

## ▶ Up Close: An Interview With Dr. Ted Batchman, Dean

By Sara Lafrance



*Dr. Batchman came to the university in 1995 as Dean of the College of Engineering. During his tenure, the college has grown in size and stature and is today embarking on a new and exciting area that could add a new dimension to both the college and the university – the field of Renewable Energy. In an interview I conducted with Dr. Batchman earlier this month, he described his term as Dean and what he sees for the future.*

**How has the College of Engineering changed during the 13 years that you have served as its Dean?**

The college has grown tremendously. Research has increased four times, student enrollment has grown by 50%, and academically there are many additional programs that did not exist when I first arrived, including Computer Engineering and Digital Game Engineering, the Computer Science Department (which joined the college in July 1995), the Chemical Engineering and Material Science and Engineering Department (which joined in July 2003), and Biomedical Engineering (which joined the college in 2004).

**Are the students different today than they were 13 years ago?**

Yes they are. Through the years we have successfully worked towards recruiting better qualified students. The Millennium Scholarship definitely contributed to these efforts. In addition, the complexion of our student body has changed. Thirteen years ago 50% of our students were working, many 40 hours a week or more. Today the vast majority are attending full time and reside on or near the campus rather than commuting.

Technology has also made a big difference. Thirteen years ago we had one computing lab with less than 20 working computers of the 286/386 variety. Today there are over 100 with state-of-the-art equipment and the latest engineering software. The students using them are extremely computer literate and use them on a daily basis for solving problems.

There no longer is interest in technology purely for technology sake, but as a way to help people. There is definitely a more broader, social conscience.

**How would you compare recruitment and retention over the years?**

For many years, education in engineering operated like the Marine Corps, in which it subscribed to the belief that only the best should survive. This has changed. The major focus now is on trying not to weed out but do a better job helping the students learn engineering concepts and problem solving skills. It is not unlike an industrial process – if you throw away 2/3 of your raw materials, you have a very expensive, non-productive process.

In addition, we do a great deal more mentoring. There are supplemental instructors for math and science. And we subscribe to the use of project based learning, wherein a student’s class lectures are supplemented by projects, enabling them to learn by doing.

Another trend is developing engineering education programs to both improve the skills of teachers as well as give them a better understanding of how students learn subjects such as math and science.

**What about advisement? Are there new directions today?**

Advisement used to be done by one person who worked only with freshmen and transfer students. Today we focus on the full spectrum of a student’s education. One of our tools is a software package that indicates where students are in relation to their program, how they are doing, what classes they need, and what they need to take next. We keep better track of the individual, intervene early, and encourage them to seek help. It is a much more intensive process that is focused on student success.

### Inside this issue

Dean’s Message	2
Advisory Board Message	2
K-12 Outreach News	3
Chemical & Metallurgical Engineering News	4
Civil & Environmental Engineering News	5
Computer Science & Engineering News	8
Electrical & Biomedical Engineering News	10
Mechanical Engineering News	11
Future City Contest	14
SWE News	14
James Graves Scroggum Medal Award	15
Alumni News	16
Memoriam	17
Spring Calendar	20

Continued on Page 20

## Message From The Dean

This will be my final article in the College of Engineering Newsletter. As many of you already know, I will be stepping down as dean of the college June 30, 2008, after thirteen years. Next year I will be on a development leave and then will return to teaching. During my development leave I will focus on building a renewable energy program for the college at the Redfield campus. I plan on retiring when I am seventy so the next two years will conclude my tenure here at Nevada. It has been a wonderful opportunity for me to be in a leadership position in the college during this period of growth.

Looking back over my tenure here it has been a period of many changes due in part to the growth in our programs. Our undergraduate student body has grown from 871 students in the fall of 1995 to 1321 students in the fall of 2007. Our graduate student enrollment has likewise grown from 220 students to 297 in this same period of time. What is most impressive is the work of our faculty in building a major research program. Our research awards have grown from \$3.8 million to \$15.7 million in this same period of time. The college development team has increased our undergraduate student scholarship endowments and annual giving awards eight fold during this same period. We now award over \$300,000 in student scholarships. Our focus on National Merit Scholars brought in three new scholars this past fall which was thirty percent of the total for the University. In addition, we have added new programs in environmental engineering, game engineering and renewable energy. The Chemical Engineering and Materials Science and Engineering department also joined the college. All of this has been accomplished because of the team effort with the dedicated faculty, chairs, staff and administrators in the College of Engineering.

We have also developed very active outreach programs in the K-12 arena. Our Mobile Engineering Education Laboratory MEEL (ME<sup>2</sup>L) has successfully reached many K-12 students in the Reno area with the fun and excitement of engineering. We initiated our engineering summer camps as part of the Hewlett Foundation grant. The week long camps in areas such as earthquake engineering, electronics, and geotechnical engineering usually attract more than seventy five students. The dean's office and our faculty have been active with the Economic Development Authority of Western Nevada (EDAWN) to help recruit companies to this area. Our Advisory Board has grown in numbers and support for the college. They have supported us through educating the state legislature, the administration and local industry on the importance of a strong engineering program to the state economy.

The consequence of this growth has been the lack of funding to grow our faculty proportional to the student and research funding growth. We have also outgrown our facilities and have reached a critical point in being able to accommodate the research programs which our faculty have so successfully built.

What does the future hold for the college? A search has been started for a new dean with the goal of filling this position in 2008. This is an opportunity for change and for building on the solid foundation established for our engineering programs. The new dean will have to work with the administration, alumni, and the state to provide the facilities and faculty to sustain this growth. I hope that all of our faculty, alumni and friends will support the new dean as s/he joins the college and continues to build on the accomplishments of the past decade.

I hope to work with many of you in my new role in renewable energy and would invite you to stop by and visit with me.



### College of Engineering Advisory Board

It was with great pleasure I learned this week that the College of Engineering had been selected for a community award entitled "Best K-16 Direction" for its Mobile Engineering Laboratory and Summer Engineering Camps. The recognition came from The Education Collaborative, an influential, non-profit organization, governed by an active 25-member community Board of Directors, of which 51% represent the Reno/Sparks private sector. The College will receive its award at the Silver Legacy on February 27, with about 500 community leaders and educators present. Being a recipient is truly an honor.

It is also reflective of the efforts of many in the College, especially the leadership and vision of the Dean. And so, hearing of this award brought my thoughts to Dean Batchman, and the fact he will be moving on to a new assignment in the next academic year.

Dean Batchman has served the College of Engineering for the last 13 years. During that time, it has grown stronger, more diversified, and better recognized for its education and research. He is leaving a legacy that will long endure.

The Dean's new assignment, providing developmental leadership at the Redfield Campus' new Renewable Energy Center, has the potential to bring both Engineering and the University a position of prominence in this exciting, newly developing field. It is certain that he is the right person to bring this vision into fruition.

We wish the Dean well in his new assignment. We will truly miss him!

*Sara LaFrance, Chair, College Advisory Board*



## K-12 Outreach News

### Engineering: now with a fresh new lemon scent

#### Mobile lab brings hands-on experience to thousands of middle school students

On a recent cold winter day, 64 fourth-graders fidgeted in the auditorium of Robert Mitchell Elementary School in Sparks. But as soon as they were handed an engineering magazine called, "Go for it!" the fidgeting stopped and the page-turning began.

The publication is filled with the feats and inventions of engineers around the world. Roller coasters, robots, lasers, laptops, iPhones and Super Soakers are just a few examples of what engineers design. It's an introduction to engineering for most students, and it's brought to them by the Mobile Engineering Education Lab (ME2L) from the College of Engineering.

"On average, we visit approximately 200 students a week," Debbie Delauer, the K-12 outreach coordinator for the College said. "We've had great response from principals and teachers, and they often say they're very excited to have more science in the schools, as it seems to have slipped in the priorities of the curriculum."

The ME2L is not a new program. But two years ago, the sturdy white van made too few visits because of too few dollars. Fortunately, the Mallory Foundation understood this and provided major funding for a part-time coordinator of K-12 outreach at the College.

The new coordinator and funding helped kick-start a broader program. Along with the Mallory Foundation, Forbes & Dunagan, MSA Engineering, Gabbart & Woods and Meridian Gold pitched in to keep the mobile lab going so it can make the rounds of Washoe County elementary schools. Delauer and mechanical engineering student Callie Henderson believe they'll visit several thousand students before the end of the year. Henderson begins each session by asking the students what they think engineers do.

"They make things!" one student shouts, while another describes the profession as "solving problems." Henderson patiently runs through a list of different types of engineers and shows some photos of engineering marvels like the Golden Gate Bridge, the space shuttle and the Dubai towers.

