

2008

# Quantum: Research, Scholarship & Creative Works at the University of New Mexico, 2008

Office of the Vice President for Research

Follow this and additional works at: [https://digitalrepository.unm.edu/ovp\\_research\\_publications](https://digitalrepository.unm.edu/ovp_research_publications)

---

## Recommended Citation

Office of the Vice President for Research. "Quantum: Research, Scholarship & Creative Works at the University of New Mexico, 2008." (2008). [https://digitalrepository.unm.edu/ovp\\_research\\_publications/40](https://digitalrepository.unm.edu/ovp_research_publications/40)

This Report is brought to you for free and open access by the Archives & University Administrative Records at UNM Digital Repository. It has been accepted for inclusion in Office of the Vice President for Research by an authorized administrator of UNM Digital Repository. For more information, please contact [disc@unm.edu](mailto:disc@unm.edu).

# Quantum 2008

Research, Scholarship and Creative Works at the University of New Mexico



## **To the Reader/Masthead**

### **Why Oceanography Matters in New Mexico**

Clifford Dahm advances water research through an interdisciplinary approach.

*by Sari Krosinsky*

### **Connecting Communities**

Undergraduate students are given the opportunity to participate in a community service project.

*by Laurie Mellas*

### **Father Knows Best**

Ziarat Hossain examines the changing roles of fathers.

*by Larry Walsh*



### **Finding a Home in Nursing**

Marie Mugavin embraces nursing research and teaching.

*by Lauren Cruse*

### **Choosing a Research Problem**

Martin Donovan works on solving an important problem for cystic fibrosis patients.

*by Karen Wentworth*

### **A Clear Destination**

The Clinical and Translational Science Center is established to embrace the connection between scientific discovery and clinical applications.

*by Luke Frank*



### **Quantum Briefs**

:: Searching for Meteorites

*by Diana Sanchez*

:: Really Neat Astronomy

*by Steve Carr*

:: Altered States

*by Luke Frank*

:: Fostering Health Policy

*by Diana Sanchez*

:: Building a Virtual Fortress

*by Karen Wentworth*

:: Creating Future Biomedical Engineers

*by Diana Sanchez*



### **Shedding Light on Dark Matter**

Dinesh Loomba is working to shed some light on the phenomenon of dark matter.

*by Steve Carr*

### **Getting the Perfect Fit**

Family Practice and Community Medicine works with rural healthcare services to provide important research assistance.

*by Cindy Foster*

### **Overcoming Addiction**

Robert Meyers created a unique model called the Community Reinforcement Approach to help treat addictions.

*by Steve Carr*

### **Experiments in Cinema**



Bryan Konefsky brings experimental cinema to the UNM community and beyond.

*by Valerie Roybal*

### **A Relentless Pursuit**

Bruce Milne implements a Sustainability Studies Program at UNM to address the challenges of Earth's ability to support life.

*by Steve Carr*

### **Patent and Invention at UNM**

*by Karen Wentworth*



### **Back to School**

The Teachers' Institute provides K-12 teachers with continuing education to develop content knowledge and improve classroom teaching.

*by Carolyn Gonzales*

### **Hot Off the Press**

Books by UNM Faculty

*by Valerie Roybal and Diana Sanchez*

**Quantum 2007**



Images at the top of the page by Matt Suhre.

Copyright 2007-2010 by the University of New Mexico. All rights reserved. Reproduction by any means in whole or part without permission is prohibited. *Quantum* is published once each year by the University of New Mexico, Albuquerque, New Mexico.

Send all correspondence to the Managing Editor, Research Development Services, Office of the Vice President for Research and Economic Development, MSC05 3180, 1717 Roma NE, The University of New Mexico, Albuquerque, New Mexico, 87131.

Any comments or questions regarding this site can be addressed to: Valerie Roybal, [valr@unm.edu](mailto:valr@unm.edu)

# To the Reader

Join me in learning more about the innovative and state-of-the art research and creative endeavors that are happening at the University of New Mexico. These efforts contribute to the University's research enterprise and have profound impacts beyond our immediate borders—in the community, the state, the nation, and the world. We value our faculty and researchers as one of our most important resources, as they bring about change and progress, but also share their knowledge, expertise, and passion with our students to build upon the future.

UNM continues to support the work of our faculty, researchers, staff, and students, providing an environment where scholarship and creativity can flourish. In 2007, the University received over \$280 million in sponsored awards. These awards encompass the activities of research, public service, instruction, and training.

This issue of Quantum offers but a sampling of some of the outstanding efforts at UNM. We invite you to learn more about these scholarly and creative activities that make our University a flagship institution.

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

In Memorium

1950-2007

.....  
.....

## **Research, Scholarship, & Creative Works at the University of New Mexico**

UNM is A Carnegie Research University/Very High

Volume 24, 2008  
[research.unm.edu/quantum](http://research.unm.edu/quantum)

*President*  
David J. Schmidly

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

*Editor*  
Denise Wallen

*Managing Editor*  
*Photo/Illustration Editor*  
Valerie Roybal

*Copy Editor*  
Denise Tessier

*Graphic Designer*  
John Sumrow

*Contributors*  
Steve Carr, Lauren Cruse, Cindy Foster, Luke Frank, Carolyn Gonzales, Sari Krosinsky, Laurie Mellas, Valerie Roybal, Diana Sanchez, Matt Suhre, Karen Wentworth, Larry Walsh

*Quantum* is published once each year by the University of New Mexico, Albuquerque, New Mexico.

Send all correspondence to the Managing Editor, Office of the Vice President for Research and Economic Development, MSC05 3180, The University of New Mexico, Albuquerque, New Mexico 87131, or call 505/277-2256.

The University of New Mexico is an Affirmative Action/Equal Opportunity institution. This publication is available in alternate formats upon request.

# Why Oceanography Matters in New Mexico

Clifford Dahm advances water research through interdisciplinary approach.

*by Sari Krosinsky*

In land-locked New Mexico, oceanography might seem like a science out of water. But Professor of Biology Clifford Dahm says a multi-faceted approach of oceanography is key to understanding the state's aquatic ecosystems. "Water is inherently interdisciplinary, whether it's freshwater or ocean," he says.

Since coming to the University of New Mexico in 1984, Dahm has used his interdisciplinary background to improve understanding of New Mexico water resources. Dahm presented his work at the Fifty-second Annual Research Lecture, one of the highest honors bestowed on UNM faculty.

Dahm began applying oceanographic tools to non-ocean settings as a graduate student at Oregon State University. It was there that he first observed the significance of the hyporheic zone—



*Photo by Matt Suhre.*

“Water is inherently interdisciplinary, whether it’s freshwater or ocean.”



the interface between groundwater and surface water in streams and rivers. He noticed that when water goes underground and comes up again, it shows an increase in nutrients and biological activity, an observation confirmed by his later restoration work at the Bluewater Watershed in New Mexico.

Understanding the interaction between groundwater and surface water adds to the picture of how global climate change may affect rivers and streams. Snowmelt rivers, which provide water for about one billion people, or one sixth of the global population, are expected to shrink as rising temperatures decrease snow packs and accelerate evaporation and transpiration. In addition, Dahm's research suggests that warmer, less viscous fluids move more surface water to groundwater, reducing surface water flows—an effect that becomes more extreme in La Niña years in New Mexico.

Current river restoration in the Southwest tends to be reactive—such as restoring areas damaged by fire or sheltering endangered species—rather than proactively focused on saving water and improving habitat in the long-term. “If you wanted to do an integrated, more holistic restoration, you should look at the whole corridor, and not do it on an ad hoc basis as we do now,” Dahm says. His research suggests that the best place to carry out restoration would be in dense stands of non-native plants where flooding occurs, and there's a better chance of restoring native plants using natural hydrologic processes.

Dahm, on sabbatical in Australia, is in residence at the Australian Rivers Institute in Brisbane. He is researching the intermittent river and spring systems in the Lake Eyre Basin, which presents aquatic ecosystems similar to New Mexico's. He also is studying plans to address water shortages and maintain river health in Brisbane, a city of more than two million people already under severe water restrictions—a situation he says New Mexico may be faced with in the not too distant future. “I think we know the condition in which we find ourselves. Whether we are willing to act upon the condition is another question,” he says.

Dahm, internationally recognized for his work in restoration biology, biogeochemistry, microbial ecology, hydrology, climatology, and aquatic ecology, has served as interim director of the Sevilleta Long-Term Ecological Research Program at the Sevilleta National Wildlife Refuge in central New Mexico and is director for the Freshwater Sciences Interdisciplinary Doctoral Program at UNM.

