DRI thanks U.S. Sen. John Ensign for support during tour of Reno campus

JUNIOR SENATOR LAUDS INSTITUTE’S WORK, ENTREPRENEURIAL CULTURE

As a former practicing veterinarian and businessman, U.S. Sen. John Ensign is no stranger to the intersection of science and entrepreneurship that is DRI’s hallmark. A strong supporter of DRI, Ensign, R.-Nev., toured the Northern Nevada Science Center in Reno during an August 6 visit, viewing demonstrations of projects he helped make possible.

DRI Research Professor Dr. John Watson greeted the senator at the first stop where he saw a drive-by smog-check demonstration using LORAX, a remote-sensing technology used to measure particulate matter emitted from passing vehicles. Based on LIDAR, or “laser radar,” the system was patented by Watson and colleagues Drs. Hans Moosmüller and Peter Barber, along with Dr. Robert Keislar, formerly of DRI.

Watson said LORAX could someday be used to identify easily the small minority of vehicles on the road that don’t meet federal or state air quality standards. This development could make annual vehicle inspections and smog stations obsolete.

Dr. Eric McDonald, interim director of the Center for Arid Lands Environmental Management, or CALEM, briefed Ensign on DRI’s desert terrain project for the U.S. Department of Defense. Ensign, who serves on the Senate Armed Services Committee and is chairman of the Subcommittee on Readiness and Management, expressed considerable interest in the project.

Ensign and U.S. Sen. Harry Reid, D-Nev., who serves on the Senate Defense Appropriations Subcommittee, were instrumental in gaining congressional authorization for funding the project officially known as Integrated Desert Terrain Forecasting for Military Operations.

McDonald described DRI’s research to understand how lubricants for military weapons interact with dust like that found in the deserts in Iraq. He said preliminary studies show that the properties of the lubricants in combination with the properties of the dust are critical in avoiding weapon jams during dust storms.

continued on back cover
DRI atmospheric scientist Dr. Vanda Grubišić has been doing a little... remodeling.

Her budget? A $3.4 million grant from the National Science Foundation’s Experimental Program to Stimulate Competitive Research, or EPSCoR.

Her objective? To create the Advanced Computing in Environmental Sciences, or ACES, Program—a collaborative network of high-end computer resources, support services and communication technology to enhance environmental research at DRI, the University of Nevada, Reno and the University of Nevada, Las Vegas.

The end result? A new level of excellence for computational environmental science research—including 3-D data visualization—and education in the state of Nevada.

“Environmental science disciplines are very data-intensive, and we saw this as an opportunity to advance our capabilities greatly and become more competitive in computer modeling, data visualization and advanced computing techniques,” says Grubišić, who serves as the statewide coordinator for ACES.

Examples of such data-intensive research abound at UNR, UNLV and DRI and include Grubišić’s own work modeling airflow over mountainous terrain; studies of groundwater flow; climate data analysis and modeling; and applications of geographic information systems and remote sensing.

ACES was launched two years ago and in that time, Grubišić has been busy bringing together science and information technology experts from around the state, acquiring key pieces of new equipment and hiring some help in the form of UNIX System Administrator Mark Ballew and Scientific Applications Programmer Shulan Liu.

A key accomplishment has been the creation of the core of the Nevada Environmental Computing Grid, a statewide distributed computational infrastructure—accessible from DRI campuses in Reno and Las Vegas, and from UNR and UNLV—that will give researchers some seriously pumped-up computing power.

“The ACES computing grid will allow them to spread their computations over multiple machines and run large jobs—much larger than they could run on any single machine—on the grid by tapping into unused computational resources shared on the grid,” Grubišić explains.

At the heart of ACES grid computing power is the SGI Altix 3700 from Silicon Graphics. Housed at DRI in Reno and on-line since October 2003, the shared-memory high-performance supercomputer boasts 40 Intel Itanium2 CPUs, 80 Gigabytes of RAM, 3 Terabytes of disk space and the Linux kernel.

In short, it’s big, it’s fast and it’s an excellent platform for running scientific applications. “Currently,” Grubišić says, “there are about 40 users of this machine and that’s growing all the time.”

One of those users is DRI’s Dr. Darko Koracín, whose high-resolution weather forecasting model, known as MM5, is supported by the machine. “We have been using this computer system to model the diurnal evolution of the cloudy marine atmospheric boundary layer on five nested model domains with the highest horizontal grid resolution of 1 kilometer,” Koracín explains, “which was not practical and in some
cases even impossible to perform on the previous generation of our computers. As an illustration, just the innermost domain of the MM5 setup has approximately five million grid points on which to compute all prediction variables—winds, temperature, humidity and turbulence kinetic energy—every three seconds.”

DRI’s Dr. Alison Murray, whose work focuses on microorganisms found in extreme environments, is a believer, too. “The ACES program has introduced my research group to parallel computing and provided us with the ability to process in hours bioinformatics data that previously would have taken weeks.”