"Many of these students start out thinking engineers are just people who drive trains," Henderson said. "So it's fun to show them the huge variety of projects and 'cool' things that different kinds of engineers actually do."

After the presentation, it's time for the hands-on experience ME2L can provide. Delauer and Henderson go classroom to classroom, hauling supplies of lemons, pennies, nails, voltage meters and K'NEX construction kits. In Mrs. Gray's fourth-grade class, Henderson explains electrons and conductors and the kids form small groups to see how their lemons can conduct electricity.

The scent of the lemons fills the small room as the students stick a nail, the negative pole, in one end of the fruit and a penny, the positive pole, in the other. The chemical reaction of the acid in the lemons causes the electrons to flow through the metals, and the kids use their voltage meters to gauge the amount of electricity produced by their endeavors.

"Your job right now is to gain knowledge," Delauer tells the class. "College may seem far away, but it's really not, so I want you to think about all the opportunities that are out there for engineers and really concentrate on your math and science lessons."



A former elementary school teacher herself, Delauer believes bringing the lab to the students not only allows them the hands on experience, but also lets them see and talk with people in the engineering field.

"Engineers are in high demand and the diversity of the profession provides a lot of opportunities. Hopefully, the children we're visiting with this program will be encouraged and curious, and then who knows? We just might have a significant increase in engineering students at the University who were inspired or influenced by these basic but fun experiments."

By Sue Putnam



Callie Henderson with the ME2L

#### Summer Engineering Camps 2008

Intro Camp, University Campus—June 16-20

Intro Camp, WNC (Carson City) Campus—June 23-27

*(recommended ages for intro camps: 12-14)*

Electrical Engineering, University Campus—June 23-27

Environmental Engineering, University Campus—July 7-11

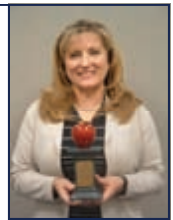
Earthquake Engineering, University Campus—July 14-18

Geotechnical Engineering, University Campus—July 21-25

*(recommended ages for subject camps: 13-17)*

**If you would like more information on the summer camps, please contact Debbie Delauer on 327-2256.**

The College of Engineering was selected to receive an "EC Award". The Education Collaborative of Washoe County presented the third "EC Awards" on February 27th, which was hosted by Brent Boynton and Terri Hendry. Our college was selected the winner in the category of "Best K-16 Direction". Well done everyone, especially Debbie Delauer, our K-12 Outreach Coordinator, who works so hard to get the message out about the college to the community.



## Chemical and Metallurgical Engineering

Maurice C. Fuerstenau, Professor & Interim Chair

### Chemical Engineering

The Chemical Engineering Senior Design class is continuing three successful collaborations this year with Genetech Corporation, NASA Ames, and Sierra Nevada Brewery. The Genetech project relates to production of a biopharmaceutical product, called Lucentis, which is used to treat macular degeneration of the eye. The NASA project involves the large scale manufacture of single wall carbon nanotubes. These materials, used for semiconductor and other applications, will be prepared in a fluidized bed reactor. The Sierra Nevada Brewery project is the development of a new Wheatbeer. The fluid dynamics in the fermentor are being analyzed as part of a process development study. In addition, an environmental part of the project is being done to pretreat the yeast waste stream for processing by an anaerobic digester which produces methane for a fuel cell.

### Materials Science and Engineering

Professor Olivia A. Graeve was awarded a National Science Foundation CAREER Award, the most prestigious award given to junior faculty members. Her award was granted for her work on the processing and mechanical properties of nanostructured refractory ceramics.

Professor Graeve has been involved in many activities related to the recruitment and retention of women and Hispanic students in science and engineering. She was awarded the Hispanic Educator of the Year Award by the Society of Hispanic Professional Engineers.

### Student Teams— University Rover Challenge

Students were awarded first place in the inaugural URC competition at the 10th International Mars Society Convention in Los Angeles, which was held August 30-September 2. This involved an interdisciplinary science and engineering team that designed, built, and operated a robot to investigate the surface of Mars (simulated in Utah on June 1st and 2nd). The 2007 URC was recently featured on the Daily Planet on the Discovery Channel, Canada and is gaining visibility worldwide as a premier event for the best engineering and science talent entering the space workforce.

### Student Teams—Materials Structures

Two student teams from Materials Science & Engineering took first and second place in the Smart Electronic Area of the 2007 Materials Design Competition sponsored by the American Association of Textile Chemists and Colorists. The theme of this past year's competition was 'Design Materials Structures.' Both student teams were part of the senior design course taught by Dr. Misra. The first place team consisted of Brett Pearson, Daniel Peterson, and Michael Saterlie. The design was CZT Nanowire Arrays for radiation detection. The team project involved a handheld sensor that detects radiation. It can be used in airports and other homeland security concerns. The second place team designed Li-Ion Nano Batteries which can be used in electric cars. Team members were Bradley Drake, Hinola Kasuhara and Whip Thompson.



## Alternative Energy Research



### Hydrogen Generation from Water

Dr. Manoranjan Misra, Professor of Materials Science and Engineering, has been awarded a \$3 million contract by the Department of Energy to continue his research on hydrogen generation from water utilizing

sunlight. He and his group have developed a novel photo electrochemical cell which consists of a photo anode containing ordered arrays of band gap engineered  $\text{TiO}_2$  nanotubes in combination with a  $\text{TiO}_2$  nanotubular template loaded with Pt nano particles as cathode. This cathodic arrangement contains considerably less Pt than a conventional Pt cathode, shows better catalytic behavior, and exhibits better charge transportation properties. Hydrogen is one of the cleanest forms of energy, and studies have shown that it is 33 percent more efficient than liquid fuels.

### Waste Biomass to Energy

Dr. Charles Coronella and Victor Vazquez, Associate Professors of Chemical Engineering, are working on conversion of biomass to energy. In one project funded by the California Energy Commission, wastewater sludge is dried to produce a high value fuel, with energy content similar to wood. The synthetic fuel gas (syngas) can be burned in a turbine to generate renewable electricity. On another project they are developing a hydrothermal pretreatment process to prepare cellulosic biomass (wood, wheat straw, cheat grass, and rice hulls) for thermal conversion to produce an intermediate biomass feedstock. The pretreated biomass can then be fed into a gasifier using a simple cost-effective solids feeder. A prototype is expected to be built for demonstration in 2010. The project is funded (\$500,000) by the U. S. Department of Energy in collaboration with the Desert Research Institute and the Gas Technology Institute.



## Civil and Environmental Engineering Department News

E. Manos Maragakis, Professor & Chair

The Department of Civil and Environmental Engineering continued its pursuit of excellence in the areas of teaching, research and service during the 2007-2008 academic year. There are two ABET accredited undergraduate programs/degrees available in the department: a traditional civil engineering degree and an environmental engineering degree. Both degrees are well planned to offer our undergraduates the broad based state-of-the-art education necessary to successfully compete for employment or advanced graduate degrees in the new millennium. In collaboration with AGC, the department continued to offer post-baccalaureate degrees in Construction Engineering and Construction Management.

The department is continuing to experience a high level of enrollment in the undergraduate programs with over 340 students. At the same time, we continue to be one of the leading departments in the university in terms of research productivity. Our graduate programs, which lead to M.S. and Ph.D. degrees, continued their growth and enhancement of their international reputation. Last year our faculty brought almost \$10m new research awards and had over \$4m in research expenditures. About 95 M.S. and 18 Ph.D. students are pursuing their graduate degrees. Our graduate research is funded through high profile research grants that provide our graduates with financial support throughout their studies and the opportunity to work on well known projects using state-of-the-art equipment. At the same time, they give our undergraduates the opportunity to be supported while they participate in some of these research projects, an experience that contributes tremendously to the enhancement of their knowledge.

Most noticeable this year are the NEESR-NSF funded Grant Challenge project on the seismic performance of nonstructural systems; the FHWA-funded project on the seismic response of curved bridges; and the project on the recycling of asphalt pavements funded by the National Consortium of the Asphalt Research Program. At the same time our nearly established Transportation Engineering Program and the Environmental Engineering Program continued their funding success with new local and national projects.

In addition to the rigorous academic programs, our students are given opportunities to participate in a variety of activities and regional or national competitions through our ASCE/AGC student chapter. The Concrete Canoe team did a fantastic job finishing 3rd in the national competition. All of our internationally recognized faculty consider their graduate and undergraduate teaching as one of their top priorities. They also make a special effort to serve the profession by offering their services at the local, national and international levels. These services vary from participation to international committees, boards and review panels offering of short-courses to local engineers.