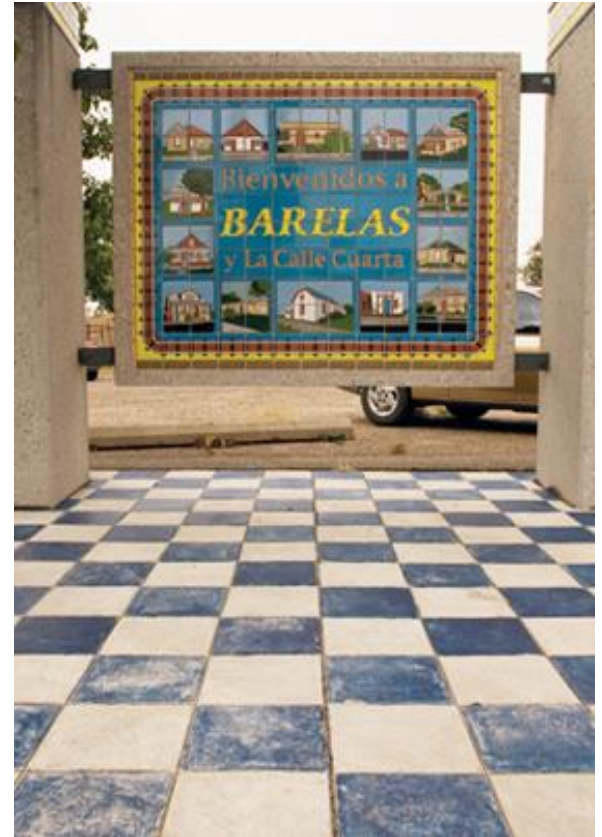
# Connecting Communities

The Research Service Learning Program presents undergraduate students with opportunities to participate in a community service project.

*by Laurie Mellas*

“If you want a better world, start with the community around you,” says Scott Albright, a UNM senior volunteering at Barelas Community Center in conjunction with UNM’s Research Service Learning Program (RSLP).

RSLP unites classroom theory with community service to address social issues. Program Director Dan Young says the aim is to improve undergraduate student success, especially in core courses, and to establish enduring relationships with surrounding communities. RSLP is privately funded, with significant support coming from the UNM President’s Club. “We get students involved in seeing education in a different way—in looking at knowledge as something that entails responsibility,” Young says.



Faculty designing curriculum look beyond a single semester, planning for sequences of courses allowing undergraduates to partake in complex academic work, Young says. Ultimately, students will research a problem, develop an action plan, implement and evaluate the plan, and disseminate findings. About twenty community-based courses are developed around themes such as hunger, poverty, health, and sustainability. Social problems are approached from different angles, using cross-disciplinary methods. Entrepreneurial projects also emerge. At present, most RSLP courses are taught by graduate students, providing research and teaching opportunities in fields such as English, anthropology, economics, geography, and sociology. Young is receiving more teaching inquiries from full-time faculty, who recognize the program as a means to mentor promising undergraduates and secure valuable research support.



*Photos by Matt Suhre.*

“The value of graduate student involvement is that they provide a thread of continuity with the community; they truly engage. We have especially good symmetry with our international students. We have a student who serves as an Asian American Association board member, for example,” Young says.

Albright, the Barelas volunteer, took part in an RSLP public speaking course taught by Communication and Journalism graduate student Hannah Oliha. In addition to more traditional coursework such as reading, writing, and delivering speeches, she required students to volunteer three hours per week at one of four Albuquerque community centers. “Projects were driven by needs students identified in the community through service experiences and by speaking directly to community members,” Oliha says.

Albright and sophomore Trevor LeVan interviewed children at Barelas Community Center about living in a deeply traditional Hispanic community. They asked the children what they would do to combat gang and drug activity. While producing a video with the youth they also had exchanges about teamwork, sportsmanship, communication, and community.

“It’s a strong place with a sense of history and spirit,” LeVan says. “They taught us a lot, too. Doing nothing about the problems will not make a difference. Our response should be to do whatever we can to help.”

Students working at other community centers developed reading and math programs. They handcrafted puppets and games, such as word bingo, created photo displays, and developed a parent night and volunteer RSLP handbook. When children complained about bland lunches, UNM student Michelle Gutierrez helped them write and create cookbooks. In the Africana Studies course “Introduction to Urban Issues,” a group of UNM athletes volunteered at Los Duranes Community Center to construct an after-school academic tutorial program aimed at reinforcing concepts such as teamwork, respect, and esteem. Students created a newsletter

to inform parents about activities at the center and to encourage more family interaction.

Back at Barelás, students in an anthropology course planted a vegetable garden using high nutritional content seeds in a back alley formerly littered with garbage. Sean Bruna, a doctoral candidate studying diabetes, required students to research the history of such gardens. In turn, UNM students use the gardens to teach children community heritage, agriculture, and mathematics.



Anthropology PhD candidate Patrick Staib led the course “Culture and Agriculture in the South Valley” this past fall. Aiming to teach and involve students in agricultural tradition in the city, students worked at the Dragon Farm, a community farm located on the campus of South Valley Academy, a service learning charter school. As part of the class, students are cooperating with efforts on the farm and applying their experiences to theoretical models learned in the classroom. Ultimately, students will design projects to benefit the Dragon Farm and other community farm projects in the region.

Says Young, “This spring, a collaboration between Africana Studies and the African Refugees Well-Being Project will engage refugees as experts on their own condition and as advocates.”

“Students bring observations from the community to connect with existing disciplines and theory,” he says. “We hope these observations will spin off into other courses based on conditions found in the community.”

Back at Barelás, students in an anthropology course planted a vegetable garden using high nutritional content seeds in a back alley formerly littered with garbage. Sean Bruna, a doctoral candidate studying diabetes, required students to research the history of such gardens. In turn, UNM students use the gardens to teach children community heritage, agriculture, and mathematics.



Anthropology PhD candidate Patrick Staib led the course “Culture and Agriculture in the South Valley” this past fall. Aiming to teach and involve students in agricultural tradition in the city, students worked at the Dragon Farm, a community farm located on the campus of South Valley Academy, a service learning charter school. As part of the class, students are cooperating with efforts on the farm and applying their experiences to theoretical models learned in the classroom. Ultimately, students will design projects to benefit the Dragon Farm and other community farm projects in the region.

Says Young, “This spring, a collaboration between Africana Studies and the African Refugees Well-Being Project will engage refugees as experts on their own condition and as advocates.”

“Students bring observations from the community to connect with existing disciplines and theory,” he says. “We hope these observations will spin off into other courses based on conditions found in the community.”

# Father Knows Best

Ziarat Hossain examines the changing role of fathers.

*by Larry Walsh*

In the 1950s TV sitcom *Father Knows Best*, Jim Anderson would come home from the office and switch into a comfortable sweater. Then, with the help of his beautiful, stay-at-home wife Margaret, he would calmly solve the problems of his three children: Princess, Kitten, and Bud.

The sweeping changes of the last fifty years have shattered this idealized and highly paternalistic model of family life. But these changes are not restricted to America or even Western Europe, as Ziarat Hossain's research conducted in Malaysia, India, Bangladesh, the Caribbean, and the United States is demonstrating.



*Photo by Chris Corrie Photography.*

“As the world is globalizing, we see the influence of Western cultural value systems all over the world.”

Hossain, an assistant professor in the College of Education's Family Studies Program, says, "The difficulty in studying just Western families is a cultural narrowness of field, and by studying international and multicultural families, you get a better perspective of the basis of what a human being is. You don't have the blinders."

Funded by a Fulbright Fellowship and grants from Malaysian universities, Hossain recently completed two studies on the changing roles of fathers in Malaysia. Because of the government's highly successful campaign to develop the nation and its population, the country has undergone a significant reorganization of its family and community life.

"As the world is globalizing, we see the influence of Western cultural value systems all over the world," he adds. "My intent is to see how much people have retained their cultural practices and how much they have been influenced by Western culture."

On one hand, Malaysia is socially conservative; its family life is governed by Adat, a complex of traditions, customs, and laws that affirm patriarchy, control of women's sexuality, submission of wife to husband, and children's loyalty to their parents. On the other hand, its entry into the global marketplace as a newly industrialized country has required the creation of a highly educated urban workforce.

Hossain's first study focused on rural and urban differences in fathers' time investment in household labor in Malay families on the Malay Peninsula. Urban fathers who participated in the study had twice the education, five times the income, and worked longer hours than their more traditional rural counterparts. Yet, they also invested twice the amount of time in child care, preparing food, and cleaning.

The second study examined parental investment in early child care by urban Kadazan families in Sabah, a state in Malaysian Borneo. The Kadazan are one of the largest indigenous groups in the state and its principal rice farmers. Over the last twenty years, many Kadazan families moved to city centers, learned the Malay language, and became solidly middle class.