Another key feature of ACES is a collaboration grid—a system of sophisticated multimedia conferencing technology—built around Access Grid™ technology developed by the National Center for Supercomputing Applications and maintained by the Futures Laboratory at Argonne National Laboratory.

“Think of it,” Grubišić says, “as video conferencing on steroids. It definitely offers something beyond video conferencing and allows Nevada scientists to hold large-scale distributed meetings and collaborative work sessions as well as share seminars, lectures and tutorials involving Access Grid Nodes in and outside the state.”

With the ability to share data in real time and display video images of many different locations at once, it basically makes users feel as if they’re in the same room as their colleagues, even though they are thousands of miles apart.

Dominated by an immense 17-foot by 4.5-foot acrylic screen, and sporting hidden data pop-ups, wireless Internet, strategically placed cameras and seating with a commanding view, DRI’s Access Grid Node in Reno bears more than a passing resemblance to a familiar Star Trek set. It’s a feeling enhanced when small windows materialize on the wall-in Reno bears more than a passing resemblance to a familiar Star Trek cameras and seating with a commanding view, DRI’s Access Grid Node accessible from this one room.

d to-wall screen, beaming you to some of the more than 400 locations you want, limited only by your bandwidth.”

In the VisLab, the only such facility in Nevada, computer simulations can not only be displayed in all three-dimensions, they can be animated, manipulated and viewed from practically infinite perspectives.

A demonstration of these capabilities, complete with stylish 3-D glasses, shows you how clouds and air currents flow over the Alps, takes you beneath the Earth’s tectonic plates to pinpoint quake epicenters and lets you ride in the eye of a hurricane.

Sure, it’s entertaining, but beyond that Grubišić says it gives Nevada researchers a whole new way of looking at their work. “With these visualization capabilities I am able to gain new physical insights into the processes I am studying and to discern much finer detail.”

And, the Access Grid Node at DRI in Reno houses a little something extra. The Scientific Visualization Laboratory, or VisLab, is a facility designed to bring the inherent complexities of environmental studies to life with remarkable clarity—that is to say big, animated and even three-dimensional.

Three Digital Light Processing™ projectors, driven by a high-performance visualization computer cluster, can cast individual images onto the large screen or fill the entire 17 feet with a single image.

“For researchers who use satellite imagery or Geographic Information Systems,” Grubišić explains, “this gives them an unprecedented capability to examine large areas at a time with incredible resolution.”

A front-projection system displays three-dimensional images on a smaller drop-down screen, a feature that gives computer modelers a host of new options for interpreting their data.

“A real challenge for environmental scientists whose work is based on tremendous amounts of data is sifting through all that and finding a way to display it effectively,” Grubišić says. “For most visualization purposes we have had to use two dimensions—paper or a computer screen—yet we are modeling three-dimensional processes.”

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Of course, technology is nothing without people to use it, and ACES is dedicated to helping researchers take full advantage of the new capabilities at their disposal.

“One of our objectives is to help them in their choice of computing platform and to find the best ways to use ACES to further their research,” she says. The program has also awarded seven graduate fellowships, four postdoctoral fellowships and four seed grants in the past year, with seven additional graduate fellowships awarded this year.

The ACES computing grid and collaboration grid put Nevada on the leading edge but it won’t be long, Grubišić says, before other states join in.

“Collaborative research environments … focused around regional and/or discipline-oriented centers, such as our Nevada Environmental Computing Grid, are relatively rare now, but are the likely direction that the NSF-supported IT infrastructure development will take in the future.”

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**From research lab to real life**

**Technology Transfer Office helps researchers aid their world**

Transfer \(\text{transfer}\) vb 1 a: to convey from one person, place or situation to another: b: to cause to pass from one to another.

It’s a simple definition, really, but a concept we couldn’t get along without. You can’t eat a peanut butter sandwich, for instance, until you transfer the peanut butter to the bread. You can’t ride a bike until you transfer the energy from your legs to the wheels. And, you can’t turn innovative technology into tangible benefits until you transfer it from the laboratory to the outside world.

That’s the idea behind the newly formed Technology Transfer Office operated jointly by DRI and the University of Nevada, Reno, says its director Dr. Richard Bjur. “We work with the faculty and students at both institutions to identify novel inventions, protect those inventions and get them into the private sector to be of service to the community.”

It’s all about connections, concurs Dr. J. Scott Hauger, DRI’s vice president for government and business relations. “The office ties research faculty to the business and industrial sector in a way that would not otherwise be there. It links them and ultimately allows everyone to benefit.”

Of course, turning an idea or technological innovation into an actual product is not as simple as spreading peanut butter on a piece of bread. It can be a long and expensive process, fraught with legal pitfalls and mountains of paperwork, and it’s something most researchers don’t necessarily have the time and expertise to handle themselves.

In the simplest, most linear terms the process goes something like this: A scientist conducts research that results in what might be a useful invention. The scientist files an invention disclosure form and the Technology Transfer Office then evaluates whether or not to take the next step—a patent application. “If it meets the legal criteria for a patent,” Bjur explains, “if it is novel, useful and unobvious, and if it potentially has significant value, then we will apply for a patent to protect that invention.”