The department offers five different areas of specialization: Environmental, Geotechnical, Pavements/Materials, Structural and Transportation Engineering. Faculty and staff are committed to continue our efforts to further enhance our activities in all of these areas, in order to improve the reputation of our department and serve better our students, the university, the state and the nation.

## The Pavements Materials Program

Part of a National Consortium



The Pavements/Materials Program at the Department of Civil and Environmental Engineering is a member of the Asphalt Research Program (with Western Research Institute, University of Wisconsin, Texas A&M University, and Advanced Asphalt Technologies) that was funded through the recent Highway Bill. Dr. Peter E. Sebaaly is the principal investigator for the university part of the Consortium. Drs. Elie Hajj, Raj Siddharthan and George Fernandez will cooperate on the various parts of the Consortium activities. Under the current budget, the Highway Bill will provide \$5.4 million over 5-years in research funds to the Pavements/Materials Program at the university. The Nevada DOT and Granite Construction are the local partners of the Consortium. The Asphalt Research Consortium contract will run from 2006 to 2011.

As part of the Consortium activities, the Pavements/Materials Program will conduct research in the areas of: recycling of asphalt pavements, designing asphalt pavements to resist heavy loads, and improving the thermal behavior of asphalt pavements. The research activities of the Consortium at the university will fund numerous faculty members and 10-15 graduate students/semester. Several M.S. and Ph.D. students will work on research topics to improve the overall durability and long-term performance of asphalt pavements throughout the world. For more information on the Asphalt Research Consortium, check [www.ARC.UNR.edu](http://www.ARC.UNR.edu).



## Civil Engineers Take Momentum To National Competition

By Sue Putnam



Despite a collision at the end of one race, the 3,500 hours of labor paid off for the University's Concrete Canoe Team in the 2007 American Society of Civil Engineers Mid-Pacific Regional Conference.

The student-built concrete canoe was judged in four categories: overall appearance, technical design paper, oral presentation and paddling. The team placed first in three of the four categories, took second overall in racing and will go to the national competition in June at the University of Washington.

"Our success was due to the culmination of three years of combined technical and construction-based expertise," project manager Nick Maxon said. "We are incredibly strong academically this year, both in the design paper and in the business presentation. Our canoe is among the top five in the nation aesthetically and paddling is very

competitive as well. By being so well rounded, we nearly swept all the areas in the competition."

The University did not have a concrete canoe program for seven years before starting a comeback in 2005. In 2006, the team placed second in their region, qualifying for the national competition for the first time in school history. This year, the team has accomplished an amazing feat by beating UC Berkeley, one of the most statistically competitive teams in the nation.

So besides the facts that this concrete canoe, christened the Cerulean, weighs 175 pounds, has walls that are a half-inch thick and is made of white concrete with a blue acid stain, what makes the 2007 model so special?

"Our hull design this year gives us incredible straight line speed without sacrificing stability or turning," Maxon said. "Additionally, the use of two layers of carbon fiber reinforcement and sixteen pre-stress tendons, each jacked to 285 pounds, gives us the strength necessary to have a durable canoe ready to withstand the rigors of competition. As shown by our collision with Berkeley, the minimal damage sustained is a testament to the composite strength of Cerulean."

Maxon credits team members Chad Lyttle and Adam McNutt, the students responsible for the construction of Cerulean, for the boat's durability. Corbin McFarlane, another civil engineering graduate student, developed the hull design and helped co-write the design paper as well. And Doyle was instrumental ensuring the mix design, presentation materials and displays were among the best in the nation. All of those elements became even more important when the collision occurred.

Just at the end of the co-ed race as the Berkeley canoe and the Cerulean paddled across the finish line, they ran into each other. Unfortunately, Berkeley's canoe sustained significant damage as Cerulean punctured a hole in the side of Bear Force One. But it was the last race and both teams took responsibility for the accident.

Michael Taylor, an engineering graduate research student who developed the analysis, co-managed the mix design and also developed the design paper said the Nevada canoe has proven it's durability. He can even provide the answer to why concrete floats.

"The concrete is 11 percent less dense than water, yielding a canoe that is naturally buoyant," Taylor said. "Due to pre-stressing, the canoe has 4,300 lbs of compressive force applied. Now, there are currently no techniques for predicting the turning ability of a canoe, but we developed a method to help improve our hull designs. The concrete mix features 14 unique ingredients which gives it impressive strength and weight properties."

Taylor said the team developed an innovative construction technique where the concrete and reinforcement were cast in a single layer. Canoes are normally cast in several alternating layers of concrete and reinforcement.

The conference also included the steel bridge category, the mead paper competition, and side contests for fun, such as concrete bowling, tug-o-war, and beach volleyball. The side competitions were used to rate each team's spirit and participation. Although the steel bridge did not meet specifications, Nevada placed second in tug-o-war, first in volleyball, first in concrete bowling, first in spirit and first overall in the Mid-Pac.

But besides the fun, the spirit and the entertainment, the canoe seems to build engineers with a power all its own.

This year's conference began on April 26 at Santa Clara University and was co-hosted by San Jose State University. The Mid-Pacific region consists of: Berkeley, Chico State, Fresno State, Sacramento State, San Francisco State, San Jose State, Santa Clara University, the UC, Davis, and the University of Nevada, Reno.

The Cerulean team represented northern Nevada and northern California in the National Concrete Canoe competition June 14-16, at the University of Washington and won third place overall in the nation

### At a Glance:

**2007 Canoe Name:** Cerulean

**Students involved:** Nick Maxon, project manager | Christine Harms, assistant project manager | Michael Taylor, graduate student adviser  
Kelly Doyle, mix design engineer | Adam McNutt, construction engineer | Corbin McFarlane, hull design engineer | Bryan Truce, paddling coach | Brian Fitzgerald | Kara Bymers | Brittany Miller | Dale Keller | Tarin Strickler | Matt Savage



## University Receives \$3.6 Million For Seismic Study

By Sue Putnam

The National Science Foundation has awarded the College of Engineering a \$3.6 million Grand Challenge grant to study the seismic performance of nonstructural systems.

Nonstructural systems represent 75 percent of the value of typical buildings that are exposed to earthquakes in the U.S. Among the various nonstructural systems, ceiling-piping-partition systems are widely used in many types of buildings and represent a major portion of nonstructural earthquake vulnerability, according to the project director, E. "Manos" Maragakis, who is also a professor and chair of Civil & Environmental Engineering at the University.

"This Grand Challenge project will integrate multidisciplinary, system-level studies for the first time to develop a simulation capability and implementation process for enhancing the seismic performance of the ceiling-piping-partition system," Maragakis said. "We'll develop an innovative test-bed structure that will be 64 feet long, 26 feet high and 14 feet wide. Then, we'll place it on the three shake tables in the Rogers and Weiner Large Scales Structures Laboratory."

Maragakis and the team of researchers will suspend a variety of ceiling-piping-partition systems that will be subjected to conditions simulating high intensity earthquakes. University researchers include Ahmad Itani and Gokhan Pekcan from Civil & Environmental Engineering and Jacque Ewing-Taylor from the College of Education.

## Civil Engineers Scout Out Accident Hazards To Make Roads Safer

Zong Tian wants to find ways to help reduce the frequency of car accidents at some of the dangerous intersections throughout the Truckee Meadows. An assistant professor of civil engineering at the University, he heads the campus' Traffic Safety Research Project employing "safety surrogates." The Nevada Department of Transportation (NDOT) sponsors the initiative. The project identifies several potentially hazardous or high-accident roadway locations in the Reno-Sparks area. In Nevada, there are 400 traffic deaths every year, making motor vehicle accidents one of the leading causes of death in the state.

Lynwood "L.J." Johnson, a graduate research assistant in the civil and environmental engineering department, is part of Tian's team. According to Johnson, the safety surrogates' goal is to find ways to predict where an accident is going to happen.

"The current system looks at accident records and tries to predict problems," Johnson said. "The problem with this is that they wait three years for 20 accidents and then have to wait longer to do something about it. We aim to find low-cost ways to predict a dangerous location before we get 20 accidents."



By Adrienne Goetz

## Civil Engineering Department Awarded \$4.1 Million For Curved Bridge Study

Dr. Ian Buckle, Professor of Civil and Environmental Engineering and Director of the Center for Civil Engineering Earthquake Research, was recently awarded a \$4.1 M research contract by the Federal Highway Administration (FHWA). The principal objective of this Project is to advance fundamental knowledge in the seismic performance of bridges and develop guidelines for improving the resilience of highway systems subject to damaging earthquakes.