In the sample, all of the fathers and two-thirds of the mothers worked full-time. Both averaged around two years of post-secondary education, the same as the urban Malay fathers. The Kadazan families had the same, if not more, income and owned modern houses.

Nonetheless, the Kadazan fathers did not participate in child care as much as their urban Malay counterparts, although their involvement exceeded that of the rural Malay fathers. Fathers invested more time in play and soothing infants, but still not as much as mothers. However, with a couple of minor exceptions, neither parent treated male or female children differently, perhaps foreshadowing a more egalitarian future.

Jaipaul Roopnarine, a professor of Child and Family Studies at Syracuse University, notes that "Hossain has methodically documented patterns of paternal investment in understudied groups in the United States and in different cultural communities around

the world. Such data are needed to shape family policies that emphasize paternal involvement in the majority world context.”

Thanks to grants from UNM’s Research Allocation Committee, the College of Education’s Overhead Funding Allocation Committee, and the Feminist Research Institute, Hossain is currently studying the interactions of Mexican immigrant mothers and fathers with their children and how those interactions help determine children’s academic readiness. He is also currently examining the relationships between parental involvement and children’s social and academic outcomes in Navajo families living on the reservation.

He says, “It is very important to understand diversity of families in the United States, not just white families. If you look at U.S. Census predictions, the ethnic minority population is going to go to forty-eight percent by 2050. Considering that demographic change in our society, it is very important that we understand what other people think and how they run their families.”



# Finding a **Home** in Nursing

Marie Mugavin embraces nursing research and teaching.

*by Lauren Cruse*

Marie Mugavin's two little boys, one nine and the other ten, were concerned about the size of their mother's office at the University of New Mexico's College of Nursing.

"When they first saw it, they asked what I did wrong and then patted me on the back sympathetically," Mugavin says with a laugh. "We live in the east mountains, so they are used to wide open spaces. I told them it was actually a really great office and that I loved it." Good thing, because Mugavin will be calling the College of Nursing her home for quite some time as she was a nursing student recently turned faculty member. Mugavin was the first PhD student to graduate from the College in January 2007, a historical accomplishment for the nursing school, which is in urgent need of a faculty boost to support the increase in student enrollment. The PhD program, started in 2003, was developed not only to harbor and encourage nursing research, but also to produce professors for the College. Mugavin is a perfect example of what the College wants to accomplish through its doctoral program. She is currently working on research she developed during her four years as a PhD student and will begin teaching classes this spring. "I was given one year to concentrate on my research before I started teaching," Mugavin says. "As far as teaching, I would



*Photo by Matt Suhre.*

Mugavin is a perfect example of what the College wants to accomplish through its doctoral program. She is currently working on research she developed during her four years as a PhD student and will begin teaching classes this spring.

like to focus on brain and behavioral correlates of health and illness.”

Her teaching interests make sense as her research expands upon her dissertation, a comparative study of women incarcerated for child abuse and child homicide (also known as filicide). This is a sensitive topic, but one Mugavin thinks can be addressed across specialties, including nursing.

“Many nurses come into contact with vulnerable mothers and children every day,” Mugavin says.

The rate of violent crimes against children is staggering. In 2005, more than three million referrals were made to Child Protective Services involving approximately six million children in the United States. Approximately fifteen hundred child fatalities occurred in 2005, a number believed to be underestimated due to inconsistencies in definition and detection. Mugavin’s research is particularly important to New Mexico because the rate of child abuse and neglect per thousand children is seventeen percent higher, and the child homicide rate is forty percent higher than the national rates.

For her study, Mugavin interviewed women convicted for crimes of abuse and filicide in two New Mexico prisons and is now collecting data from two additional prisons in neighboring states.

The purpose of Mugavin’s study is to explore vulnerabilities and triggers that may contribute to nonfatal and fatal child abuse from the perspective of the mother. To identify these vulnerabilities and triggers, Mugavin employs a novel method called multi-dimensional scaling, which is an exploratory technique used to identify unrecognized dimensions affecting behavior. The participants generate cognitive maps that reflect links between factors that may predispose them to child abuse. Mugavin believes that identifying the varying constellation of factors that predispose one to fatal or nonfatal abuse will allow for the development, testing, and dissemination of assessment tools and strategies for healthcare providers.

“Healthcare providers would benefit by having access to a perception-related assessment tool when interacting with potential abusers,” Mugavin says. “Too many of these women slip through the cracks. Increasing provider awareness is so important, especially in the context of nursing. Nurses and mid-level nurse providers are at the frontlines of healthcare. If they are aware of the red flags and have set guidelines and/or tools in place for assessment and prevention, the cases of abuse and filicide may begin to decrease.”

# Choosing a Research Problem

Integrative Graduate Education and Research Training Fellow Martin Donovan works on solving an important problem for cystic fibrosis patients.

*by Karen Wentworth*

“Martin Donovan may be the man who finds a way to improve the quality of life for people with cystic fibrosis. Today, a CF patient spends hours each day doing vigorous chest massage to loosen the sticky mucus in the lungs and air passages, which is a symptom of the disease. Patients usually take two drugs that give them immediate short-term relief; then, as the benefit wears off, they must spend more and more time trying to keep the mucus flowing, as it does in healthy people.

Donovan, a doctoral student in pharmaceuticals, is experimenting with hydrogel particles that can be inhaled by patients to deliver drugs to the lungs and linger there to help keep the mucus flowing normally and fight infection. The goal is for the particles to remain in the lungs for days or weeks, slowly releasing the medicine as it is needed, dramatically changing the quality of daily life for CF patients.



So far, things are going well. STC.UNM, a non-profit corporation formed by UNM to commercialize intellectual property, has patented the technology, and two pharmaceutical companies have made inquiries. Donovan's complex project has meant working closely with Assistant Professor Hugh Smyth from the College of Pharmacy, Chemical and Nuclear Engineering Professor Timothy Lee Ward, and Assistant Professor of Physics and Astronomy and Center for High Technology Materials faculty member Steven Koch, as he tackles the technical problems involved in this particular drug delivery system.

Donovan is hoping to complete his degree in 2009, but the fact that he is able to concentrate on his research and education is possible because he is an Integrative Graduate Education and Research Training (IGERT) fellow. That means he gets yearly funding and a chance to work with research-oriented faculty members. The funding comes from the National Science Foundation and other partners like the National Cancer Institute. Donovan is part of an IGERT research group in Nanoscience and Microsystems led by Electrical and Computer Engineering Research Associate Professor Diana Huffaker. This particular program allows students to choose their research problem, and work with professors in almost any lab on campus to solve specific elements of the problem.

UNM also has IGERT programs in Cross-disciplinary Optics Research and Education led by Regent's Professor of Physics Wolfgang Rudolph, and Integrating Nanotechnology with Cell Biology and Neuroscience led by Electrical and Computer Engineering Professor Marek Osinski, providing students with valuable research experience and extraordinary opportunities to tackle a variety of important research questions.

# A Clear Destination

The Clinical and Translational Science Center at the UNM Health Sciences Center is established to embrace the connection between scientific discovery and clinical applications.

*by Luke Frank*

What are the keys to controlled acceleration? The Roadmap Initiative introduced by the National Institutes of Health's (NIH) in 2005, indicates solid infrastructure and a clear destination. Over the past decade, the UNM Health Sciences Center (HSC) has been constructing both, and, in the process, has tripled its annual research awards to \$123.3 million in fiscal year 2007.

To sustain this velocity, the HSC is merging onto the NIH Roadmap Initiative in part with the development of its Clinical and Translational Science Center (CTSC). The NIH is supporting the development of such centers to shorten the thoroughfare between biomedical scientific discovery and clinical applications. After all, isn't a goal of medical discovery to improve public health?

“When you get right down to it, that's our job—to improve the health of New Mexicans,” says Richard Larson, Health Sciences Center Vice President for Translational Research and Senior Associate Dean for Research at the UNM School of Medicine. “We continue to re-engineer our medical research infrastructure in very specific areas to embrace the NIH's ‘Bench-to-Bedside’ paradigm, which will accelerate the application of our research results in the community.”



*Photo by John Sunrow.*

“When you get right down to it, that's our job—to improve the health of New Mexicans.”

Part of that re-engineering is actively engaging New Mexico's diverse communities to help further define regional health issues and construct practical biomedical research that translates from the HSC's emerging Clinical and Translational Science Center to the citizens of New Mexico and beyond. The greater vision is to create community research networks in the state linked through UNM's CTSC to other regional centers across the country, thus casting a community health system investigative net.

This interdisciplinary effort includes restructuring health sciences educational curricula and inviting community involvement, while assembling progressive research partners and technology, and expanding electronic data storage and cataloguing capabilities.

