing him is like feeling an electrical charge.

Chen, an associate professor in the Department of Electrical and Chemical Engineering, has applied for patents through STC for a number of inventions, including an implantable ultrasonic transducer array, a mechanism that will deliver drugs at the cellular level, and an ultrasonic capsule endoscope.

The implantable ultrasonic transducer array looks like a tiny probe. About half the thickness of a human hair, it will allow temporary freezing of individual cells so that delicate surgery can be performed in tiny areas of the brain or organs with minimal impact on the healthy surrounding tissue. The probe is also ultrasonic and can be used to heat a small area of tissue for treatment and measure temperature.

The drug delivery device looks like a tiny probe as well. It is meant to target cancer cells. Chen says the cell membrane of a cancer cell often blocks the drugs that are trying to kill it. Aided by ultrasound, the device disrupts the membrane's ability to block the drug and more easily allows it to penetrate the cell. He thinks it will improve the effectiveness of some cancer treatments. Both technologies will be available for companies to license through STC.

Chen's latest patent application is for an ultrasonic capsule endoscope. This device can be swallowed, and it will use ultrasound to look for polyps and irregularities as it travels through a patient's colon. Doctors will be able to see digital images from the device, and if something looks suspicious, the ultrasound can help diagnose whether the polyp is potentially cancerous. It's a major change from current technology because the device can scan from the front and from six sides, making it easier to cover the entire environment. The ultrasound can also use shorter wavelengths to provide clearer images than those produced by current medical equipment.

Chen believes there is great medical potential for this device. He knows he can make it even smaller, and is already thinking about how to fit it into blood vessels to target clots and plaque. Chen and his research group have made a prototype of the endoscope in a University of Michigan laboratory, and he hopes to build the devices at UNM next year.



Making Some Medical Tests Faster and Easier

Gabriel Lopez, director of the UNM Center for Biomedical Engineering, has a patent, now licensed to a start up company, for the development of a device that can precisely separate molecules using small sample volumes. This device could make detecting some kinds of cancer and testing for birth defects in utero easier, and give doctors the results more quickly.

Lopez has been working on ways to separate and identify proteins and protein complexes efficiently and inexpensively. Now he believes he has developed a method that will be attractive to industry as it moves toward a better understanding of the way drugs and cells interact.

Lopez is leading a cross disciplinary effort at UNM to connect engineers with medical researchers to develop, fabricate, and test new medical devices and treatment methods.



Finding a New Way to Examine Cell Structure

Two physics professors, James L. Thomas and Wolfgang Rudolph, have developed a promising new way to look at very tiny areas on cell surfaces. It may help solve one of the challenges in optical microscopy, which is finding resolution at scales below the wavelength of the illuminating light.

Thomas and Rudolph's application has combined Rudolph's expertise in advanced optics with Thomas' knowledge in biophysics to design cell substrate surfaces with nanoscale "islands" that act to concentrate the illumination near sharp vertices. A laser is used to illuminate each island, and the resonances of electrons in the island create the strong local illumination. The technique should allow observation of regions of cell membranes that are much smaller than the optical wavelength, and it is a promising method to study the nanodomains within cell membranes.

This is important because researchers need to see the way the components of a cell membrane interact with outside elements such as drugs. It's a new way of seeing parts of cells, and Thomas and Rudolph hope it will help them take the next steps in discovering how the molecules in the membranes of cells function.

Solving the Laser on a Chip Problem

For more than twenty five years, researchers have wanted to put a laser light source directly on a silicon chip for faster information transfer. However, it's never been possible because the laser material is fundamentally different in molecular size and develops cracks and defects when the chip heats up while operating in a computer. The problem has been so technically daunting that many researchers have given up to explore other methods of increased information transfer speed.

Now a group of UNM researchers has developed a technology they think will enable companies to build a single chip with the laser, driver, and the electronics components together. The team, which includes Associate Professor in the Department of Electrical and Computer Engineering and the Center for High Technology Materials Diana Huffaker, post doctoral students Ganesh Balakrishnan and Sandilya Birudavolu, and Research Professor Larry Dawson, is working to complete a successful prototype diode laser growth directly on silicon substrates that will work on a commercial chip.