During this Project (1) a comprehensive assessment tool will be developed to measure highway resilience by improving current loss estimation technologies, such as the REDARS software tool (Risks from Earthquake Damage to Roadway System); (2) factors affecting system resilience will be identified such as damage-tolerant bridge structures and network redundancy; (3) design aids for curved bridges and those structures in near-fault regions will be developed; (4) new technologies will be developed for improving the seismic performance of bridges; (5) methodologies and technologies developed herein will be implemented in REDARS; and (6) outreach to improve seismic safety will be conducted.

One of the highlights of the Project will be the study of curved bridges. There are a growing number of bridges on curved alignments throughout the U.S. and little is known about their seismic behavior. As a result, large-scale experiments on a highly curved bridge will be undertaken to investigate load path in the superstructure, column behavior, abutment interaction (pounding), and the effectiveness of response modification devices, self-centering substructures, and rocking columns. The bridge will be a half-scale model of a three-span, steel girder bridge, and span four shake tables. The model will have a total length of 145 ft., a length-to-radius ratio of 1.98 and a subtended angle of 113°. The ultimate aim is to develop a set of seismic design guidelines for this type of bridge. A secondary aim is to develop a set fragility functions for curved bridges for use in REDARS



## Computer Science and Engineering Department News

Sushil Louis, Professor & Interim Chair



The Department of Computer Science and Engineering has achieved several significant milestones in research, teaching, and service. In research, we received or are working on grants from the National Science Foundation, the Office of Naval Research, the National Aeronautics and Space Administration, the State, and Industry. These grants enabled us to invest in new equipment, support several postdoctoral and graduate research fellows, as well as undergraduates, greatly increasing our research output and industry-academia cooperation. This translates into better national and international recognition. Working with local industry, the Third UNR-IGT symposium attracted internationally well known speakers and was attended by a large diverse group of engineers and scientists from IGT and the university. The third International Symposium on Visual Computing organized by our

Computer Vision research group continues to attract top scientists in the field to our area.

These research efforts strongly enhance our existing, accredited undergraduate programs in computer science and computer information engineering. The Department's internationally recognized faculty bring their research into the classroom considerably enhancing students' classroom experience with state of the art equipment and exposure to the latest technical advances. In addition, our faculty applied for, and were awarded several grants that enhanced instruction. We have established a new minor in Digital Interactive Games and are in the process of proposing a new gaming-related major. If approved, this new major will bring national prominence in a rapidly developing area (of special interest to local industry) and potentially increase undergraduate and graduate enrollment. Local and national employers will benefit.

There were several significant events in which students, faculty, and staff were highlighted. A student team was awarded a \$10,000 governor's cup prize for their business plan, the annual senior projects presentations and departmental open house were well attended, and the annual video game party lasted well into the night!

### Contract-Switching: Value Flows and Risk Management Architecture for Future Internet

The National Science Foundation grants UNR to shift the Internet's architectural paradigm in order to offer end-to-end quality-of-service. The University's Murat Yuksel, the leading principal investigator for the grant, an assistant professor of computer science and engineering, said that the project will investigate ways of shifting the current "packet-switching" architecture to a new paradigm called "contract-switching". The project, which includes Aparna Gupta and Koushik Kar of Rensselaer Polytechnic Institute, is funded under NSF's new initiative called Future Internet Design (FIND). The initiative brings together the Nation's top institutions and researchers to design a clean-slate design for the Internet of 15+ years from now.

"The current architecture is very good at providing a singleton "best-effort" service, but falls behind in satisfying performance expectations of user applications such as video, games, and telemetry," the assistant professor said. "The impediment is not because the "packet-switching" architecture is bad, but rather due to the fact that ISPs forward the packets as "hot potatoes", trying to give them to the next ISP as fast as possible. This kind of operation is driven by business relationships and policies among ISPs and cannot be addressed only by "packet-switching". Our new paradigm of "contract-switching" will revolutionize the OSP relationships by embedding contracting into the inter-domain routing protocols, which we call "contract routing". Such a new paradigm of inter-domain relationships will enable end-to-end contract compositions leading to performance assurances across several domains, instead of bets being off when crossing into other domains".

"A key capability contract-switching will enable users to switch their value choices while enabling ISPs to participate in end-to-end contracting thereby able to better manage the risks involved in investments. This means better service to users with more varieties than a singleton service, and more revenue to the ISPs," Yuksel adds.

More information about the project is available through its website: <http://www.cse.unr.edu/~yukse/contract-switching.htm>.

### AAAI Conference

Assistant Professor Bobby D. Bryant of Computer Science and Engineering, presented the paper "Acquiring Visibly Intelligent Behavior with Example-Guided Neuroevolution" at the National Conference on Artificial Intelligence (AAAI-07) in July. The paper demonstrated a mechanism for using human-generated examples of behavior to guide training of agent controllers with neuroevolution, which is the use of evolutionary algorithms to train artificial neural networks. The resulting controllers operate by mapping the agent's sensory inputs onto its controller outputs. Such methods promise to allow subject matter experts to inject their knowledge directly into a simulation without a need for the lengthy and expensive procedures for knowledge engineering traditionally used to acquire subject matter expertise and incorporate it into an artificial system. Progress in this area will reduce the cost of simulating autonomous agents in applications ranging from games to training simulators, and will provide faster turnaround whenever it is determined that a new behavior needs to be modeled.

AAAI is the world's premier conference for all areas of work in artificial intelligence. However, the biologically inspired methods such as those Dr. Bryant used in this work have traditionally been underrepresented at the conference. The work was done in conjunction with Dr. Bryant's former thesis advisor, Risto Miikkulainen of the University of Texas at Austin.



## Folmer Believes A Virtual World Doesn't Have to be a Visual One

By Sue Putnam



*Eelke Folmer, an assistant professor of computer science and engineering, is the first researcher to receive an NSF grant for gaming accessibility. He will try to make the online game Second Life accessible for the blind.*

He's not big on paper.

It's not that the work of Eelke Folmer, an assistant professor of computer science and engineering, isn't impressive or ambitious or even paper-worthy. It's just that other than seven mini-Post-Its, there's no paper visible anywhere in his office. Not even the one that shows he recently received a \$90,448 grant from the National Science Foundation.

"We are the first ever to get a grant in gaming accessibility from the NSF," Folmer said quietly. "We're working with a massive multiplayer online game that can potentially offer opportunities for social interactions regardless of disabilities."

Folmer cites the present lack of computer games that can be played by people who are unable to see or use a mouse. His work is designed to help cognitive and physically disabled people enjoy the socialization and just the pure fun of multiplayer games. This particular NSF grant will primarily help with accessibility for the blind.

"Our goal is to improve the quality of life for millions of people with disabilities and gaming is a part of that," he said. "I'm developing a prototype client for the massive multiplayer virtual world called 'Second Life' that offers a basic level of accessibility for the blind."

Second Life is a 3-D virtual world built and owned entirely by its "residents." Since it began in 2003, it has grown dramatically and today is "inhabited" by a more than nine million players from around the world. Folmer's prototype client will initially allow blind players to navigate the environment using voice commands alone. It will then be enhanced and extended to enable players to interact with other players.

"We hope to raise the awareness of game developers so they see that not only is there a market here for them, but that it is really part of their obligation to make these games accessible," Folmer said as he navigated a game prototype on a Sony flat screen TV. "Modern controls have close to 30 buttons on them, and we want to reduce that interaction to perhaps a one-button shooter for people with disabilities. In the case of blind players, there is a lot we can do with audio cues so that it's still fun to play."

Achieving these goals won't be easy, in part because the client and the server of Second Life have only recently been made as open source code and no one has yet attempted to create an accessible client for the environment. In other words, Folmer has to figure out how to extract relevant information from the game's environment in order to provide meaningful output for the player.

"It's exciting because in many ways Nevada is on the cutting edge of computer science engineering," Folmer said. "And we will try to leverage the technology to other massive multiplayer online games and games in general. Voice navigation can make 3-D adventure games accessible to physically disabled players, which will enable future games to be developed in an inclusive way for the benefit of all players."

## Grant Projects

### **FSO-MANETs: Free-Space-Optical Mobile Ad-hoc Networks, Murat Yuksel, \$498K, September 2007—August 2010**

This new project explores the potential usage of free-space-optics (FSO) communication in the context of very-high-speed mobile ad-hoc and opportunistic networking. Mobile ad-hoc communication is starting to find real-world applications beyond its military origins, in areas such as vehicular communications and delay tolerant networking. As the radio frequency (RF) spectrum is getting saturated by recent advances in wireless communications, enabling optical spectrum in wireless communications is the needed revolution for ultra-high-speed mobile ad-hoc networks (MANETs) of the future. The project, which includes Mona Hella and Shivkumar Kalyanaraman of Rensselaer Polytechnic Institute, is funded under NSF's Networking Technologies and Systems (NeTS) program.