The patenting process itself is complicated, taking as long as two to three years to complete.

“The ultimate goal is to license these patent rights to private-sector companies that will handle the marketing and manufacture of products and processes covered by these patent rights,” Bjur says. “We independently investigate the potential market for each technology and identify potential licensees. They will commercialize the invention and certain royalties will come back to the institute where they can benefit the inventors and their various departments.”

Perhaps the most famous example of a commercially successful technology transfer is Gatorade. The sports drink was developed in 1965 by University of Florida researchers responding to a rash of dehydration and heat-related illnesses on the school’s football team—the Gators. The drink accompanied the Gators through a winning season in 1966, and in 1967, Stokely-Van Camp, Inc. secured the rights to market the sports drink nationwide. The rest is history—and on the shelves of grocery stores worldwide—and Gatorade royalties continue to support University of Florida programs and research projects.

But Hauger points out that commercial success benefiting the inventor and institution is not the only, or even the primary goal of technology transfer. The real impact is more far-reaching, he says, and stems from linking a research community with a business community.

“Technology transfer leads to economic diversification for the state of Nevada—spinning off new tech-based business ventures, especially small businesses, generating jobs, funding additional research—it’s a very positive cycle.”

The numbers show that tech-based industries are beginning to recognize Nevada’s favorable business climate. According to information released by the Economic Development Authority of Western Nevada, the high-tech payroll in 2002 topped $1 billion for the first time in the state’s history. And, with a reported growth of 58 percent from 1995 to 2001, Nevada was ranked 10th in the nation by the American Electronics Association for percentage increase in the number of high-tech jobs.

The Technology Transfer Office recognizes the importance of attracting and nurturing the types of companies that bring those high-tech jobs, Bjur says.
“Economic development and diversification is often based upon the success of small companies. We are looking to assist those businesses in technology fields and hope to build some small companies around the technology coming from these two institutions.”

Of course inventors and institutions also gain something beyond revenues or royalties from successful technology transfer. “By securing rights to the intellectual property our researchers develop,” Hauger explains, “we give them and the institution a competitive advantage in winning future research contracts. We can offer something others institutions cannot.”

Researchers also stand to gain valuable experience and perspective, points out Bjur. “This creates opportunities for our faculty to work on practical solutions to real-world problems and to collaborate with successful companies.”

Patent laws prevent Bjur from discussing works-in-progress in detail—publicity prior to a certain point in the process can undermine patent rights. But even a general overview reveals an intriguing array of areas being explored by would-be Nevada inventors. It’s an array that reflects the depth of the research being conducted at DRI and UNR, where faculty collectively received more than $1.36 million in grants and awards in 2002.

Environmental issues are a main focus of research efforts at DRI, according to Bjur, particularly ways to improve environmental measurements. Examples include instrumentation that aids air quality monitoring by quantifying black carbon aerosol emissions, a device to more efficiently gauge precipitation at airports and other transportation centers and a device to measure wind-blown dust.

Researchers at UNR are also interested in environmental issues. They have developed technology to pull arsenic and mercury out of groundwater—a potentially vital service in Nevada, where early mining practices often left behind dangerous toxins.

Other areas being investigated at DRI and UNR include alternative energy, computing applications and sensor technologies. “We have researchers looking into different ways of generating electricity, especially ways that are more environmentally friendly,” Bjur says. “We have some new software being developed to solve certain problems and new sensors with potential applications in biomedical fields and homeland security.”

Nanotechnology is another growing area, he says, one that will interact with and augment other areas, especially alternative energy applications and sensor technologies.

The new Technology Transfer Office is up to the challenge of supporting such a broad range of research expertise. Hauger’s previous experience includes seven years at the American Association for the Advancement of Science where he provided guidance to states establishing technology transfer programs.

Bjur, who holds a Ph.D. in pharmacology, is a professor of pharmacology at the University of Nevada School of Medicine and a registered patent attorney.

The office’s licensing director, Val Fikovsky, is a registered patent attorney with an engineering background and previous experience in licensing early stage technologies for the University of California’s systemwide Office of Technology Transfer.

Charles Whitaker serves as the office’s business manager, as well as financial administrator for DRI’s Division of Atmospheric Sciences, and Lisa Grey supports them all as office manager.

“It’s a small office,” Bjur concedes, “but we’ve covered the bases well and both institutions have been very supportive in getting the Technology Transfer Office off the ground and off to a strong start.”

Joining forces, he says, made sense for both DRI and UNR. “In part, we did it because of the resources that both institutions would be able to contribute. Patenting and licensing are expensive processes and joining together gave us additional resources to create a more effective office.”

But resources were only one factor, and Bjur believes that the partnership ultimately benefits everyone. “This was an opportunity to create synergy between these two institutions, both of which have so much to offer, and to serve better not only our faculty and students but the state of Nevada as well. We believe we can become a catalyst for economic innovation and growth in Nevada.”

And that’s one definition of a bright future.