"We're well on our way," says Mark Burge, director of the CTSC. "We've created new master's degree and doctoral programs in Clinical Research specifically, while emphasizing clinical research at all University educational levels—from undergraduate health science and pre-med, to pharmacy and nursing students, to medical residents, fellows, and even junior faculty."

The CTSC now also supports not only traditional drug trials in the University of New Mexico Hospitals, but a variety of community-based trials throughout the state. An important aspect of these initiatives is the development of a statewide database that centralizes research information for quick, shared access to New Mexico's biostatistics, research protocols, and study results.

To further cultivate homegrown clinical research and education, an effective telehealth network is evolving in more rural communities. CTSC will utilize this electronic outreach system to deliver the latest technology and medical advances through clinical trials in New Mexico's communities. "We are right in line with the NIH's desire to accelerate the pace of change in biomedical research, delivering health solutions to hospitals and clinics all over the state," Burge says.

Just how significant is this fundamental shift in NIH's public health focus? According to the NIH, funding for General Clinical Science Centers (from which the HSC is devolving) will be phased out over the next few years. Only those medical schools that follow the Clinical and Translational Science Center model will be eligible for funding.

"There are 125 medical schools in the U.S.," Larson says. "There will be approximately fifty Clinical and Translational Science Centers in the NIH program. So fewer than half of the academic health centers will be able to participate." Such exclusivity means a select few will benefit from a comprehensive research program that delivers new medical advances efficiently to medical practice.

Determined to build a powerful research center, the HSC Office of Research applied for and received a \$200,000 CTSC planning grant from the NIH, helping to fund the upgrades to date. The Health Sciences Center was one of 112 schools to apply for the planning grant or the full grant, and was one of 52 applicants awarded planning grants. "We're on the short list and are preparing our proposal for a full CTSC grant,"

says Paul Roth, UNM Executive Vice President for Health Sciences and Dean of the School of Medicine.

“We want to participate in meaningful medical research that can be applied right here in New Mexico,” Larson says. “Our Clinical and Translational Science Center will provide that access. As important as the funding component is, we also see this transformation as critical to the health of our communities.”

# Quantum Briefs

## Searching for Meteorities

*By Diana Sanchez*

“For UNM’s Institute of Meteoritics Research Scientist Barbara Cohen, combing over the Antarctic snow is just another summer’s day. For two seasons she spent six weeks of Antarctica’s summer (our winter) as a team member of the Antarctic Search for Meteorites (ANSMET), funded by NASA and the National Science Foundation.



*Photo courtesy of Barbara Cohen.*



Hunting for meteorites on the frozen continent is ideal because the severe conditions leave them preserved, concentrated, and easy to see. “Meteors usually take five to ten years to disintegrate, but in a hot desert, they don’t wither and turn into soil,” she says. “Antarctica is basically a cold desert.” The white snowy landscape also provides stark contrast against the meteorites they find—black on the outside after burning through the atmosphere. She says, “We use a map and GPS to navigate around where we’ve already looked. Then, the only instruments we use are our eyes.”

Along with her team, Cohen spotted an exciting find—a new type of meteorite. “It’s clearly a meteorite, but we have no idea what it is,” she says. “No one’s ever seen anything like it before—ever.” It, along with other ANSMET finds are sent to Smithsonian scientists who catalog each meteorite after conducting preliminary elemental tests. After that, samples are up for grabs. “Anyone can have a piece, anywhere in the world,” she explains. “Even researchers who find the meteorites have to write a request for a piece of one.” She definitely plans on requesting a sample of the mysterious meteorite she found, and says by age-dating meteorites, “We can understand the beginnings of the solar system,” adding, “They’re the only way we know anything about Mars or asteroids.”

As for her future summer plans, she says, “It’s really cool. I’d go back again—definitely.”

.....  
.....



*Photo courtesy of the Long Wavelength Array.*

## **Really Neat Astronomy**

*By Steve Carr*

“New scientific discoveries are constantly being made with the evolution of technology. Space is no exception—distant radio galaxies and clusters have become tools for understanding the earliest black holes and the cosmological evolution of dark matter and dark energy, respectively.

Several UNM researchers hope the Long Wavelength Array will eventually provide useful information about the Earth and the cosmos. Gregory Taylor, associate professor of physics and astronomy and LWA scientific director; Lee J. Rickard, LWA executive project director; and

Christopher Watts, LWA ionospheric scientist, are on the leading edge of such technology, along with a number of collaborators.

In fall of 2006, UNM collaborators at the University of Texas Applied Research Lab and the Naval Research Lab installed the current prototype, which is referred to as the Long Wavelength Demonstrator Array (LWDA), to differentiate it from the larger LWA project, on the Plains of San Agustin in southwestern New Mexico. It is now providing images of the sky that show emissions from the center of the Galaxy, a supermassive black hole, and the remnant of a star that exploded in a supernova more than three hundred years ago. It is comprised of sixteen four-foot-tall antennas combined to produce data comparable to that from a more traditional dish style telescope with a diameter of seventy feet.

Rickard says UNM is in a good situation to provide great research.

“We’ve got an instrument where we think we can do a lot of really neat astronomy,” he says. “It has a big impact on things like communications systems, navigation systems, and imaging the surface of the earth to look for things under forests. There are all sorts of applications. It’s a great opportunity.”

.....  
.....

## **Altered States**

*by Luke Frank*

Look at the little faces in any pediatric emergency unit. Eyes are big and welling; legs are nervously swinging in an oversized chair; tiny knuckles are white with anxiety.

During a medical emergency, kids can become frightened, almost hysterical, about the pain and trauma they've encountered—the sight of their own blood, the sounds of others in pain, and the great unknown that awaits.

When fear shifts gears, the experience can be tough on the child, tough on the family, and tough on medical staff. Robert Sapien, director of pediatric emergency medicine at University of New Mexico Hospital (UNMH), has embarked on a journey into the subconscious using medical relaxation techniques—hypnosis—to help all parties better cope with the experience.

Sapien began extensive certification training approximately three years ago at the Hypnotherapy Academy of America in Santa Fe, New Mexico, and is now training UNMH emergency medicine residents, nurses, social workers, and child life specialists. “Medical relaxation is a technique that taps into the human subconscious,” he says. “This has been a very serious undertaking for me—the human mind is not something to play with.”

Sapien uses several steps to access the subconscious and then gently apply pain management techniques for kids. This can include an imaginary pain dial—a numb spot that the child can apply to the point of pain—and “pain dilution”—using different colors to represent varying levels of pain. Such tools engage the child, creating a distraction and effectively diverting attention from the injury and the procedure.

“Medical relaxation has much the same effect as daydreaming or exercising,” he concludes. “It puts your mind in a different place, a different environment. Moreover, it seems to nurture communication among staff and patients, and improve bedside manner.”

.....  
.....

## **Fostering Health Policy**

*by Diana Sanchez*

With \$18.5 million of initial funding, UNM established the Robert Wood Johnson Foundation Center for Health Policy in January 2007. The Center aims to create a new generation of scholars to lead the nation in health policy discussion. Along with providing scholarships for eligible Economics, Political Science, and Sociology PhD candidates, the Center offers funding competitions each spring with the stipulation that scholarship recipients complete at least six hours of health policy coursework. With these scholarships, the Center endeavors to increase the representation and presence of minorities with PhDs and expertise in health policy, ultimately creating greater racial

and ethnic diversity at the national level where health policy is formed.

Additionally, the Center offers research grants to UNM faculty working on projects related to health policy and health disparities and also hosts visiting scholars. Together, faculty and students working with the Center are fostering new leadership by providing a physical, educational, and cultural base for minority students to gain access to training and research opportunities, thus giving true voice to the very group most affected by health policy decision-making.

.....  
.....

### **Building a Virtual Fortress**

*by Karen Wentworth*

Many people in many locations working together on a complex problem is a dream the internet makes real. However, preventing any sabotage in the process is a challenge that keeps researchers like Assistant Professor of Computer Science Jared Saia on the search for solutions.

Saia is working on mathematical algorithms that may lead to a workable, commercially viable software program to keep communication on the web flowing smoothly. A four hundred thousand dollar National Science Foundation CAREER Science award, along with other awards from the NSF and Sandia National Laboratories, support his work.

His research, using probabilistic method and expander and extractor graphs, allows him to create ways for web-based projects to survive and function reliably, even if up to one third of the people involved in a particular collaboration are attempting to disrupt it. Saia says his algorithms are robust, scalable, and can support systems even if hundreds of millions—a group as large as the entire population of Japan—are participating.

He is working with several collaborators, including Valerie King at the University of Victoria and Microsoft Research, Vishal Sanalani, a former UNM student now at Microsoft Research, and Erik Vee at Yahoo Research.

.....  
.....