This project introduces basic building blocks for MANETs using FSO and prototypes multi-hop high-capacity FSO building blocks and protocols operating under high mobility. 3-d spherical structures covered with inexpensive FSO transceivers (e.g. VCSEL and photo-detector pair) solve issues relevant to mobility and line-of-sight (LOS) management via availability of several transceivers per node. Such structures facilitate electronic LOS tracking (i.e., "electronic steering") methods instead of traditional *mechanical steering* techniques used with very expensive long-range FSO devices like lasers. Results of this research can revolutionize the MANET technologies by enabling optical spectrum in addition to RF. FSOI has been used at high-altitude communications, and this project enables FSO communications at lower-altitudes and in ad-hoc settings. This research will provide a new application for solid-state lighting technology as well, due to potential integration of illumination and communication functions. Other impact areas include: sensor networks, peer-to-peer networks leveraging directional overlay protocols, and military wireless applications such as UAV/aircraft airborne networks and inter-ship communications.

### **Office of Naval Research, "Understanding Intent Using a Novel Hidden Markov Model Representation", Monica Nicolescu, Mircea Nicolescu, \$619,584, June 2006—May 2009**

Understanding intent is a critical aspect of communication among people and for many biological systems. This is particularly important in situations that involve collaboration among multiple agents or assessment of potential threats. During the recent years, there has been an increased interest in using robotic technologies for security and defense applications, in order to reduce the danger for the people involved.

However, the current systems deployed by the US Army (e.g., Hermes) and the US Air Force (e.g., MDARS) rely heavily on input from a human operator who assesses the situation and takes a decision. Thus, in the context of these applications, being able to automatically detect any threatening situations is of critical importance. This reduces to the problem of understanding the intent of the other agents in the environment, from their current actions, before any attack strategies are finalized. Toward this end, the main research problems addressed in this project are to: 1) develop a tool for modeling the behavior of relevant agents (people, robots, boats), which incorporates the predictive capabilities necessary to infer those agents' intentions, and 2) develop novel vision-based techniques for target detection and tracking, which provide essential sensory information to the modeling engine.



## Electrical and Biomedical Engineering Department News

Nelson Publicover, Professor & Chair

The department of Electrical and Biomedical Engineering is continuing its efforts to expand research focal areas in the fields of biomedical engineering and renewable energy. The first of three faculty hires has been made with Yantao Shen, an expert in various types of bioinstrumentation. Two additional hires (one each in the areas of biomedical engineering and renewable energy) are currently pending.

There have been a number of outstanding design projects and business plans developed by students and student groups. Some of these activities received continuing financial support from the Lemmelson Foundation. The Foundation has been supporting activities stressing innovation and entrepreneurship in the College of Engineering and nationwide for the past 6 years.

The department hosted on campus and utilizing facilities at Lake Tahoe, a national conference on electrical communications and cyber systems. Jim Henson and Nelson Publicover were the local organizers for the meeting involving 140 scientists and National Science Foundation (NSF) administrators from across the Country. Jim also directed two sessions where future directions of communications/cyber systems, the scientific review process and the NSF as a whole were discussed.

Supported by a wide range of federal agencies, research activities in the department involve a number of areas including bioelectromagnetics, biosensors, communications, electronics design, environmental monitoring, plume formation monitoring, power conversion, and alternative sources of energy. Faculty members and students in the department also continue to interact with the local community including with the power company, and both large and small R&D firms.

### Student News

William Davison, Jr., an electrical engineering senior, won the first place award for his design titled "Ultimate Ref- Hardware Layout, Menu Software, and Electronic Design" at the IEEE Region 6, Central Area meeting in Chico, CA on April 28, 2007. William's project involved design and manufacturing of a printed circuit board on a top of a flying disk (Frisbee) to provide automated judging of the ultimate Frisbee game. The device keeps the score for the two teams and sounds an alarm when the disc is stationary beyond a set delay. Dr. Mehdi Etezadi advises students in the local chapter of the IEEE.



### Governor's Cup

The Governor's Cup program is the only statewide awards program in which graduate and undergraduate students compete for cash awards in excess of \$110,000. Three EBME students (Heather Malson, Dan Traut and Robert Terhune) along with three students from Mechanical Engineering (Mindi Casey, Shunsuke Otani and Doug Eckery) comprised the ME3 team that created carGLOW, which placed third in the Governor's Cup undergraduate category and won \$5,000. The team used a flexible solar collector to line a car cargo carrier so people would "never have to dig in the dark again."



The department would like to welcome its newest member, **Yantao Shen**. Yantao joined the department in January as an assistant professor. He received his baccalaureate degree in Mechanical and Electronic Engineering and masters degree in Mechatronic Control and Automation from the Beijing Institute of Technology. He received his Ph.D. specializing in sensor-based robotic systems and automation from the Chinese University of Hong Kong in 2002. From 2002 to 2007, Yantao was a Research Associate in the Department of Electrical and Computer Engineering at Michigan State University. He led research in sensorized and network-enabled micro/bio systems and design. Currently, his research interests lie in the areas of bioinstrumentation, smart sensors and actuators for bio-systems, sensorized micro/nano systems, visual servo systems, and haptic/tactile interfaces. Dr. Shen is a member of the IEEE and Sigma Xi.

### 2007 Electrical Communications and Cyber Systems Conference

Jim Henson headed the local steering committee for the 2007 Electrical Communications and Cyber Systems conference sponsored by the National Science Foundation. The meeting in Reno and Lake Tahoe involved 130 scientists from across the country and 10 directors/scientists from the National Science Foundation.



## Mechanical Engineering Department News

Kwang Kim, Professor & Chair



Dr. Kwang Kim, Professor and Chair of ME, was recently awarded a research grant entitled "intelligent microwave power transmission and control system for artificial muscle-driven biomimetic robotic systems" from the National Science Foundation. He was also awarded a STTR Phase-1 grant from NSF to develop nano-porous surfaces for enhanced heat transfer. Dr. Kim is also honored to announce that he was elected a Fellow of the American Society of Mechanical Engineers in Dec 2007. The Fellow Grade recognizes significant engineering achievements and contributions to the engineering profession.

Welcome to Dr. Chanwoo Park, an assistant professor in the Mechanical Engineering Department and comes from Advanced Cooling Technologies, Lancaster, Pennsylvania where he was a lead engineer for a number of R&D projects dealing with two-phase heat transfer, renewable energy, energy storage/conversion, electronic cooling, and vehicle thermal management. From 2001 to 2003, he worked as a research specialist in Ford Research and Advanced Engineering Laboratory, Dearborn, Michigan, working on hybrid electric vehicles. He received the PhD degree in mechanical engineering from University of Michigan-Ann Arbor in 2000.



Congratulations to Dr. Jonghwan Suhr, Assistant Professor of Mechanical Engineering, whose research paper entitled "Viscoelastic Response and Fatigue Resistance of Carbon Nanotube Blocks Under Cyclic Compression" has been published in *Nature Nanotechnology*, Vol. 2, 417 (2007). This paper is a follow-up work of "Viscoelasticity in Carbon Nanotube Composites" previously published in *Nature Materials*, Vol. 4, 134 (2005). He is a PhD graduate of Rensselaer Polytechnic Institute (RPI).

Congratulations to Dr. Yanyao Jiang of the Mechanical Department, who was elected a Fellow of the American Society of Mechanical Engineers in Dec 2007. Dr. Jiang graduated from the University of Illinois at Urbana-Champaign in 1993 and has been with the ME Department at UNR since 1996.



## Researchers Working On Next Generation of Artificial Muscles

University researcher Jonghwan Suhr says a recent study could lead to new materials that will mimic biological tissues and artificial muscles. The assistant professor of mechanical engineering has been working on the ability of carbon nanotubes to withstand repeated stress and still be able to retain their structural and mechanical integrity, similar to the behavior of soft tissue. While extensive research has been done over the past decade into the mechanical properties of carbon nanotube structures, this study is the first to explore and document their fatigue behavior.

"If you can smartly control properties and materials, you can more efficiently control the whole structure," Suhr said. "If these nanotubes can mimic artificial muscles, then some day they might be utilized as the soft tissue of the stomach wall or even as tendons throughout the body."