In the industry, developing a smaller, lighter, and faster device is considered to be a major breakthrough. Developing a solution to the "laser on a chip problem" has been considered the "holy grail" of silicon chip technology. One of the initial challenges of developing the solution may be convincing others that the researchers have succeeded in an area where so many have failed.

The UNM team's success is based on a newly demonstrated growth technique which enables the laser material to be monolithically single crystal integrated with the silicon substrate.

STC has applied for a formal patent and hopes to license the technology. In the meantime, Huffaker and Balakrishnan are working with a company to try to make a working device.

They both agree, they didn't know the potential technological impact when they began growing the crystals and saw the first promising results. This research has been a series of complex problems solved step by step and day by day for almost two years says Huffaker. "I don't think we really knew until very recently that this might be really big." ☐





Photo of Suellyn Scarnecchia by Matt Suhre.

Telling the Law School's Story

Suellyn Scarnecchia breathes new energy into the UNM School of Law.

By Laurie Mellas

No one can accuse UNM School of Law Dean Suellyn Scarnecchia of taking it easy. During her brief tenure, she has developed a strategic plan, recruited key faculty and staff, fostered a new era of research and scholarship, fashioned and funded several endowed chairs, and created a host of workshops and lectures to increase legal dialogue in the school. And this is just the beginning.

She has spearheaded a new Economic Development Program, which includes a clinic where students gain hands on experience

by providing low income, small business clients with affordable legal and tax services.

At the state level, she chairs New Mexico's Judicial Nominating Commissions, traveling to communities to oversee the very public process of filling vacant judgeships. She co chairs a governor's task force charged with recommending how the state can toughen ethics and campaign finance laws. She also serves on the New Mexico Supreme Court task forces on professionalism and access to justice.

Nationally, Scarnecchia

plays a vital role "telling the law school's story," delivering lectures, and serving on key committees, including the Association of American Law Schools' Committee on Recruitment and Retention of Minority Faculty.

"People know us as a friendly law school with high standards," she notes.

The opportunity to take the helm of a law school with a top ranking in clinical law was a draw for Scarnecchia, who earned her JD from the University of Michigan. She worked in private practice prior to joining her alma

Photo by Matt Suhre.

“The best part of being dean is bringing in terrific people and watching them blossom. It’s a real investment in the future of the institution.”

mater in 1987 as faculty in the Child Advocacy Law Clinic and later as clinical affairs associate dean. There, she was thrust into the national spot light as counsel for an Ann Arbor couple trying to adopt the child known as Baby Jessica.

Coming to the law school in 2003, Scarnecchia is the first woman to hold the post of dean. She makes her mark as a no nonsense leader who sets and meets lofty goals. Asked to discuss her early accomplishments, Scarnecchia makes clear her priority: “Let’s talk about students first.”

About 360 students attend the law school. Access, low student faculty ratios, and diversity are its hallmarks. In fall 2006, approximately 115 were enrolled in the first year of a three year program. Of those, 41 percent were minority. Of the thirty five full time faculty Scarnecchia oversees, half are women and 40 percent are minority.

The school supplies many of the state’s legal eagles. Professional reputations begin to form as early as the first year, so it’s important for entering students to know that classmates and faculty mentors quickly become colleagues, Scarnecchia says. With that in mind, she raises the bar for

student professionalism.

“Law is a self regulating profession. My feeling is that if something goes awry, it’s up to the students to fix it,” she says. “Instead of being a scolding school principal, I try to approach discipline as a professional issue. What would be the consequences of this action if you were a practicing lawyer?”

Creating a classroom environment where students feel free to express themselves is also a goal. Scarnecchia works with student organizations to offer Legal Dialogues, a one credit course also open to faculty and organized by student groups who are asked to select a controversial topic for discussion intelligent design and race are some of the topics chosen in the past. Scarnecchia serves as moderator. She is pleased with the students’ ability to work together on touchy subjects. “For lawyers to be successful problem solvers for their clients, they must understand why the opposition is taking a different position. This understanding is the difference between a great lawyer and someone who is not,” she explains.