### **Information Bounty**

*by Carolyn Gonzales*

The UNM Latin American Knowledge Harvester is an outcropping of a U.S. Department of Education grant funded through Technological Innovation and Cooperation for Foreign Information Access.

This highly competitive, four-year, eighty thousand dollar award supports UNM partnerships with universities in Mexico, Venezuela, and Brazil to reduce the digital divide between scientific communities in North and South America.

“The Harvester addresses the challenge to identify and maintain stable and reliable internet access to library and institutional collections and digitized archives in and about Latin America,” says Johann van Reenen, assistant dean of University Libraries.

Using an internationally agreed upon Open Archives Initiative Protocol for Metadata Harvesting, the Harvester allows UNM and its Latin American partners to collect content and make it available across disciplines, with a customized interface that gathers streams of full-text content from participating repositories.

The harvester reaps content representing the fields of history, public health, and social medicine, and includes photographs and images, curriculum resources for teaching, indigenous culture, and new scholarship in the humanities and social sciences, including works in progress.

.....  
.....



## Creating Future Biomedical Engineers

by Diana Sanchez

“Someone made the medicine you take, hearing aids, hip replacements—those people are biomedical engineers,” says Heather Canavan, assistant professor of chemical and nuclear engineering. She and colleagues are bringing this message to bilingual, fifth-grade and Albuquerque High School classrooms, where students benefit from biomedical presentations from UNM researchers.

These presentations are part of the outreach component of a National Science Foundation (NSF) award to UNM’s Center for Biomedical Engineering. This is one of its Partnerships for Research and Education in Materials (PREM) programs, which foster development of collaborative partnerships between minority-serving institutions and NSF-supported centers and facilities to increase diversity in materials research.

UNM has partnered with Harvard University to conduct research, education, and outreach in the area of biomaterials. Center Director and Professor of Chemistry and Chemical and Nuclear Engineering, Gabriel Lopez says Harvard was “a natural fit. UNM is a top minority-serving institution with a strong history of materials research. By partnering with them we stand to become a major national program.”

Each of the five investigators on the grant, including Canavan, Lopez, Elizabeth Dirk, Julia Fulghum, and Dimiter Petsev, all from the Center for Biomedical Engineering, has a partner at Harvard that works with UNM students sent there to do research. The opportunity can be life changing. “It just opens up a whole world of possibilities for the students,” says Canavan.

Creating possibilities is also the objective of the outreach to Albuquerque students. By teaching them about bioengineering and associated opportunities in the future, the field of bioengineering will become diversified.

UNM researchers work closely with Albuquerque Public Schools to create age-appropriate plans. Because Canavan's research focus is cardiovascular tissue engineering, she based one demonstration on the heart, calling it "How To Mend a Broken Heart." Part of the lesson included actual implants for the students to examine for the "Name that Implant" quiz.

In its first year, the project has been a huge success, and the team hopes to continue the outreach long after the initial grant period. Says Canavan, "The teachers and APS administration really like it. It's been very rewarding for everyone who has participated, from professors on down to students."

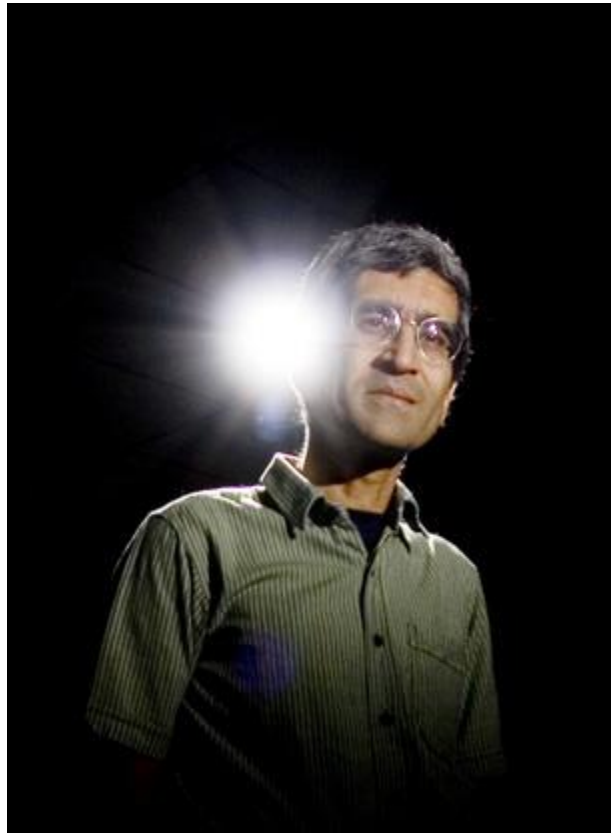
# Shedding Light on Dark Matter

Dinesh Loomba is working to shed some light on the phenomenon of dark matter.

*by Steve Carr*

From astronomical measurements made in the past decade, we know the age of the universe, the geometry of space, its total energy density, and contributions to it from various types of matter and energy. Measurements suggest that ordinary matter—protons and neutrons, the stuff we are made of—is a mere four percent of the total energy and matter density in the universe. This is all we know—the rest is dark.

Scientists have precise numbers quantifying ignorance on the subject. Something called dark energy makes up seventy percent of the universe and something called dark matter makes up approximately twenty-five percent. Dark energy, discovered in 1999, is so mysterious that few even dare to wave their hands about it. Dark matter, on the other hand, has been around for more than seventy years, and concrete, testable theories exist to explain it, however, much is yet to be known.



*Photo of Dinesh Loomba by Matt Suhre.*

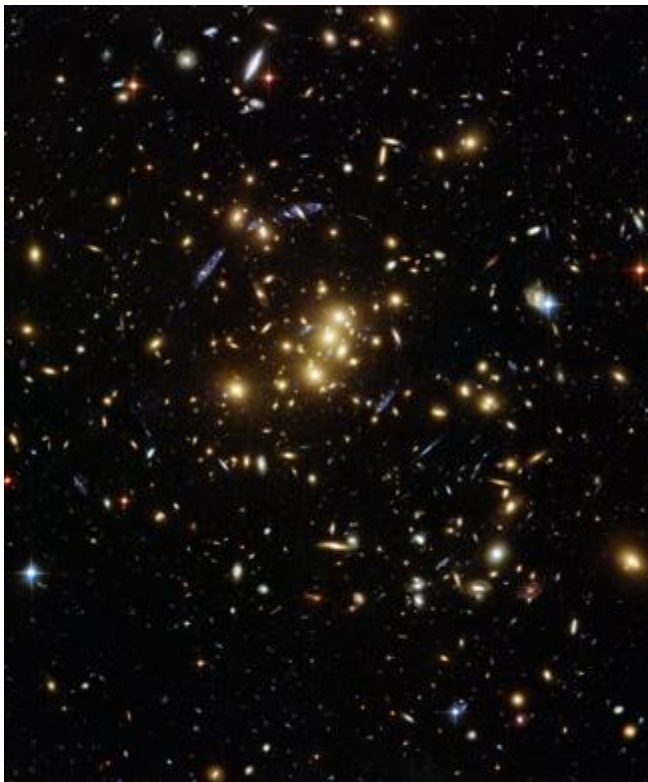


UNM Physics and Astronomy Professor Dinesh Loomba is working to help shed some light on the dark matter phenomenon.

Although its effects can only be seen gravitationally, astronomical measurements have given many clues to the nature of its properties. The National Academy of Science's Committee on the Physics of the Universe has put this on top of its list of problems to be solved this century. The next step is detecting and identifying dark matter.

“Clues from astrophysical measurements, coupled with theoretical models of structure formation, suggest that dark matter could consist of cold, non-relativistic particles that have very weak interaction with ordinary matter,” explains Loomba. “The general characteristics of dark matter are naturally satisfied by the neutralino, a stable, weakly interacting massive particle—or WIMP—predicted in super-symmetric extensions of the Standard Model of Particle Physics.”

In fact, the neutralino is the leading candidate for WIMP dark matter and there is a worldwide experimental effort to look for it, says Loomba. “If WIMPs exist, they would make up the ‘halos’ of dark matter surrounding galaxies that are inferred to exist from observations. Therefore, in our own galaxy, WIMPs should pass through the solar system, leaving signals in detectors.”



*This Hubble Space Telescope image of a rich galaxy cluster allows astronomers to probe the distribution of dark matter in space. Image courtesy of NASA and ESA by M.J. Lee and H. Ford.*

The big problem, Loomba points out, is their weak interactions with the ordinary detectors makes these signals small and compounded by the mountain of background ordinary radiation that can mimic the signals our detectors. This makes their direct detection a monumental task.”