Many researchers believe carbon nanotubes are the future of electronic circuitry and the successors of silicon, which, according to scientists, has nearly reached the limit of its applications. Suhr and a team of national engineers tested the nanotubes' ability to resist fatigue by building a two-millimeter-square block in which millions of nanotubes were aligned vertically. Then, they repeatedly compressed it between two steel plates once every 0.75 seconds for more than 100 hours. After 500,000 compressions in which the tubes were repeatedly squashed to 75 per cent of their original length, the block kept springing back almost to its original shape. The springiness is similar to real muscles' ability to return to their original shapes over a lifetime of perpetual extension and contraction. But it's not only artificial muscles that interest Suhr. Because real muscles create a smoother motion than jerky electric motors or pneumatic devices, some of the new materials would be used to power robots and prosthetic limbs, as well as artificial tissue for implantation. Suhr is now combining nanotubes with different polymers, which control when an artificial muscle gets stretched, to improve their resistance to fatigue.

"I want to focus on new materials and other applications," Suhr said. "We need to discern which of these polymers will work best, and then we can fabricate the new material ourselves."

Although carbon nanotubes are not currently used in commercial applications, they are being studied intensely by researchers. The miniscule tubes, some of which are only one nanometer wide (a human hair is 50,000 nanometers wide), may one day have uses in computer-chip technology as transistors.



## Mechanical Engineering Department News

### Engineering Students Take Top Honors With "Bicycle Boiler"



Four undergraduate engineering students from the University of Nevada, Reno's American Society of Mechanical Engineers (ASME) chapter captured first place in the 2007 ASME Student Design Competition finals in Seattle, Wash.

Team members Ian Chase, Nathan LaBrosse, Karl Schulz and Scott Waters worked together to build a human-powered water still they named the "Bicycle Boiler."

"The competition was partially based around solving one of the big problems introduced by Hurricane Katrina," Waters said. "There was water everywhere, but nearly all of it was polluted and not fit to drink.

So ASME decided to create a design competition with the primary goal to boil water using only human power, essentially making it safe to drink no matter what kind of pollutants were in there."

In New Orleans, the city water system was inoperative and the water that surrounded people was either brackish or filled with both biological and chemical pollutants.

According to the ASME, one of the ways of purifying some of it would have been to distill it. However, electrical power was not available, solar energy was limited or not available, and filter systems, which could have been available, might not have removed all of the pollutants present.

So the creators of the competition decided one possible solution would be to make use of a human-powered still. This could provide at least limited amounts of purified water for drinking purposes in an emergency situation. So the students were challenged to design and build a device that would heat water to boiling temperatures and then to condense the steam generated to get potable water.

The requirements included having all significant energy input come from a linkage or mechanism driven by human effort, the device had to be small enough to be easily stored or transported for emergency use and it had to be easily assembled from its stored configuration.

"We decided very last minute to enter into the competition in the first place, so we only had about two weeks to come up with our first design last spring," Waters said. "To generate the heat needed to boil water we chose to use friction instead of generating electricity. The main power plant of our design is a modified bicycle 'fluid trainer' which is basically a stationary bike roller for use indoors. It uses a spinning disc in oil to generate resistance and most of the pedaling work people do goes straight to heat. We quickly discovered it had no problem getting to 300°F in a few minutes of pedaling.

"One cool thing about this design is that if someone has an existing bicycle, the whole project would be very portable and would only weigh about 30 pounds."

After winning at the North-American Pacific District competition last April, the team made a few modifications to the device. The main change was adding a second boiling chamber connected to a vacuum hand pump.

By Sue Putnam

## University Engineers Modify Nevada Snowplows to Combat Major Storms

University of Nevada, Reno mechanical engineers are conducting research for the Nevada Department of Transportation aimed at improving the visibility of both snowplow vehicles and drivers that could enhance road safety for northern Nevada drivers. Mechanical engineering professors Cahit Evrensel, Yanyao Jiang, Kwang Kim and their research team recently completed the first phase of the project with one plow in Elko, one in the Carson Valley and one primarily working the Mount Rose Highway.

"Current plows have some inherent problems with blowing snow and dramatic conditions which we think can be greatly abated by several mechanical improvements," Evrensel said. "We added an airfoil on top of the sander and a taillight puffer to improve visibility of the snowplow and protect other vehicles on the road. We're also working on a blower system and transparent splash barriers."

The airfoil has performed well in preliminary tests and prevents snow from gathering on the equipment on the back of the plow to keep the lights visible for drivers behind it. The researchers also installed a taillight puffer system with high pressure nozzles by the plow's taillights as an alternative system to keep the lights clean and visible for others on the road. Other systems that are being developed include: a blower that can decrease the density of the falling snow in front of the truck, some transparent barriers on the front part of the plow to prevent the plowed snow from hitting the drivers' windshields and another for the side window designed by the NDOT Elko group

"We have some more testing to do, but we feel these improvements can make an important difference in snowplow safety and efficiency," Evrensel added.

"NDOT is keenly interested in improvements that benefit the public and the worker," said the agency's assistant district engineer Tracy Larkin-Thomason. "We also need to insure that any improvement does not adversely affect another aspect of the operation. We have high hopes for some of the proposed improvements."

"This is excellent real world experience for our graduate students who developed these models," Evrensel said. "Onur Dur, Xiaowei "Arthur" Hu and Kurn Ma deserve a lot of the credit."



## Mechanical Engineering Department News

### NanoVation, Inc, Reaps Rewards From Energy Harvesting

"If you want to enter, give it your best. Otherwise, don't compete."

Simple words from mechanical engineering associate professor Kwang Kim, but his team of five very unique students took his advice to heart and came out of the 2007 Governor's Cup \$25,000 richer with their plan to develop energy harvesting products. The Governor's Cup program is the only statewide awards program in which graduate and undergraduate students compete for cash awards in excess of \$110,000. The University's NanoVation, Inc. took the top prize of \$20,000 in the graduate category, and they also won the \$5,000 Lt. Governor's Award in the graduate category for students who best employ clean, renewable or efficient energy technologies and services. Three members of the team are doctoral candidates, one is a master of science candidate and one is working on her masters in business administration.

"We had it in mind to compete in the Governor's Cup, but we needed an amazing team and the will to follow it through," said Kaustav Sinha, who is earning his doctorate developing smart materials based on magnetorheological technology. "Dr. Kim really put it in perspective for us and the result was pretty good."

Sinha smiled modestly, although he has every reason to shout the team's accomplishments from a clean energy rooftop. And this summer, he will be working at the Ford Motor Company's global research and product development center in Dearborn, Mich., in alternative technology-related areas. Rashi Tiwari and Sinha both did their undergraduate studies in India and both received outstanding international graduate student awards this year. She acts as the CEO of NanoVation, Inc., is a doctoral candidate in mechanical engineering and specializes in ionic polymer metal composite (IPMC) research. This technology is also part of her research.

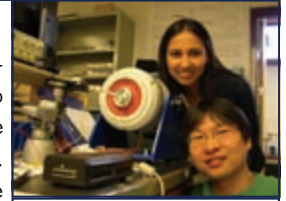
"We think this is the next generation of energy," Tiwari said. "NanoVation uses vibrations, so it's green technology, to develop energy harvesting products for reaping otherwise wasted energy. We intend to develop, patent, manufacture and market a line of tiny, self-powered, clean energy harvesters. The prototype design has been developed and tested, and we believe it will be an efficient solution to the current and future energy needs of our clients worldwide."

The initial product, dubbed the EH series for energy harvesters, is currently meant for the automobile industry and NASA. Not far down the line, the group of five plans to develop it for other transportation industries, the construction industry, the biomedical industry and the wireless communication industry. It will even have military applications, because the product uses vibrations, both above ground and underwater, to provide energy that can be used to re-charge batteries, say for night vision goggles or flashlights. The individual soldier can generate that energy with this device just by walking. This will be useful for pacemakers as well.

"We have such a good blend between business and technology," Yvonne Dang, the MBA candidate specializing in finance said. Dang's background includes four years in the financial services industry and four years of international casino marketing. "I've helped make sure this product is applicable commercially, environmentally friendly and profitable."

Both Dang and Tiwari are in the *Who's Who among American Universities, 2007* and are vice presidents of the Graduate Student Association. Sang-Mun Kim is also working on his doctorate in mechanical engineering and has been a researcher for development of thin film materials, including the 3-D electro-magnetic simulation. His experience in the field of smart materials helps on the technical side of overseeing of the product and material development is part of his research as well.

Alex Vanderhoff rounds out the team as vice president of marketing, and will be working for NASA this summer. An Alaska native, she's also been a member and an officer of the University's mountain bike racing team and is working on an master of science degree in mechanical engineering. Vanderhoff's previous work experience involves designing a solar hot water heating system for household use and she's also working with metal hydrides to develop new types of robotic actuators.



Rashi Tiwari and Sang-Mun Kim stand in the lab where they helped create NanoVation, Inc.

So what will the team do with all this green?