Scarnecchia is known for building stronger relationships across communities strengthening Indian law

is high on her agenda and across disciplines. A better alliance with UNM’s business school resulted in a joint graduate degree in law and accounting.

Seeking out great people to teach is another of Scarnecchia’s fortes.

“The best part of being dean is bringing in terrific people and watching them blossom. It’s a real investment in the future of the institution,” she says.

Those petals unfold with her encouragement, notes Laura E. Gómez, recruited in 2005 from the University of California, Los Angeles. At UNM, Gómez was delighted to find a critical mass of law professors devoted to scholarly work.

“Moreover, I’ve been pleased to see this devotion combined with a commitment to teaching and engagement with students both in and out of the classroom,” Gómez explains. “Suellyn fosters an environment in which we don’t so much see these as separate spheres, but instead see our research as feeding into our teaching and other interaction with students.”



Hurricane Katrina victims are transported by Blackhawk helicopter from New Orleans to Baton Rouge, where they are received and triaged by NM DMAT members.

When Disaster Strikes

The New Mexico Disaster Medical Assistance Team can provide on the spot emergency and routine care at the site of any disaster.

By Luke Frank

Like millions of Americans, Mike Richards enjoys a quiet Sunday afternoon leisurely perusing the newspaper in his easy chair. But the summer is quickly approaching, so his blood is pumping a little faster. Hurricane season is around the corner, ushering in great cyclonic weather events that sometimes engulf and destroy entire communities.

Once the season is under way, Richards sits atop twenty two tons of medical, communication, and

mobile shelter gear, as well as power generators and potable water, awaiting the call for his well trained and highly skilled thirty five member New Mexico Disaster Medical Assistance Team or DMAT to deploy. They must mobilize within twelve hours of initial contact and be prepared to swiftly erect a fully operational field hospital capable of administering both emergency trauma and routine medical care at disaster sites anywhere in the U.S.

Richards, an MD and associate professor of emergency medicine at the UNM Health Sciences Center’s School of Medicine, is also the director of UNM’s Center for Disaster Medicine and medical director for NM DMAT. The team has seen plenty of action in its over twenty year history, providing frontline, first response services for emergency medical missions to thousands of injured and traumatized victims of major hurricanes, earthquakes, fires,



After a long day at the World Trade Center site, doctors, nurses, administrators, and other NM DMAT members assess their operation and prepare for the next morning. All photos courtesy of the New Mexico Disaster Medical Assistance Team.

floods, and the 9/11 terrorist attack.

Created in 1984 on the heels of Mount Saint Helens' violent volcanic detonation, the National Disaster Medical System NDMS was tasked with providing emergency and other critical medical services immediately following a U.S. disaster. That same year, regional Disaster Medical Assistance Teams were conceptualized to support the NDMS mission.

UNM Executive Vice President for Health Sciences and Dean for the School of Medicine Paul Roth remembers the process well—he was first to volunteer to establish a New Mexico disaster medical assistance team in 1984. "The NDMS identified and then traveled to the top 100 cities in the U.S., including Albuquerque," Roth recalls. "They assembled a huge meeting that included much of New Mexico's political, medical, and community leadership, aiming to voluntarily establish medical centers that could treat disaster victims as part of the NDMS Federal Response Plan."

At that meeting, NDMS also asked for volunteers to take the lead in New Mexico. "After quite a pregnant pause, I stood up and stated that both tasks were logical and necessary public missions for the University and the hospital's division of emergency medicine," Roth explains. As division chief for emergency medicine at the School of Medicine and chief of emergency services at the state's only Level I Trauma Center, he fully understood and embraced that responsibility.