An example: “If you take typical estimated properties, such as their mass, speed, and density, a solar system, you estimate something like 100 WIMPs passing through your hand every second,” says Loomba. “But their interactions with the hand are so weak that, with high probability, they pass through unhindered. During the search, many ordinary particles are interacting with your hand: Cosmic radiation, radiation from the sun around you, even radioactivity in your body. It’s the cliché of looking for the needle in a haystack. You really have to be a little crazy to get involved in this difficult problem.”

However, he also remembers something his advisor, Martin Perl of Stanford University, told him about rare searches: “When you embark on a search for something rare, you have to be a little crazy to get involved in this difficult problem.”

something rare, which may not even exist, it is important that the journey be fun...because, at the end of the day, that may be your only reward.”

To shield the detectors from cosmic radiation, dark matter experiments are typically located in deep underground mines. It's important for the detectors to have the ability to distinguish signals left behind from WIMPs versus those left by ordinary particles, like protons and neutrons.

Fortunately, a number of unique dark matter signatures exist which, if exploited, can be used to separate the large background from the dark matter signal. The largest and most robust of these signatures is the day-night variation of the directionality of dark matter at Earth. This “sidereal modulation” is predicted to be as large as ten to fifteen percent, and is considered by many astrophysicists to be a necessary condition for proof of the discovery of dark matter.

“This is the smoking gun signature we are looking for,” says Loomba. “The technology used in the DRIFT experiment is currently the only one out there that can see this day-night modulation.”

DRIFT, which stands for Directional Recoil Identification From Tracks, uses technology that measures the energy and the tracks of recoiling nuclei resulting from WIMP interactions. An international collaboration, DRIFT is an experiment located about a kilometer deep in the Boulby Mine in the United Kingdom, where the miners go one way and the researchers go another.

In addition to Loomba, the UNM research group includes Professor Michael Gold, Research Engineer Martin Hoeferkamp, and three graduate students, Christina Hagemann, Neeru Sanghi (who graduated in 2006 with a master's), and Johanna Turk.

The collaboration also consists of researchers at Occidental College, MIT, Edinburgh University, and Sheffield University.

Funding for the dark matter research comes from a five-year National Science Foundation CAREER grant received in 2006. Loomba also has a three-year grant from the NSF, with Gold as co-investigator, for the DRIFT project.

Loomba says one of the main goals of the research is to investigate novel detectors, which could provide large improvements in energy and tracking resolution, two crucial areas needing improvement in the experiment running at Boulby. These detectors, called Gas Electron Multipliers, or GEMs, are based on new technologies invented by Fabio Sauli at the CERN Laboratory.

Work done at UNM by Hagemann during the past year has resulted in preliminary data indicating these detectors meet the necessary requirements for high tracking and energy resolution. The results, which will form the basis of her thesis, were presented at a conference in the UK and will also be submitted to physics journals.

Says Loomba, “For our research group here, the next big step is to see whether these novel GEM-based detectors can be feasibly scaled up to large sizes that make them competitive as dark matter detectors.”

## Getting the Perfect Fit

The Department of Family Practice and Community Medicine works with rural healthcare services to provide important research assistance.

*by Cindy Foster*

Before Hildago Medical Services opened in Lordsburg, New Mexico, in 1995, area residents knew that if they wanted a dentist, a cardiologist, or a surgeon, they were looking at a drive that might range from 60 to 150 miles before finding one. Hildago Medical Center began as a community effort to pool much-needed resources in a health commons model where it's possible to get coordinated care. That concept of providing comprehensive healthcare—"one-stop shopping"—for medical, mental, and dental healthcare needs, has garnered national attention. Locally, it has grown to a 150 person enterprise in ten locations in the southwestern corner of the state.

For years Charlie Alfero, Hidalgo Medical Services CEO, traveled to UNM on a monthly basis, with a "grocery list" in hand, looking for healthcare professionals. However, as the clinic grew, the need to conduct research that could help the clinic's patients became clear. Diabetes and its complications, for instance, "is always in the top five reasons people visit us," he says. Rural patients can find it hard to get pertinent information on managing their disease, obtain the foods they need, or even



*Photo by Matt Suhre.*

sign up for a convenient exercise class. His staff wondered if complication rates would fall if those barriers were addressed. He added “research assistance” to the list.

UNM’s Department of Family Practice and Community Medicine had the expertise to design and complete the evaluation of that kind of research. LA VIDA, a community-based diabetes intervention program, was the result.

The program targets the Hispanic population in Grant and Hidalgo counties, aiming to remove barriers patients encounter when trying to control their diabetes. It also aims to reduce the side-effects that long-term diabetics face. At its core are Hidalgo Medical Services *promotoras*—local community health workers fluent in Spanish. They began working with their clients to solve a wide range of problems—from lack of transportation, to inability to pay for food, medication, and healthcare, to lack of knowledge about diabetes risk factors. The *promotoras* also began creating an array of culturally appropriate community services focused on improving diabetes-related health behaviors.

A recent analysis of LA VIDA data shows these efforts are paying off for some fourteen hundred participants. “It has been awesome,” says Alfero. “We are finding that research project participants’ blood sugar levels have gone down, and stayed down.” Which led his people to wonder, could the same model help reduce teen pregnancies?

“The *promotoras* actually had the idea for the study,” says Kristine Tollestrup, associate professor in UNM’s Department of Family and Community Medicine. She provided the academic expertise to coordinate a new program entitled GUTS (Growing Up Together Strong). Funded by the U.S. Department of Health and Human Services, the program is designed to decrease repeat pregnancies in teen mothers, while increasing their high school graduation rates, and the immunization rates of their infants. Each teen mother and her family members receive a network of assistance services tailored to individual needs from the *promotoras*. They’ve done everything including creating parenting and grand parenting classes, locating safe and supportive homes for the girls and their babies, arranging daycare so moms stay in school, and finding transportation for

pediatrician visits. A preliminary analysis of data from the first two years has found no repeat pregnancies among participating teen mothers.

“Invariably, when working with communities, the first request is to find healthcare providers. Later, there’s an interest in educational links. Finally, after trust is built and basic healthcare needs have been tended to, communities request partnership in evaluating their programs or measuring outcomes,” says HSC Vice President for Community Health Arthur Kaufman.

“No one knows better than community members what their health problems are,” he continues. “When we go into that community and actively listen to their concerns, it is possible to design research programs that expand our knowledge while making a difference in the health of communities throughout the state.”

# Overcoming Addiction

Robert Meyers created a unique model called the Community Reinforcement Approach involving family members to help treat addictions.

*by Steve Carr*

Alcohol addiction is a phrase Robert Meyers got used to hearing a long time ago. Meyers, a research assistant professor in the Department of Psychology at UNM, has been treating patients with alcohol and substance abuse problems for more than thirty years.

For Meyers, who was recently featured with his own segment in the HBO documentary “Addictions,” it started when he created a unique alcohol and substance abuse treatment model called the Community Reinforcement Approach, or CRA. The CRAFT method, or Community Reinforcement and Family Training, evolved from CRA. The CRAFT mode of treatment is designed to help a family member motivate a treatment-resistant substance user to enter treatment.



In past clinical trials, CRAFT had a sixty-five percent success rate getting people into treatment when tested against the Johnson Institute's Intervention Method and Alcoholics Anonymous, which have success rates of twenty-nine percent and thirteen percent, respectively.

Today, the popular model is gaining more and more momentum abroad with its success in treating individuals with alcohol and addiction problems.

"I'm getting a lot of interest from China, Finland, and Sweden," Meyers says. "The Scandinavian countries have much more of a difficult problem. Places like Russia and Western Europe have a pretty serious problem with alcohol. The European countries like Holland, Germany, and France do have alcohol problems that are probably very similar to ours in the U.S., but in Scandinavian countries, it's pretty intense—more severe."

Meyers conducts training sessions for psychologists and psychiatrists in many of those countries and has written a book, *A Clinical Guide to Alcohol Treatment: The Community Reinforcement Approach*, which provides basic guidelines for clinicians, focusing on communication skills, problem solving, and drink-refusal strategies, and also addresses the needs of the client as part of a social community.

"Initially, we discuss the evidence of why CRAFT works and then we go through the studies," says Meyers. "We continue by doing exercises or a functional analysis. After, we'll typically break into groups of two or three people with each of the techniques we've trained them on and have them practice the techniques after we demonstrate them. Then, we come back into the large group and process what happened. Did it work? Was it difficult? Does it fit your culture? Would people be offended if you asked certain kinds of questions?"

Meyers feels the main reason CRAFT is so successful is the involvement of family members as part of the overall treatment.

"The key is family members," he said. "We help family members of a user who refuses help."



## Experiments in Cinema

Bryan Konefsky brings experimental cinematic arts to the UNM community and beyond.