"We agreed to put our winnings back into the company," Tiwari said. "Dr. Kim knows this field so well and his knowledge has really propelled us down the right path. We don't want to rush and take a wrong step, so we are being very careful."

A right step was being asked to present their plan in front of some of the state's top venture capitalists recently in Las Vegas. Kim is proud of their progress, and when asked about the odds for NanoVation's success, he is positive but not unrealistic.

"My experience tells me that making a successful company is very challenging. However, under a certain circumstance, with the right people and enough financing, I think the chance is very good."

By Sue Putnam



Award winners, from left to right: Yvonne Dang, Alex Vanderhoff, Dr. Kwang Kim, Sang-Mun Kim, Rashi Tiwari and Kaustav Sinha



## Aliens, Hovercrafts and Milk Dud Boxes

By Sue Putnam



A view of the Harambe project, made of recycled materials and designed by Anthony Casselli, Haley Etchart & Alyssa Foster of the Nevada Christian Home School.

More than 30 students from northern Nevada middle schools competed this weekend at the University of Nevada, Reno for the chance to go to the nation's Future City contest in Washington, D.C., in February, and there was no lack of creativity to be found among the 11 teams.

"For some of our buildings, we used a laundry bottle cap, a pepper grinder, a CD container and a Milk Duds box," Haley Etchart, a member of the Harambe team, said. "The street lights are painted Q-Tips and we've even used the bottom of a yogurt cup here for support."

Sponsored by the nation's professional engineering community as part of National Engineers Week, the Future City competition fosters interest in science, technology, math and engineering among young people. Students work in teams under the guidance of a teacher and a volunteer engineer mentor to design and build a city of tomorrow. This year's regional competition was held in the Harry Reid Engineering Laboratory building on the east side of campus. It's billed as

the nation's largest engineering education program and is in its 16th year. Students first create cities on computers using SimCity 3000 software. Then they build three-dimensional, tabletop models to scale. Models must use recycled materials and can cost no more than \$100. Students also write brief abstracts describing their city and must present and defend their designs at the competition before a panel of engineer judges who test the depth of the teams' knowledge. The Buenaventura team from the Writers Institute of Northern Nevada won the top spot this year. They will travel to the national finals in Washington, D.C., Feb. 18-20. The grand prize is a trip to the U.S. Space Camp in Huntsville, Ala. More than 30,000 students from 1,100 middle schools were expected to participate nationwide. The Harambe team from Nevada Christian Home School placed second, and the Coral Academy of Science Ilayda team took third. Area 51 ½ from Silver Stage Middle School received an honorable mention.

This year's topic was "Keeping Our City Infrastructure Healthy: Using Nanotechnology to Monitor City Structures and Systems." Many engineers and researchers believe nanotechnology, generally described as technology operating at the molecular level, offers limitless potential. Students were required to incorporate nanotechnology into their designs and to have at least one moving part on their models.

"We're so proud of these students," Debbie Delauer, the K-12 coordinator for the College of Engineering, said. "The projects were incredibly creative and well planned, and while they were here, many parents, students, and their teacher mentors and judges commented how they appreciated getting the opportunity to see our buildings, classrooms and labs. We definitely hope we saw some future University engineering students in the group."



UNR SWE officers Rashi Tiwari, Nalleli Herrera and Allison Hemberger



SWE Officers at Evening With Industry 2007



Evening With Industry Lego Contest—Dr. Batchman and his team

## Society of Women Engineers (SWE)

UNR-SWE this year has had and will be seeing a lot of activities. Our 12th annual Evening with Industry (EWI) was held on 5th November 2007. There were 223 who attended this event with 30 companies and 117 students, making it one of the most successful EWIs hosted by us. There has been an article on this event published by Nevada's Center for Entrepreneurship and Technology. The article can be seen at [www.ncet.org/uncategorized/unr-society-of-women-engineers-evening-with-industry](http://www.ncet.org/uncategorized/unr-society-of-women-engineers-evening-with-industry). Besides, there has been more involvement by SWE members this year. The officers have been very active and we have had 10 volunteers this year. Our male membership has also grown. We are getting tremendous response from SWE regional members as well as industry for the Region A SWE conference to be held on the UNR campus on February 29-30, 2008. Our region website is up and is being maintained by Amy Crandall, regional webmaster ([www.swe-goldenwest.org/Conference2008/](http://www.swe-goldenwest.org/Conference2008/)). We have finalized our keynote and workshop speakers. We are very excited as all the topics, and accessories used are related to our theme of "Engineering: a sustainable future."

UNR SWE will be starting two new programs this year:

- SWE-Buddy: Each officer will have a sub committee consisting of members interested in understanding officer duty and other work done by the officer. This will also make members feel more comfortable at meetings. We will hence be training future SWE leaders and officers.
- Pasta-Potluck: This started in February with our members. This will help in networking with other SWE members



## James Graves Scrugham Medal 2007

### College of Engineering Presents Scrugham Medal to Five Nevada Alumni

The College of Engineering awarded five James G. Scrugham medals to outstanding alumni this Fall. Scrugham was a distinguished Nevadan who was the first dean of the College of Engineering, a state engineer, Governor of Nevada, a U.S. Representative and a U.S. Senator. Recipients of the second annual Scrugham Medal awards were:



J. Dietrich Stroeh is a 1960 civil engineering graduate known for his work in water conservation and creating the multi-disciplined firm CSW/Stuber-Stroeh Engineering Group, Inc. in northern California.



James N. Gardner is a 1960 mechanical engineering graduate and the CEO of Gardner Engineering and Gardner Mechanical. He is also an award-winning leader in energy conservation.



Jan B. Packwood, retired president and CEO of IDACORP/Idaho Power Company and a 1966 electrical engineering graduate, is also the past chairman of the Western Electric Coordinating Council, an association of over 100 utilities and power producers.



William Pillsbury, a 1950 civil engineering graduate, founded William F. Pillsbury, Inc, Consulting Civil Engineers and Sierra Environmental Monitoring, Inc. He was the key consulting engineer for the Tahoe Keys, portions of the then Reno-Cannon International Airport and Tyrolian Village in Incline, Nevada.



Richard Smith Hughes, a 1960 electrical engineering graduate, helped design anti-radiation missiles at the Naval Air Warfare Station at China Lake. He received several military commendations for his work.

## James Graves Scrugham Medal 2008

**Nominations are due no later than May 31, 2008.** The awards will be presented at the Scrugham Medal Banquet which will be held on the evening of Friday October 17, 2008 during Homecoming. The Scrugham Medal recipient must have demonstrated success in his/her chosen profession. Any alumna or alumnus of the College of Engineering is eligible and may be self-nominated or nominated by other alumni, faculty or staff members of the college. The selection committee will be comprised of the Dean of the college, College Personnel Committee Chair, the Chair of the College of Engineering Advisory Board, and a former Scrugham Medal recipient.

### Scrugham Medal Nomination Form

Nominee Name: \_\_\_\_\_  
 Preferred Address: \_\_\_\_\_  
 Preferred Phone Contact: \_\_\_\_\_  
 Email: \_\_\_\_\_

Please attach a list of professional accomplishments, a biography, or resume to illustrate the outstanding professional achievements you believe qualify this individual for the award.

Nominator Name: \_\_\_\_\_  
 Preferred Address: \_\_\_\_\_  
 Preferred Phone Contact: \_\_\_\_\_  
 Email: \_\_\_\_\_



Submit information to:

Sally Casas, College of Engineering/Dean's Office, Mail Stop 256 University of Nevada, Reno, Reno, NV 89557-0030, Fax: 775.784.4466  
 E-mail: [scasas@unr.edu](mailto:scasas@unr.edu)—**Electronic submissions are encouraged!**



## Alumni News

**Jack Myers '60** (mechanical engineering) has no plans for retirement after publishing two math handbooks, organizing and operating four air shows, and being awarded seven patents. Jack works in commercial real estate with offices in Reno and Half Moon Bay, CA, and has been licensed for 30 years. He also recently published a book about a German U-Boat captain during World War II's Battle of the Atlantic.

**Hugh Ricci '67** (civil engineering) retired in June 2006 after 36 years of service to the State of Nevada. He is enjoying his new granddaughter, who was born Dec. 9, 2006.

**Jack L. Byrom '69** (civil engineering) retired in 2005, after a 36 year career in the utility business at Sierra Pacific Resources. Jack started a new career at the Truckee Meadows Water Authority in Reno and spends his spare time following his two very talented granddaughters around the state at athletic events.

**Jay Chun '70** (mechanical engineering) retired in July 2004, following 32 years of civil service, conducting research and engineering for the U.S. Navy's electronic warfare and fighter aircrew training.