—Jackie Allen

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With the computing grid up and running, and the Access Grid Nodes and VisLab completed, Grubišić is ready to unveil her work to the world with a fall grand opening. Researchers, on the other hand, don’t stand on ceremony and are already putting their new capabilities to good use. “Just since January 2004,” Grubišić says, “there has been more than $3 million in competitive proposals produced that plan on using ACES facilities in their research. That’s something of which we are very proud.”

—Jackie Allen
Man's best friend proves useful in detecting threatened wildlife

Fort Irwin National Training Center is looking to expand its facility by some 120,000 acres and at the same time protect threatened species there.

Dr. Mary Cablk, DRI assistant research professor, is assisting the U.S. Army at Fort Irwin, near Barstow, Calif., in this effort by collaborating with tortoise biologists from the U.S. Geological Survey's Biological Resources Division, academia and the private sector.

They are colleagues in a required management and research program that will include locating, “translocating”—or displacing—researching and ultimately protecting the desert tortoise, a federally designated threatened species native to the Mojave Desert.

With such a large expanse of land to survey, it would take humans an incredible amount of time to track and remove the thousands of tortoises estimated to need translocation to other protected areas nearby.

Given that people have been shown to have limited success rates at finding tortoises—only 30 to 60 percent for two size/age classes of tortoises—Cablk and her colleagues are moving forward with a program that has, in its preliminary stages, proven considerably more effective than using humans alone.

Cablk has teamed up with man's best friend to develop another viable option: let the four-legged species with a keener sense of smell find the tortoises instead.

Cablk is no stranger to understanding the abilities of search-and-rescue dogs, as she and her own German shepherd are auxiliary deputies who specialize in finding missing people and crime victims.

If dogs can find people or drugs or bombs, why not use them to find tortoises?

Using her professional expertise in remote sensing technology and landscape ecology, Cablk joined forces with the Redlands Institute, of the University of Redlands (Calif.); the U.S. Army Research Office; the U.S. Fish and Wildlife Service; and the Bureau of Land Management Desert Tortoise Conservation Center to determine if certain wildlife detection dogs could be trained and relied upon to locate and correctly identify desert tortoises under semi-natural conditions.

“The more tortoises we find, the more data we will collect about the population. Therefore, we can give better estimates about population numbers and structure,” Cablk says about why improved survey tools are being explored.

“This is a once-in-history opportunity to make significant advances in our understanding about the desert tortoise in a very short time based on massive amounts of new data. The results, we hope, will reverse the negative trend in tortoise populations.”

The Players

Detection Dogs: Cablk brought in dog teams from the non-profit organization Working Dogs for Conservation that specialize in scat detection of rare, threatened and endangered mammals. Dog handlers worked with the dogs in their native Montana to introduce the tortoise scent and train the dogs to understand there was a reward for targeting that scent. The transition to live tortoises was done on site at the Desert

Left: Freeze: Handler Alice Whitelaw and German shepherd “Camas” demonstrate that dogs can find tortoises safely and reliably. Camas has picked up the scent of the tortoise in the air and is about to indicate this fact to her handler by doing her trained alert freezing in place and staring at Whitelaw.

Below: All in a day's work: Left to right, dog handler Aimee Hurt and "Fin," researchers Jill S. Heaton and Mary Cablk, dog handler Alice Whitelaw and "Camas" pose for a group shot.
Tortoise Conservation Center outside of Las Vegas in the Mojave Desert where tortoises live. It takes a special dog with the right type and level of drive to do live animal detection work off leash. The dogs need to be motivated to work and when they reach a tortoise, inherently want a reward from their handler, not from the tortoise itself. Not everyone is the right type of handler, either. Tortoise detection work requires both the dogs and the handlers to be athletes and to be able to communicate to each other consistently, clearly and effectively.

Tortoises: After obtaining the required permit from U.S. Fish and Wildlife Service, Cablk and colleague Dr. Jill Heaton from the University of Nevada, Reno were able to use research tortoises at the Desert Tortoise Conservation Center for the study. In each trial, known numbers of tortoises were tethered at spatially random locations to prevent them from relocating more than a half-meter in any direction during the trial. The tether design was also approved by U.S. Fish and Wildlife Services to ensure minimal stress to the tortoises from heat, cold, restraint and potential predation. Hundreds of dog-tortoise interactions were carefully logged using an extensive relational database designed to record and maintain spatial and statistical data.

Humans: Cablk's research team included hand-picked specialists, each of whom contributed unique but critical expertise that would maximize success of the pilot project. Cablk's understanding of scent detection and tortoise issues enabled the team to communicate across their respective areas of expertise. First, a master dog trainer from Contra Costa County, Calif., was selected for her skills in canine behavior and specialized technical-detection training. Heaton, a tortoise biologist, oversaw the biological element related to tortoises and their habitat. She brought with her a project manager skilled in database design to ensure continuity of the complex spatial and temporal data set collected during the one-month study. Add the dog handlers, three database GIS/GPS technicians and more than 10 student workers to round out the team. And of course, the study designer, Cablk: “I speak the dog language and science language, which was the glue to make sure we met our objectives.”