*by Valerie Roybal*

Bryan Konefsky, tireless and long-time educator of video art, filmmaking, and other media, does not consider himself an artist, but rather a “cultural worker.” Making this distinction is natural for him: It involves transferring the focus of creating from a self-oriented point of view to creating for and with others. It also involves making a connection and creating more than just art, but a community through collaboration and the encouragement of shared viewpoints. Konefsky believes in the importance of supporting self-expression far and wide. “Everyone has a story to tell,” he says, “And I’m interested in finding it, drawing it out of people, and then putting it out there.”



*Photo of Bryan Konefsky by John Sunrow.*

One of Konefsky's many modes of actualizing this idea is by presenting *Experiments in Cinema*, a three-day film festival in collaboration with Basement Films, local non-profit supporters and presenters of under-represented cinema. The primary goal of *Experiments* is to provide an alternative cinematic experience to the UNM and Albuquerque community. With strong local interest and funding from the McCune Foundation, the UNM Department of Cinematic Arts, and the UNM PLACE (Partnership Learning for Arts and Community Engagement) Program, April 2008 will be the third run of the fledgling festival, which has expanded each year with additional programming.

The festival is unique in a number of ways. The planning of the festival is offered as a Cinematic Arts course at UNM, providing students an academic opportunity to collaborate, coordinate, and present a cultural event. Students form and join committees that are charged with various aspects of planning and production. Additionally, students from local Amy Biehl High School can intern with the festival, serving as valuable assistants, gaining experience, and obtaining the mentorship of UNM students and Basement Films.

The program, curated by Konefsky, students, and guest curators, aims to go beyond Hollywood and present the best in experimental and under-represented forms of filmmaking selected from a pool of short films submitted through an international open call. "We receive entries from all over the world; it puts us in a role of being social scientists in a way. We look forward to receiving work that is challenging, thoughtful, and goes beyond traditional notions of 'the cinematic,'" he says. "We want to support moving image artists who are making movies in ways that we have never imagined possible." Konefsky believes that these visionary experimentalists are vital to our cultural health and that their work informs other modes of movie making.

*Experiments in Cinema* screens films on campus at the Southwest Film Center and at the nearby independent theater, the Guild. In addition to film (including 35mm, 16mm, and digital video), the festival presents special events, such as panel discussions and scholarly presentations from visiting filmmakers and experts. The 2007 festival presented "Secession From the Broadcast," featuring Gene Youngblood, renowned scholar on experimental film and media, as well as a talk on the history of amateur filmmaking given by Dwight Swanson and the founders of Home Movie Day. Eventually, Konefsky would like to include more film showings and multi-media presentations, including live performance with film. In 2008, he has plans to publish a DVD of the festival program. He would also like to expand collaboration by "taking the festival to the streets" and involving local galleries and presenting at more locations, especially alternative spaces, out-of-the-way places, and out of town. To this end, one of Konefsky's students, Noel Fernando, received a UNM PLACE Grant to take *Experiments in Cinema* around the state in the coming year.

In the bigger scheme of things, *Experiments in Cinema* fits right into New Mexico Governor Bill Richardson's Media Industries Strategic Plan, a priority that has been adopted by UNM on a number of levels. The UNM ARTS Lab hosts the annual New

Mexico Media Industries Conference. And, under the guidance of College of Fine Arts Associate Dean Jim Linnell, UNM has crafted the Interdisciplinary Film and Digital Media Program in association with Sony Pictures Imageworks IPAX. This new program provides education and research opportunities aiming to support growth and innovation in, among other things, areas of digital media, animation, and visualization. Additionally, the Cinematic Arts department offers students the opportunity to study a wide range of cinematic histories in addition to production courses, in which burgeoning filmmakers develop skills and create films that respond to the histories and theoretical concepts explored in other courses.

“I’ve had a not-so-secret mission to keep experimental film included in the larger New Mexico filmmaking conversation,” says Konefsky. “So far, so good!”

# A Relentless Pursuit

Bruce Milne implements a Sustainability Studies Program at UNM to address the challenges of preserving Earth's ability to support life.

*by Steve Carr*

Relentless. That's one word that can be used to describe Biology Professor and Sustainability Studies Program Director Bruce Milne. It also sums up the type of Herculean effort it took Milne to implement the new Sustainability Studies Program at the University of New Mexico.

The Sustainability Studies Program, as Milne and many colleagues have envisioned, is a program designed to provide leadership and solutions to tackle the sustainability challenge, which addresses the Earth's ability to support life in the face of disruptions in global, regional, and local processes central to security, health, and economic well-being.

After toiling for years with the idea, Milne had to take action if the program was ever going to get off the ground. He sat in on an introductory leadership training course where he and the other participants were asked three questions in order to help them evaluate what it was they wanted to accomplish.

"They walked us through this whole process of evaluation," says Milne. "The



*Photo by of Bruce Milne by Matt Suhre.*

"My feeling is that if you're going to be an active citizen of this planet, as opposed to a passive consumer, you need to enlist your life in doing that kind of work."

key questions were: ‘What’s working for you now? What’s not working, and what do you need to be?’ What was working for me was that I had this great concept for a program, which enjoyed overwhelming moral support. What wasn’t working was the lack of money and decision-making power to provide the funding.”

Then Milne asked himself, “What do I need to be?” He really dug in and came up with one word.

“I had to be relentless,” he says. “I came back here the next day and set up a file on my computer and called it ‘relentless.’ In that file there are key titles like legislative activity—going to the Roundhouse and pitching my program and doing everything that’s required to make that happen.

“It was really to a point where you could not say ‘no’ to me. If someone said ‘no,’ it just slid off like Teflon and I kept on going,” Milne says with a laugh. “That’s what it took.” In the end, by the time the curriculum proposal was approved, Milne thought, “Man, this was almost impossible.”

The program has been designed as a major collaboration across campus, including the sciences, engineering, management, architecture and planning, the humanities, and arts, which will facilitate new career paths and job opportunities in sustainable development.

The possibilities range from “energies,” including solar, wind, biomass, and vegetable fuels, to design solutions, involving architecture, neighborhoods, rural-urban interactions, and building and construction. It includes “technologies” that range from transportation, water re-use, local food production, waste disposal, and water retention, to “decision-making” in urban planning and public policy, public transportation, and resource use, including art, culture, and economics.

Additionally, one of the biggest components of the program involves “collaboration” in the areas of academic, business, community, state, non-profit, and global interests.

The guiding principle behind the program is to “respect the wisdom of each to practice sustainability suited to their domain,” which encompasses and embraces collaboration.

Milne says you either believe the world is facing a major crisis or not. He defines crisis as a mass extinction of species unheard of since 65 million years ago, when dinosaurs became extinct— the last time the planet had this magnitude of extinction.

He points out: “By the year 2050, we’re going to have so many humans it will take four planets to support everybody in the lifestyle Americans are used to.” He cites other red-light indicators, including the world’s fisheries, which are in dire straits with major predatory fish like marlin and swordfish down ten percent. There are severe water shortages around the world, a pending energy crisis, and effects of global warming, including the melting of glaciers. The proof is seemingly endless.

“Either you say, ‘OK, that’s real stuff and we’re going to have to deal with it’ or somehow you just go back into your cave and you just forget about it,” Milne says emphatically. “My feeling is that if you’re going to be an active citizen of this planet, as opposed to a passive consumer, you need to enlist your life in doing that kind of work.”

While it may take yet another Herculean effort to redirect the harmful effects of global warming and its effects on the planet, Milne will surely continue to be relentless in his pursuit to make a difference.

# Patent and Invention at UNM

*by Karen Wentworth*

UNM researchers are continually inventing a wide variety of tests, technologies, and devices. STC.UNM was formed by the University as a private non-profit corporation to patent, license, and market this intellectual property. President and CEO of the corporation, Lisa Kuuttilla, says it now has 445 active technologies in its portfolio.



### **Detecting Early Stage Melanoma**

Every hour of every day, someone in the United States dies from melanoma, and every ten minutes someone is diagnosed with the disease, says Assistant Professor of Pharmacy Graham Timmins. The skin cancer is easily treatable in the initial stages, but is nearly impossible to stop once it has begun to travel throughout the human body, therefore, it is critical to find out whether the cancer has spread.

Timmins is developing technology using electron paramagnetic resonance to image melanomas and detect whether the cancer has metastasized. He is experimenting with the sensitivity of the test to try to detect a few thousand cancerous cells among the billions of cells in a lymph node being examined by a pathologist. If the test can quickly pinpoint the location of cancerous cells before they move beyond the initial site or the nearest lymph node, survival rates may be higher.

Timmins is hoping to make the technology sensitive enough for a physician to scan a melanoma and determine immediately if the cancer cells have begun to move through the body. It can also be used to create a new way to measure the efficiency of sunscreen protection against UVA damage, since preventing melanoma is as important as treating it.