Roth's volunteerism wasn't idle talk, and with the support of University leadership, UNM Hospital emergency medicine staff and personnel, and a large number of volunteers from around the state, a disaster medical assistance team was quickly formed. "We weren't offered any established guidelines or instructions on training, supplies, or even team components, so we built the nation's first team based on a military model," he remembers. "We assembled a roster of approximately

two hundred medical and other volunteers from which we would select between thirty five and forty personnel for a deployment tailoring the team to individual medical, communication, and administrative needs of the disaster site."

Roth also served as an informal advisor to the NDMS and helped determine the team's need for doctors who specialize in crush injuries, hemorrhages, and other acute trauma; nurses and pharmacists; safety, security, and communications experts; engineers and utility professionals; and transportation and administrative support personnel.

Hurricane Hugo's battering of St. Croix in 1989 drew the country's first NDMS DMAT response, and New Mexico's team became the nation's first deployed DMAT to a U.S. disaster site.

Over the last sixteen years, NM DMAT has been tasked with establishing impromptu, acute care field hospitals, devising ambulance and medical transportation systems,



Treatment of medical trauma patients from Hurricane Katrina occurred at staging sites like Pete Maravich Center on the Louisiana State University campus.



NM DMAT Medical Director and UNM Center for Disaster Medicine Director Mike Richards coordinates with a National Guard member when deployed during Hurricane Katrina.



UNM Executive Vice President for Health Sciences Paul Roth lends his considerable expertise in emergency medicine to the crews and teams tasked with conducting recovery operations at the World Trade Center site.

“We assembled a roster of approximately two hundred medical and other volunteers from which we would select between thirty-five and forty personnel for a deployment—tailoring the team to individual medical, communication, and administrative needs of the disaster site.”

and erecting free standing outpatient clinics for homeland events like presidential inaugurations, Olympic Games, and Kosovo refugee intake missions. Perhaps most notable has been the team’s work concerning the terrorist attack on the World Trade Center and the devastation following Hurricane Katrina. In addition to its regular, specialized safety and emergency medicine exercises, the team receives site specific instruction to handle local environmental challenges like alligator evasion training for Hurricane Katrina, for example.

Integral to the effectiveness of all DMATs is their safety and ability to adapt and cope with cataclysmic events and the chaos that follows. How do DMAT members keep from becoming casualties of the devastation around them? “We think about emotions and anxiety a lot,” Roth admits. “After all, we’re in the business of following traumatic events and experiencing people’s very personal losses firsthand.”

To that end, the team is trained to monitor, detect, and treat victims suffering from post traumatic stress disorder and other behavioral conditions associated with disasters that may confront them, even within their own ranks. “We first must ensure that our own team members are physically, mentally, and emotionally prepared to enter a disaster site,” Roth explains. “Then we evaluate and debrief our team afterward. The sheer enormity of destruction and death brought on by

disasters like the World Trade Center and Hurricane Katrina can seriously affect even the strongest, best trained, and most composed team member.”

However, NM DMAT isn’t just about high profile, mass casualty incidents. The fundamental premise behind disaster medical assistance teams is that they are a resource for local needs. New Mexico’s DMAT was deployed to the Cerro Grande Fire in 2000 and provides medical support for the annual Bataan Memorial Death March at White Sands Missile Range. DMAT can also be seen at the New Mexico State Fair, the Albuquerque International Balloon Fiesta, Elephant Butte State Park on busy holiday weekends, and other special events throughout the state.

“Fundamentally, we’re just people who want to help other people,” Richards concludes. “But it demands so much more. We only deploy about thirty five people at a time, but get unbelievable support from a lot of folks, including our families, work colleagues, and employers. There’s real satisfaction in being a part of a collective effort to help people who are in desperate need.”

Quantum Briefs

Making Money

By Steve Carr

The possibilities are endless—imagine a web based business that gives people the opportunity to make money automatically. Associate Professor Nick Flor, Anderson Schools of Management, came up with this innovative idea over a decade ago.



Illustration by Robert Saunders.

Flor thought it would be an ideal learning situation for business students to build autonomous web based businesses that require no involvement beyond initial development.

“When I first started teaching web classes in the 90s at another school, I thought it was a great idea to go out and work with small business,” Flor says with enthusiasm.