The Study

The dogs and their handlers were fitted with GPS units to record their exact locations in one-second intervals. Each time a dog identified a tortoise, the event was recorded. During the trials, climate conditions at dog-nose height were recorded using specially designed meteorological stations to determine if there were identifiable trends in environmental conditions, such as wind speed, wind direction, air temperature and relative humidity that correlated with detection distances.

The Results

With an overall accuracy of more than 90 percent for finding tortoises on the surface and in burrows, the dogs were recorded to locate tortoises at distances of more than 60 meters, about 200 feet. Their rate of detection was unaffected by the size or sex of the tortoise or the time of day.

Climate conditions were not a factor in detection distances—a finding that contradicts conventional wisdom about what comprises “ideal” scent conditions. The dogs were able to locate very small tortoises that humans do not survey due to difficulty in finding and even detected extra tortoises not involved in the study.

Factors to Consider

Tortoise and dog safety was the primary concern in the trials. During the course of the training, three dogs were removed from the program due to safety concerns resulting from excessive “prey drive.” Two exhibited aggressive behavior toward the tortoises and one was not experienced enough to do the intense field trials.

These dogs lacked the acceptable hunt and play drive respectively for wildlife detection work. Natural hazards existed but were uncontrolled, such as rattlesnakes, cacti, weather changes and rough terrain. The dogs and their handlers took these hazards in stride as would be expected under actual working conditions.

The Next Step

Now that the trials are completed, Cablk is hard at work analyzing the data to create a program outlining the boundaries for using wildlife detection dogs to locate threatened or endangered species, the success rate anticipated, how many people it would take to execute a job and the length of time needed to get the job done satisfactorily. She also is compiling results to determine what constitutes a good dog team.

“Would you want just any dog checking an airplane you were getting on instead of a trained bomb dog?” Cablk asks. “No, and that’s the type of rigor we brought to researching appropriate wildlife detection dog teams.”

She will continue research into the dogs’ drive and the level of training required, including obedience and strategic search aspects, as well as narrowing the dog-screening process by looking at the history of their training.

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Dr. David Rhode, archaeologist and paleoecologist, knew what he was getting into as he and a team of students and fellow researchers followed guides across the Tibetan Plateau in China, retracing steps he had taken years before. Often called the “roof of the world,” the Tibetan Plateau is the world’s highest geological feature.

Its lofty altitude, thin, oxygen-poor air and harsh climate pose serious challenges and questions to scientists like Rhode: How could Paleolithic or Stone Age hunting people sustain themselves in such an extreme environment thousands of years ago? Like a private investigator searching for clues, Rhode’s eyes are trained to spot evidence of Ice Age hunter-gatherers who first colonized the area sometime between 10,000 and 35,000 years ago. During previous trips to Tibet, Rhode’s research team had discovered firehearths and other signs of ancient hunters’ campsites, and they made plans to return to unearth their finds.

His group’s research will help answer questions about what evolutionary and ecological processes led hunter-gatherers to occupy these extreme environments and what behavioral strategies facilitated successful human colonization.
Late last June, Rhode packed his gear and returned to Tibet with targeted sites plotted and with high hopes of avoiding treacherous summer monsoons. The five-week trek took the team through high-altitude meadows bordering China’s largest lake, across vast stretches of sandy desert and into deeply cut canyons with towering walls of gravel and loess—ancient deposits of windblown silt.

The expedition took them atop the broad high plain of the Tibetan Plateau—all places traversed for thousands of years by prehistoric hunters and herders. They crossed paths with yaks, antelope, gazelles, camels and even a Tibetan wolf in an effort to turn back the hands of time to the Ice Age.

The Tibetan Plateau reaches upward to more than 15,000 feet, surpassing the likes of Mt. Rainier in Washington and Mt. Whitney in California. The thin air can make the task of excavating tough on the body. Despite these inconveniences, the research team exposed the 13,000-year-old hunters’ camp they had discovered previously near Qinghai Lake. Rhode and his team gathered remnants of stone tools, bones and plant remains, and took sediment samples from geological sections and small lakes to understand better when and how Ice Age people survived at high altitude in a cold, arid climate.

“We were able to accomplish everything we set out to do,” Rhode says with a smile. “We cleaned up a big geological section of a loess outcrop to create a stratigraphic profile and dig down about two meters to get at the firehearth. We initially thought there were several separate individual hearths, but instead we found one main hearth and small associated ash scatters, suggesting a single short-term campsite used by a hunting party for only a few days.”

At this site, the team gathered evidence of Stone Age tool technology involving microblade cores—stones that Ice Agers chipped away at to form thin parallel-sided blades to be used as efficient tools. The blades, sharp as razors, were usually stuck in bone shafts or antler shafts to create knives or long spear points for hunting.