The technology has been licensed by TenthGate International Inc. for further development.

### **Oven Plans for Healthy Cooking**

Professor of Health Careers Jean Martinez-Welles was teaching a nutrition class at UNM Gallup when one of her students asked how to use the information she was giving them about baking food. Students' families fry everything, because the propane they use to cook is too expensive to heat an oven for a long time and electricity is not always available on the Navajo and Zuni reservations.

When one student said her family baked food in a solar cooker, an idea was sparked.

Welles spent months researching and designing a simple box for cooking with reflective insulation. The Centers for Disease Control and UNM-Gallup gave her a grant to build test ovens as part of a project to convince Native Americans, who are prone to diabetes, to cook without frying. Welles showed the ovens to staff at STC.UNM, which copyrighted the idea and sells the oven plans online. Welles gets a portion of each sale.

The oven is simple, sturdy, and costs about eighty dollars in materials to build. It doesn't have to be rotated to follow the sun as many solar ovens do. It can resist local dogs, and a family can put food in it in the morning and come home to a meal cooked in a healthy way.

### **A New Way to Treat Macular Degeneration**



Retired UNM Provost and Professor of Physics MacAlister Hull wanted to find a way to help his wife, who has macular degeneration, to see better. He experimented with a design for glass lenses to refract light to the undamaged parts of her eyes, putting a cone in the center of the lenses and focusing the redirected light.

The lenses did allow her to read more, and STC.UNM thought the design was innovative enough to patent and license. Select University Technologies, Inc. has licensed the technology and is refining it and researching which macular degeneration patients will find it most useful.

### **New Diagnostic Test for Endometrial Cancer**

Kimberly Leslie, professor and chief of the division of Maternal-Fetal Medicine, was frustrated because it took a biopsy to tell what was happening every time she suspected a patient might have endometrial cancer. About forty thousand women are diagnosed with the cancer each year in the U.S., and since it is much easier to treat if found in the early stages, she and her research team began looking for a way to diagnose the cancer using a simple blood test.

The research attracted the attention of Allied Minds, a pre-seed investment corporation specializing in early stage university business ventures. They have invested in further research and have agreed to create a start-up company, Endoscreen, once research is completed.

## Back to School

The UNM Teachers' Institute provides continuing education for K-12 teachers to develop content knowledge and improve classroom instruction.

*by Carolyn Gonzales*

The College of Arts and Sciences Teachers' Institute has worked with teachers since 1999 to develop content knowledge needed to improve classroom teaching in public schools. Today, the Institute features workshops designed to enhance teachers' understanding of subjects such as mathematics and science, and helps them understand what students need to know to write well at the college level, among other initiatives.

Under the direction of Wanda Martin, associate professor of English, and Matt Nyman, lecturer in earth and planetary sciences, the Institute has provided many teachers with instruction that counts toward credentialing, helping them move up the three-tiered system for New Mexico educators and meet No Child Left Behind standards.



*Photo courtesy of Matt Nyman.*

“When teachers came under attack because students scored low on math achievement tests or because students couldn’t write for college level courses, we knew that we had a responsibility to address teachers’ content knowledge,” says Martin.

The La Meta (Mathematics Educators Targeting Achievement) program is geared toward teachers in grades 5 through 9. “If we can help teachers learn more math and become better equipped to teach it, then they will help their students learn more math,” says Kristin Umland, assistant professor of mathematics and statistics.

“It is important for our teachers to practice talking math. They need to be able to explain how they solved problems, not just solve them,” she says. Starting in 2006, Arts and Sciences faculty participating in Teachers’ Institute programs have devised a series of one-day workshops on climate change. Sessions have included the down in the dirt perspective of soil morphologist Les McFadden, professor of earth and planetary sciences, and a consideration of how economic incentives can encourage environmental degradation with Kate Krause, professor of economics.

“The field-based workshops provided hands-on learning. The teachers got out of the classroom and saw things in action,” Martin says.



The teachers also grew to understand climate citizens. “A huge problem in education is the compartmentalization of knowledge. With time they understand it in social terms—its impact on cultures. They can see how climate change affects and societal relationships,” she says.

“We also try to help teachers develop strategies for reading and writing, which are important in science,” Martin adds. “Scientists, for example, use reading to articulate what they know—and what they don’t know.”

Since 2005, the Institute has offered a week of creative writing held in conjunction with the Department’s Taos Summer Writers’ Conference. Participants write poetry, stories, memoirs, and plays, and learn strategies for teaching these genres.

In 2007, two summer seminars focused on teaching literacy, helping teachers prepare students for a world where success demands that students be able to apply reading and writing to a variety of problems across the disciplines,” says Martin.

Martin taught a course for high school teachers on strategies for teaching critical reading and analytic writing skills, the basis for learning across the disciplines. Krause,

working with middle school teachers, worked on strategies for reading, evaluating and writing editorials, letters to the editor, online commentary, and other arguments to join and influence civic debate.

For teaching science, the SEIS (Science Education Institute of the Southwest) program is focused on improving science education at all levels, offering summer field courses and one-day science workshops for teachers.

A collaboration between UNM, Sandia National Laboratories, New Mexico Museum of Natural History and Science, and the Albuquerque Public School (APS) district, the program was able to bring three APS science teachers to work as Science Research Fellows through funding from Sandia.

“They worked with UNM researchers in the lab, taking that knowledge back to their classrooms. A similar program, Museum Teaching Fellows, funded by the Albert I. Pierce Foundation, allows teachers to work with and learn from the educators at the New Mexico Museum of Natural History and Science,” says Nyman.

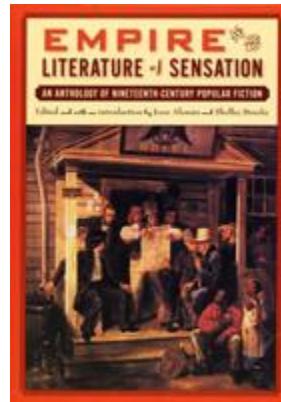
Thus far, the Institute staff have seen a number of improvements including enhanced teachers’ writing skills, more enthusiasm, increased content knowledge in science, and better relationships between UNM and K-12 teachers.

Says Nyman, “We want to bridge the cultural divide between K-12 and higher education. We view the teachers as our colleagues.” Martin adds, “The Teachers’ Institute closes the loop between educating teachers and educating our kids. We can teach them now, or teach them later.”

# Hot Off the Press

## Books by UNM Faculty

by Diana Sanchez and Valerie Roybal



### **Understories: The Political Life of Forests in Northern New Mexico**

*By Jake Kosek, Assistant Professor of Anthropology and American Studies  
Duke University Press*

Jake Kosek offers a thorough examination of the violent fight over forests in northern New Mexico. More than reporting historical facts, *Understories* is an intriguing account of the very personal political struggles for the forest based on the underlying themes of nature and difference. An engaging narrative on topics from drug use to the National Forest Service to Smokey the Bear reveals the “volatile politics of difference” Kosek argues is central to this battle.

## **Migrations**

### **New Directions in Native American Art**

*Edited by Marjorie Devon, Research Professor of Art and Art History/Director,  
Tamarind Institute  
University of New Mexico Press*

This book is the accompanying publication to Tamarind Institute of Lithography's project by the same name. The project invited six emerging Native American artists working with a contemporary vocabulary to create prints with collaborating printers at Tamarind and at Crow's Shadow Institute of the Arts in Oregon. *Migrations* documents the project, showcasing various works of the artists and providing essays and commentary that expands understanding of contemporary Native American art.

## **Empire and the Literature of Sensation**

### **An Anthology of Nineteenth-Century Popular Fiction**

*Edited and with an Introduction by Jesse Alemán, Associate Professor of English, and  
Shelley Streeby  
Rutgers University Press*

In this anthology, Alemán and Streeby provide a collection of mid-nineteenth-century popular and sensational American literature. The writings are representative of the energy and tensions of the time period and contain stories of adventure, conflict, forbidden romance, and frightening encounters. Most of these stories, which originally appeared in pamphlets, dime novels, and newspapers, provide a look at the rhetoric of empire during that time period before the Civil War.

## **Fugitive Landscapes: The Forgotten History of the U.S.-Mexico Borderlands**

*By Samuel Truett, Associate Professor of History  
Yale University Press*

*Fugitive Landscapes* explores the complex history of the Sonora-Arizona border. Part one, "Frontier Legacies," focuses on "foundational social relationships" between Spanish settlers, Mexican miners, and Apache struggles with them in the Sonoran desert. Next, "Border Crossings," reveals how American innovation led entrepreneurs including Phelps Dodge to the area for copper mining, supporting a railroad route there. Here, civilization versus perceived barbarism becomes integral to the borderlands struggle as examined in the third section, "Contested Terrain."