Flor is teaching Management 461, System Development Project, one of the more popular courses at the Anderson Schools, with an average of more than fifty undergraduate and graduate students participating each semester. “I’ve been teaching it at UNM since 2002, and students love it,” says Flor.

As part of the class, students have a weekly tournament to see who makes the most money. Winners at the end of the semester disclose to the class what they did to make the site successful.

Says Flor, “Getting the site to run itself is the trick, and students are learning about technology. The goal is to make more than \$45 over the course of the semester, which means about \$15 a month for three months to pay for expenses.”

The Significance of Bells

By Greg Johnston

The ringing of bells has led ethnomusicologist Steven Feld around the world to countries in Africa, Asia, and Europe. Feld is a UNM professor of music and anthropology who composes soundscape recordings based on his worldwide travel and research.



Recently Feld released the fourth in a series of CDs called *The Time of Bells*. Field recordings were made in Italy, Denmark, Japan, and in the United States at Newport, Kentucky, home of the World Peace Bell, the largest swinging bell in the world, weighing 66,000 pounds.

“I recorded the bell on World Peace Day, September 21. Then I asked Rahim AlHaq, an Iraqi oud Middle Eastern lute musician, to collaborate with me.” Feld says the result was a composite recording that places the sound of the bell within an Iraqi context.

Feld was the recipient of a MacArthur Foundation’s “genius award” in 1991 and a Guggenheim Foundation fellowship in 2003 2004. He is the founder of VoxLox, a documentary sound art label whose CDs advocate for human rights and ecology.

Lessening “Needle Phobia”

By *Cindy Foster*

Fear of needles can seriously impact the care a patient receives. Some children become hysterical, while some adults will avoid the doctor’s office altogether. However, when researchers at the UNM Health Sciences

Center HSC decorated syringes and catheters with butterflies, flowers, fish, and smiley faces, patient fear, aversion, and anxiety levels decreased significantly.

In a UNM study, published in the August 2006 issue of the *Journal of Family Practice*, some sixty patients were recruited from HSC outpatient clinics. The patients were randomly exposed to different designs of winged needles and syringes fitted with a needle. They were tested on a range of standardized visual analogue reaction scales.



Photo courtesy of UNM HSC Public Affairs.

A fear of needles, syringe procedures, intravenous therapy, and medical devices is given the overall term of “needle phobia.” The study focused on specific psychological components of stress induced by exposures to needles and medical devices.

Using decorated syringes resulted in significant stress reduction of exposure to conventional syringes, and reduced aversion by 68 percent, fear by 53 percent, and anxiety by 53 percent. Significant reductions were also found when catheters, IV bags, and scalpels were decorated.

Wilmer L. Sibbitt, professor of internal medicine, rheumatology, and neurology at the UNM School of Medicine, says it is likely that decorating a medical device is a neurophysiologic intervention, resulting in stimulation of brain areas not usually associated with fear, anxiety, and aversion. This suggests the decorations interfere with the established link between visual recognition of a perceived threat and the subsequent emotional response to that perceived threat. UNM researchers believe this novel form of cognitive therapy can make a real difference in the quality of care patients receive. ☐

Law’s Utton Center Develops Model Water Compact

By *Laurie Mellas*

During the past half century, American states have entered into some twenty six interstate water allocation compacts, primarily in the western part of the country. UNM’s Utton Transboundary Resources Center at the UNM School of Law has developed a model water compact to help parties with a process that could possibly lead to costly litigation. The project was funded in 2000 with congressional funding obtained by U.S. Senator Pete Domenici.



Photo by Michael Mouchette.

“This model river compact addresses the relevant and integrated scientific, economic, legal, and cultural factors that must be thoughtfully and thoroughly examined by any practicing water resource administrator,” explains Ken Knox, chief deputy state engineer for the State of Colorado.

The new document is available for use as a traditional interstate compact, with states as signatory parties, or as a federal/interstate compact with the United States as a signatory party. The latter approach has been used in the compacts recently approved by Congress.

“The beauty of the new model compact is that it can be adapted to different situations in the various river basins around the country,” says Marilyn O’Leary, recently retired Utton Center director.