As part of the three-year National Science Foundation project, UCLA’s Dr. Jeff Brantingham is analyzing the stone artifacts. For Rhode’s part in the project, he will use clues such as seeds, charcoal and pollen from the site to shed light on what the hunter-gatherers were eating or using for fuel. Rhode will also study core samples from lake sediments to help reconstruct the changing natural environment of the area at the end of the last Ice Age.

“In this project, we hope to know when our human ancestors were first able to tackle extreme environments such as the Tibetan Plateau and to understand better how they were able to do so. Finding the artifacts of ancient mankind always fascinates me—retracing their steps to figure out how they survived with little more than rocks and simple tools in such a harsh environment,” Rhode says. “Their adaptation to the environment is really tremendous when you appreciate how tough it still can be to travel those same paths today.”

But the tough conditions don’t deter Rhode—he’s already planning his next trip back in time to the Ice Ages atop the Tibetan Plateau.

—Heather Emmons

Nevada Woman magazine features DRI researchers

Open up the September/October edition of Nevada Woman magazine—its yearly Health and Prevention issue—and readers will see an article highlighting some of DRI’s most distinguished women in science. Dr. Judith Chow, Dr. Gayle Dana, Jenny Chapman, Dr. Lynn Fenstermaker, Dr. Alison Murray and Dr. Barbara Zielinska are featured for their leadership in research to improve human health and the environment. With a distribution of 30,000 and readership topping 200,000 an issue, the magazine showcases professional women who live in Nevada and make a difference in their communities. DRI’s contingent certainly fills the bill with fascinating stories about pioneering approaches to understanding air pollution, water quality, genomics technology and Earth’s ecosystems through global research.
1. Apollo Gold team members Jill and Llee Chapman.
2. Barrick was a 2004 sponsor, and its team took home the third place women’s prize.
3. Bear Industries took third in the men’s competition.
4. Jem Chapman picked up Titan Cleaning’s sponsorship prize.
5. Custom Tile continued its ownership of the best-dressed title for the mixed team competition.
6. The FASTFRAME women were first and best-dressed in the women’s division.
7. The FASTFRAME men were the best-dressed in their category.
8. The Sprint team checking for messages. Sprint was a 2004 tournament sponsor. Team member Lou Emmert is a trustee of the DRI Research Foundation.
9. TILECO II took first place in the men’s division.
10. DRI Research Foundation Chair David Fulstone II (right) with trustee Walt Higgins III.
11. Groves-Fischer took second this year and vowed to be back next year.
12. Dr. Harry Huneycutt enjoying Friday night’s reception.
13. International Services placed second in the women’s competition.
14. The Mill Direct Services team gets a boost on the fairway.
15. Left to right: Regina Miller, Craig Breuer, Linda Ackerman and Robert Chavez took first in the mixed team competition.
16. Tournament planning committee member Pam Parenti and daughter Caitie.
17. The Red Hawk team loses one in the rough.
18. Tom Aleo continued TILECO’s tournament sponsorship in 2004.
19. Wells Fargo placed second in the mixed team competition.
20. The Reno Hilton team.
21. The SBC team.
22. Tournament Chair Skylo Dangler and Cathy Kiesecker.
23. Tournament volunteers stood out in their orange shirts.
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- Vicki Hall
- Michael Hays
- Hello World Travel
- High Sierra Lanes
- Janice Hirayama
- Hoagie Hut
- Sue Hoffman
- Hometown Café
- Honey Baked Hams
- Honey Mountain Hams
- Angela Horning
- Pat Hughes
- Harry Huneycutt
- IGT
- Infiniti Day Spa and Wellness Center
- International Services
- Barbara Jackson

#### Associated Management

- Custom Tile
- Drs. Harry and Rita Huneycutt
- Lenmar Homes
- Mill Direct Services
- Newmont
- Jamba Juice
- Java Jungle
- John Ascuaga’s Nugget
- K.G. Park Lines/Victor Gottschalk
- Brian Karsok
- Cathy Kiesecker
- Kate Kirkpatrick
- KNPB - Channel 5
- La Pinata
- Lake Shastina Golf
- Las Vegas Paiute Resort
- Legacy Golf Club
- Lionel Sawyer & Collins
- Cindy Littlefield
- Keith Lockard
- Los Trojes
- Louis Basque Corner
- Luciano’s
- Marble Slab Creamery
- John Marshall
- Charlene Martin
- Mason Valley Golf Club
- Doug Masselli
- McDonald’s/Tom McKennie
- Marty McGhin
- Regina Miller
- Mimi’s Café
- Claudia Miner
- Mission Car Wash
- Moana Nursery
- David Mollenberg
- MS Dixie Cruise
- Christopher Mulloy
- Napa Sonoma
- National Automobile Museum
- Paul Neeley
- Nevada Opera
- Nevada Shakespeare Festival
- Roger Norman
- Northgate Golf Course
- Oak Furniture Mart
- Oak Furniture Outlet
- Oasis Resort
- On the Border
- Outback Steakhouse
- Pam Parenti
- Gloria Parsons
- Payless Cleaners
- PDM Shell
- Peppermill Hotel Casino
- Pepsi
- PJ’s and Co.
- Playful Potter
- Plumas Pines Golf Course
- Ponderosa Ranch
- David H. Pooser
- Port of Subs
- Quinzi’s Subs
- Rail City Casino
- Red Robin Restaurant
- Red Hawk
- Red Hawk Golf Course
- Red Lobster
- Dave Reece
- Reno Gallery of Furniture
- Reno Hilton
- Reno Mattress Company
- Reno Vulcanizing
- Reno-Tahoe Golf Headquarters
- Dave Rhode
- Jim Romaggi
- Lycia Ronchetti
- Rosewood Lakes Golf Course
- Ruby River Steakhouse
Cablk is grateful to the University of Redlands for its year-long development of an intricate database design that tracks everything from where the tortoises were located, their measurements, sex and age, to which handler was with which dog and the weather conditions during the trials.