The model compact can be downloaded from the Utton Center web site, uttoncenter.unm.edu. ☐



Illustration by James Steinberg.

Elisa LaBeau: Implementing a Surveillance Protocol for Detecting West Nile Virus

By *Diana Sanchez*

In the fall of 2002, the first cases of horses and birds carrying West Nile Virus WNV were reported in eastern New Mexico. This prompted UNM undergraduate biology student Elisa La Beau to learn from and work with top scientists and institutions to create and implement a comprehensive disease surveillance protocol to detect the emergence of the virus in Albuquerque’s Rio Grande Valley. “This undertaking was very close to my heart, because it had a direct impact on the lives of my fellow New Mexicans,” says La Beau.

The team designated nine sites to trap, sort, and monitor mosquitoes as well as sentinel chicken flocks, put in strategic locations across surveillance areas used to determine whether any mosquitoes are carrying disease, in six of those sites. Using CO₂ baited traps and live mosquito traps, La Beau collected mosquitoes. “The traps we used were designed to attract mosquitoes known to carry WNV and to take their blood meals from primarily avian and mammalian human hosts.”

Captured mosquitoes were then identified and tested for the virus. The same week Bernalillo County reported the first human cases of WNV, La Beau and team found both infected mosquito pools and sentinel chicken cases. “The data from the first year of outbreak in conjunction with new data has proven to be very effective to severely reduce amplification in WNV ‘hotspots’ during peak seasons,” she says. ☐

Student Research

Ryan Weiss: Turning Science Into Policy

By Karen Wentworth



Photo courtesy of Ryan Weiss.

For Ryan Weiss, it all started when he spent a day volunteering to help repair stream banks in the Valles Caldera in Northern New Mexico. He was living and working in Taos and met a number of UNM students and faculty who were also volunteering their time to

work on the stream banks in the Valles Caldera National Preserve.

This experience led him to take a class as a non degree student in watershed management. He was hooked. He is now in his third year of a master's degree program in natural resource planning with the School of Architecture and Planning.

Weiss is working with the U.S. Forest Service in Taos to improve the habitat for Rio Grande Cutthroat Trout. He soon begins a new job with the New Mexico Environment Department in the Surface Water Division. He says he is interested in helping to shape public policy, but he thinks it's important to first know the science that underlies policy regulations.

Weiss' thesis will be on community based watershed planning in the Rio Pueblo de Taos watershed. "I've thought that my home watershed is a really interesting case because there's every different curveball that you could throw into the situation," he says. "The river originates on Taos Pueblo tribal land, then it flows through the town of Taos, and through a lot of smaller agricultural villages."

Weiss is fascinated by the idea of letting the people in the community have a say in how the water in the watershed should be shared and used. He's learning how water law and policy have shaped and channeled water use over the decades. He's also thinking about whether there are ways to reexamine and maybe change traditional rules. ☐

Matthew Ingram: Researching Judicial Performance

By Diana Sanchez

For political science graduate student and Fulbright fellow, Matthew C. Ingram, returning to Mexico is more than just a trip home. In September 2006, Ingram began his work researching the judicial performance of state court systems in Mexico and Brazil. These two countries' regional prominence makes them ideal candidates for his research, as does their recent experiences with democratization and market reforms.

Says Ingram, "I am trying to see how the demands of democratization and economic liberalization have shaped court reform and court performance. How do courts perform in a state with lots of economic activity and a heavy burden of commercial litigation? Or, how do courts perform in a state with a history of competitive elections as opposed to a state with a single dominant party?"

Little research exists of judicial access, efficiency, and independence at the state level, despite these courts being the first point of contact between ordinary citizens, small firms, and the justice system. "These sectors are most dependent upon judiciaries to protect their interests. The failure to understand the conditions that strengthen state judiciaries imperils the political and economic future of these countries," Ingram says. ☐



Photo courtesy of Matthew Ingram.

Hot Off the Press

Books by UNM Faculty

by Diana Sanchez

Panchita Villa and Other Guerrilleras

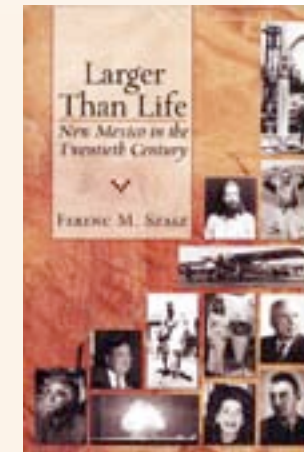
Tey Diana Rebolledo, Regents' Professor Spanish and Portuguese
University of Texas Press



In this literary criticism volume, Rebolledo manages to mix her personal story, undoubtedly shared by many Chicana writers, with humor, articulate arguments, and astute cultural critiques of the mainstream literary world's marginalization of talented Chicana writers. The essays explore historical writing development, feminism, art history, and much more Chicana literature centered topics. Rebolledo offers solutions to academia's oversight, by suggesting "guerrillera" warfare promoting Chicana/Latina writers' inclusion in the traditional literary canon.

Larger Than Life: New Mexico in the Twentieth Century

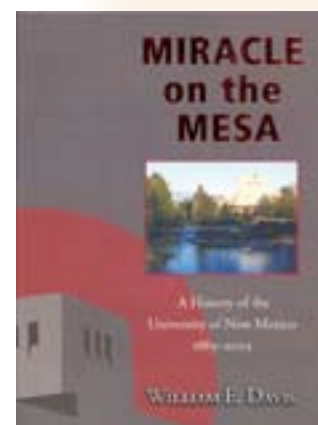
Ferenc M. Szasz, Professor of History
University of New Mexico Press



With this book, Szasz offers eleven enthusiastic essays in four parts, chronicling some of the more obscure details and figures of New Mexico's notorious history. Nationally prominent figures, including J. Robert Oppenheimer, receive attention alongside local favorites Smokey the Bear and writer Tony Hillerman. Science plays a large role throughout the book, and Szasz's affinity for the atomic age is clear, even devoting "Part Three Atomic New Mexico" to the topic. A final section explores folkloric "mysteries" such as an immigrant healer said to have cured over five thousand people.

Miracle on the Mesa: A History of the University of New Mexico, 1889-2003

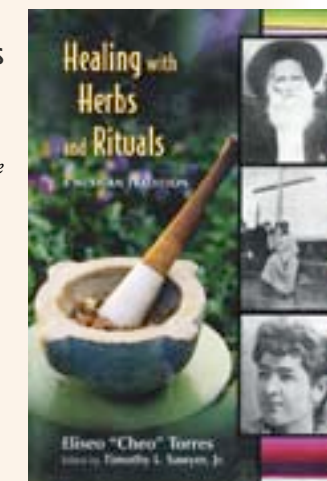
William E. Davis, President of the University of New Mexico
from 1975-1982
University of New Mexico Press



A former UNM president, Davis presents the University's development chronologically organized into presidential administrations, beginning in 1889 and ending in 2003. Over two hundred photos accompany the text, which includes press excerpts and oral accounts of UNM life from athletics to academics to politics. This is a comprehensive collection of the construction and evolution of UNM's campus, from buildings to student life, fit for any past, present, or future Lobo.

Healing with Herbs and Rituals a Mexican Tradition

Eliseo "Cheo" Torres, Vice President of Student Affairs and Professor of Language Literacy & Sociocultural Studies
edited by Timothy L. Sawyer Jr.
University of New Mexico Press



This book serves as a great introduction for anyone interested in the history, belief system, and practical applications of traditional Mexican *curanderismo*, or healing arts. An extensive glossary of herbs listed both in English and Spanish along with their medicinal uses and descriptions of ailments most commonly treated by *curanderismo* break down centuries of Mexican experience. Individual chapters dedicated to recounting documented lives and practices of revered *curanderas* of the past give a glimpse into the legacy modern day healers, discussed in a separate chapter, continue to share.



Transmogrification, 2004, Patrick Nagatani.



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