The glass ceiling for dog career choices may have just come crashing down with Cablk's research results. No longer are dogs limited to law enforcement, medical screening, pest detection and search-and-rescue.

The career field seems to be expanding to include conservation efforts for fellow animals.

—Heather Emmons

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Members of a history-making delegation of Russian and Mongolian government, academic and non-profit leaders, take time out for a group photo with DRI President Dr. Stephen G. Wells, center, and Assistant Research Professor Saxon Sharpe, far right.

DRI hosted the group for a tour and reception as part of a 10-day workshop called “Promoting Trans-boundary Water Cooperation in Russia and Mongolia’s Selenga River: Lessons in Regional Watershed Management.”

The workshop marked the first time officials from the two countries have worked cooperatively to protect the trans-boundary Baikal watershed since 2000, and it is the first time Lake Tahoe has been showcased to such high level delegates from Russia and Mongolia. The three countries came together to share lessons learned from Lake Tahoe to manage better Lake Baikal.

The workshop was aimed at identifying cooperative watershed management lessons that can be applied in the Lake Baikal watershed. The Baikal Basin is split between Russia and Mongolia and is roughly the size of France.

With a population of more than four million people, the region includes Lake Baikal, the world’s oldest, deepest and most voluminous freshwater lake.

The Tahoe-Baikal Institute, organizer of the workshop, focuses on achieving excellence in resource management toward the preservation of mountain lake watersheds around the world through the creation and support of innovative, multi-disciplinary watershed-based education, leadership and partnership development, international exchange and science-based research.

U.S. Sen. Harry Reid, D-Nev, made funding possible for DRI’s work with TBI and the delegates.
Since its inception in 1959, DRI has maintained a well-earned reputation for conducting effective world-class science in a business-like manner. With untenured faculty and the bulk of its revenues coming from contracts and grants won via competitive proposals, DRI is widely lauded not just for its leading-edge research but also for its entrepreneurial spirit. But art, well, that’s another matter.

Enter William T. “Ted” Hartwell, DRI associate research archaeologist, co-author of “Reading the stones: The archaeology of Yucca Mountain” and cellist extraordinaire for the Las Vegas Philharmonic Orchestra. His musical career in Las Vegas has seen him play supporting roles for luminaries such as Placido Domingo, Sarah Brightman and Andrea Bocelli.

But don’t expect the modest, soft-spoken Hartwell to trumpet these and other brushes with fame. “I’ve been lucky to have worked with some extremely talented people,” he says. Earlier in Texas, Hartwell also shared the spotlight with the likes of popular music legends Henry Mancini, Doc Severinsen and Carmen Dragon.

Hartwell’s life has always been centered on family, science and music. And, his musical pedigree is impeccable: his father was a voice teacher at Texas Tech for more than 30 years and his mother is pianist for the Spokane (Wash.) Symphony. “We always had music in the house, whether classical or popular,” he says. Love of music has been a constant in his life since before grade school when he took piano lessons at age 5.

He was “recruited” to the cello in the sixth grade by the beginning-orchestra teacher. “He said something like, ‘You’ve got the hands of a cello player. Wanna try it?’ So I did, and it didn’t take long for me to get hooked on it.” By the time he was a high school senior, Hartwell had joined the Lubbock Symphony Orchestra and soon thereafter began performing regularly in a string quartet made up of some of its top musicians.

At Texas Tech, where he earned a bachelor’s and a master’s degree in anthropology with an emphasis on archaeology, Hartwell’s interest in music remained unabated. He continued working with the Lubbock Symphony and was principal cellist with the Texas Tech University Orchestra. He also occasionally substituted for orchestras in Roswell (N.M), Spokane and Midland (Texas).

Despite all the musical activity, Hartwell says he decided early on that he didn’t want any strings attached when it came to his profession. “Music gives me a great deal of enjoyment, but it’s not how I want to make a living,” he says.

His passion for science led him to DRI in 1991. He worked on the Yucca Mountain cultural resources project mandated by the National Historic Preservation Act after the U.S. Department of Energy identified the site as a potential repository for long-term storage of spent nuclear fuel.

At Yucca Mountain, Hartwell helped identify and record a wide range of Native American artifacts. He says he was well prepared for the job. As a research assistant at Texas Tech, he conducted similar studies at the Lubbock Lake Landmark—a 350-acre state historic site along a tributary of the Brazos River—containing paleo-Indian deposits dating back 12,000 years.
Golden State’s climate data goes online

Public access to California climate data for research and government use is only a few clicks away at a new Web site launched earlier this year.

The climate data site can be accessed at www.calclim.dri.edu.

The California Climate, or CalClim, project is co-sponsored by the Desert Research Institute’s Western Regional Climate Center and Scripps Institution of Oceanography’s California Climate Change Center, which is funded by the California Energy Commission.

CalClim aims to make information available in a usable format and timely manner for the purpose of climate monitoring in California. Resources currently online include daily climate data available for download; summarized data; California Climate Watch, a monthly monitoring newsletter; and climate maps updated daily.

Future efforts will be made to identify key stations with long records and relatively high-quality sampling characteristics to use as baseline references in monitoring climate variability and change in the California region.

The California Climate Data Archive provides access to climate products and data download capabilities and will grow over the coming months. The first dataset made available is the daily National Weather Service Cooperative, or COOP. This network includes volunteer observers across the state as well as airports and other automated sites. In California alone, more than 500 active stations participate in the COOP network.

DRI’s Laura Edwards designed the CCDA Web site and is the editor of California Climate Watch.

“We hope this Web site offers a selection of information and products that appeals to a varied audience,” Edwards says. “We want to attract everyone from climatologists and university researchers to the average citizen who just wants to learn about climate in California.”

Other CalClim projects underway include collaboration with Scripps to develop an enhanced climate monitoring network and a data archive targeting coastal areas.

National Academy of Sciences names DRI president to advisory board

DRI President Dr. Stephen G. Wells has been named to the Board on Earth Sciences and Resources, a nationally prominent environmental advisory body to the National Academy of Sciences. Wells, a geomorphologist specializing in the evolution of arid land surfaces and soils as well as a noted environmental-policy scientist, will serve through 2006.

As advisors to the National Research Council—the chief operating agency of the National Academy of Sciences—the Earth sciences group provides independent counsel on scientific and technical questions of national importance. BESR is one of several committees in wide-ranging areas of science and technology providing expert advice to the NRC.

Established in 1988, the board is known as “the nation’s eyes, ears and voice for the Earth sciences.” It is considered a focal point for NRC activities related to research involving the environment, natural hazards, resources and education. The board works to combine technical analyses, peer review, testimony from the research community, policy makers and the public to ensure that the best scientific knowledge is available to decision-makers in government, academia and industry.

“I am deeply honored to be able to contribute to the board, which represents a critical intersection of science and policy,” Wells said.

More information on the Board on Earth Sciences and Resources can be found online at: http://www7.national-academies.org/besr/index.html.
A visit to the Advanced Computing in Environmental Sciences, or ACES, VisLab (see story on page 2) was the last stop on the senator’s tour. Here DRI atmospheric scientist Dr. Vanda Grubišić demonstrated the lab’s 3-D data visualization capability and discussed the benefits that will be derived from the lab’s collaborative network of high-end computer resources, support services and communication technology.

At a reception and lunch before the tour, DRI President Dr. Stephen G. Wells welcomed the senator and his staff, represented by John Lopez, deputy chief of staff; Verita Black Prothro, northern Nevada director; and Kevin Kirkeby, rural coordinator.

Wells thanked Ensign for his support of DRI and said his interest in science and commitment to DRI and Nevada have benefited the state and the entire world. He said the senator has been a long-standing champion of Nevada’s environment and its economy.

“When Senator Ensign was a congressman, he was the first in the House to recognize the need for an air quality study in Las Vegas. He also understood DRI’s capabilities in air quality research. He pushed this from day one,” Wells said.

As a result, Wells said, DRI scientists have been able to provide important information to air quality managers in the Las Vegas Valley.

In gratitude for his support, Wells presented Ensign with a photograph representing DRI’s desert terrain studies work, which was signed by faculty and staff.

Speaking off-the-cuff, Ensign said the day before he had met with Secretary of the Interior Gale Norton at a Lake Tahoe meeting, where he bragged to her about DRI.

“I appreciate the work that you all do here. I think you’re one of the bright spots for Nevada … You know, back in Washington, D.C., I brag about you all the time … I think it’s the spirit; you are the entrepreneurs of the scientific community. That’s really the way I look at you.”

Characterizing himself as a fiscal conservative inclined to cut programs, eliminate waste and put cash back in the taxpayer’s pocket, Ensign praised DRI for being credible and judicious in its use of funding. “DRI has never brought me anything that I couldn’t get enthusiastically behind and that is because of the people in this room and the work that you do.”

He credited DRI’s entrepreneurial culture as a key to its success. “You earn your way each year … I think it’s the reason you’ve been as successful as you have … and it’s the reason that it makes it very easy for me to get enthusiastic about supporting you.”

Ensign lauded DRI’s work, saying it is not difficult for DRI to convince him to help on projects.

—Ron Kalb