**Jeff Codega '76** (civil engineering) was presented with a Professional Achievement Award at the 2007 Nevada Alumni Association Awards. Jeff's Reno-based company, Jeff Codega Planning & Design, was established in 1992 and is the area's leading provider of signature planning, surveying, civil engineering, landscape architecture and construction administration services.

**Chris Robinson '85** (civil engineering) has been hired as director of land development engineering at Jeff Codega Planning & Design, Inc. Chris will supervise and direct the land development services of the civil engineering department, manage and plan projects, and oversee related hiring, training and recruitment efforts.

**Rob Jenson '90** (civil engineering) was named the Public Works Director of the Year by American City and County Magazine.

**Theresa Jones, P.E. '94** (civil engineering), '04 MS (hydrology) joined PBS&J, an engineering consulting firm, as a project manager. Theresa is an active member of the American Society of Civil Engineers and the Society of Women Engineers.

**Monette Greer '97** (chemical engineering) and **Brian Greer, '99 M.S** (mechanical engineering) welcomed their first child, Tyler Austin Greer, on Nov. 27, 2005.

**Ryan Dixon '98** (civil engineering) and **Yvonne (Lum) Dixon '98** (speech pathology) welcomed their third child, Brady William, on April 18, 2006. He joins big sister Annika and big brother Ryker at their home in Reno.

**Brad Platt '00** (electrical engineering) is very busy starting Silver and Blue Outfitters, a Nevada Wolf Pack sports apparel store with **Mark Glodowski '04** (marketing). The Wolf Pack nation has never looked so good!

**Carie Huff '01** (civil engineering) has accepted the position of project engineer at Jeff Codega Planning & Design, Inc. Carie will oversee the design of public works and land development projects.

**Carlos Ledon '01** (chemical engineering) and **Sarah (Warner) Ledon '00** (elementary education/special education) welcomed their first son, William Carlos Ledon, on Jan. 31, 2006. He joins big sister Calista Michelle.

**Will Woolsey '02** (computer science) and **Rebekah (Newman) Woolsey '03** (biochemistry) welcomed their first child, Emma Jeane, on May 28, 2006.

**Rob Morris '05** (electrical engineering) married **Michele McArthur '05** (journalism) on December 2, 2006 at Anthem Center in Henderson, NV. Michele and Rob met while attending the University of Nevada, Reno. Michele, an employee of R&R Partners and Rob, who is working for Paragon Consulting Services, hope to buy their first home soon.

**Joseph Peterson '06** (civil engineering) has been hired by Jeff Codega Planning & Design, Inc. as a project designer. Joseph will design and prepare plans for construction projects, perform engineering modeling, and prepare technical reports for land development and public works projects.

**Brian Fitzgerald '06** (civil engineering) and **Meg Fitzgerald** (Coordinator of Recruitment, Retention & Advising, College of Engineering) welcomed Elizabeth Fitzgerald on Oct. 29, 2007. Elizabeth joins big sister Katie Fitzgerald, who is 2½.



## *In Memoriam*

### Richard James Elmore, Jr.

On November 17, 2007 under the roar of the Wolf Pack cheer, **Richard James Elmore, Jr.** passed on at Lawlor Events Center just before tip-off. He was born on May 13, 1923 and graduated from Mineral County High School in 1940. His college education at the University of Nevada was interrupted by World War II, however he returned at the end of the war and became President of the ATO Fraternity, Team Manager of the UNR Basketball Team, which was coached by Jake Lawlor. In 1950 he founded Wedco, Inc. and was an active member of the Lions Club, a founder and past President of the Lions Eye in San Francisco and District Governor of Lions Club for Nevada-California. He remained active in the Reno Arch Lions Club and in Junior Achievement. He was serving on the Board of Directors at the time of his death. He was honored with induction into the Business Leaders Hall of Fame and was the 2007 recipient of the Associated General Contractors SIR Award in recognition of his contributions and service to the electrical and construction industry. An avid Wolf Pack fan and University of Nevada booster, his deep belief in higher education is reflected in the significant contributions he made to the University of Nevada, Reno., including the Wedco, Inc. Scholarship Endowment in Electrical Engineering.

### Ralph Wilson Shearer

A 1941 graduate in electrical engineering, Ralph passed away at his home on June 10, 2007. After graduation he worked summers on the Hoover Dam. In 1943, he won an "E" medal for work on the B-29 and also worked on the Whittle jet engine to support the Bell P-59. He obtained his MBA degree and certificate in Industrial Relations at the University of California, Los Angeles and later returned to Reno to do professional engineering at the University Planetarium, Sierra Pacific Power and Rocketdyne as well as test Gemini engines for the lunar model.

### Jim Melarkey

A 1947 civil engineer graduate, Jim died November 19, 2006 at the age of 84. He was a lifetime Nevada resident who attended the University of Nevada, Reno, both before and after World War II. He had a very successful basketball career with the Nevada Wolf Pack and was inducted into the Wolf Pack Hall of Fame in 1976. He enjoyed attending Wolf Pack athletic events, his coffee group at the Gold-N-Silver, and his friends at LakeRidge Golf Course, where he was still employed as a starter.

### Charles Frederick Coe

A 1948 graduate in mechanical engineering, Charles died on April 17, 2007 in Cupertino, CA. He was born March 15, 1923 and during World War II, flew 31 missions as a navigator on B-17's in the European theater as a member of the 303rd Bomb Group—the Hell's Angels. He was awarded the Distinguished Flying Cross, Air Medal with three Oak Leaf Clusters and a European Theater of Operations Medal. He retired from NASA Ames Research Center after 32 years of research on aerodynamics, dynamic loads, aero elasticity, structural dynamics and instrument design. Charles was a member of the Space Shuttle Structure Team and proposed and carried out special wind-tunnel tests on space shuttle tiles. He designed the unique tile airdrop instrument that made these tests a success. In recognition for his work, he received NASA's Exceptional Engineering Achievement Medal in 1981. In 1999, alumni relations at the university awarded him an Outstanding Professional Achievement Award.



## *In Memoriam*

### William F. Pillsbury

William F. (Bill) Pillsbury, 82, died after a short battle with cancer on Wednesday, January 23, 2008. He passed away peacefully at home surrounded by his family. Bill was born on July 7, 1925 in Oakdale, California to Eva, Pearl, and William McKinley Pillsbury. He was raised in Vallejo, California; he distinguished himself as an Eagle Scout, Master Councilor of DeMolay, and in track and field. He graduated from Vallejo High School in 1943.

Bill served as a 2<sup>nd</sup> Lieutenant and navigator in the Army Air Corps during World War II. On November 25, 1944, Bill married his high school sweetheart, Nadine McKinney, and began their life together in Sacramento. Bill graduated from the University of Nevada in 1950 with a degree in civil engineering.

After managing several municipalities in California and serving as City Engineer and Assistant City Manager for South Lake Tahoe, Bill founded his own consulting firm, William F. Pillsbury, Inc. in 1966.

As president of William F. Pillsbury, Inc., he maintained an office in South Lake Tahoe for 22 years and in Reno for 21 years. Bill was the consulting civil engineer on many notable projects including Tahoe Keys, Tyrolian Village, and Uppaway at Lake Tahoe. He also worked with the terminal, apron, and runway expansion at the Reno-Cannon International Airport (later renamed the Reno-Tahoe International Airport.)

Nadine joined Bill in the workings of the firm where she served as Vice President and Controller for the offices in Nevada and California. In 1974 he formed Sierra Environmental Monitoring, Inc. which specialized in chemical analyses of water and wastewater for various private and public entities.

Bill was a member of the Reno South Rotary Club, St. Luke's Lutheran Church, the University of Nevada, Reno Foundation Board of Trustees, and the College of Engineering Advisory Board at UNR. He was a life-time member of the American Society of Civil Engineers. He was an avid sportsman who enjoyed hunting, fishing, and exploring Nevada and the West. He received the James G. Scrugham Medal for professional achievement from the College of Engineering in 2007.

Bill is survived by his loving wife of 63 years, Nadine, daughter, Fran Sloane (Doug), son, Dr. Clark Pillsbury (Karen). He is also survived by grandchildren, Todd, Scott (Erin), and Courtney Sloane, Brad (Stephani), and Matt Pillsbury, great grandchildren Ashlyn and Zackary Sloane, and sister, Betie Coker, and several nieces and nephews.

The family would like to give a special thank you to Bill's doctors and Circle of Life Hospice for their kind and loving care.

### Jasper Cooper

A 1951 civil engineer graduate and long time Martinez, CA resident, Jasper was born in Oklahoma on March 17, 1926. He graduated from Bret Harte High School in San Andreas and joined the Navy during World War II where he flew Catalina flying boats on antisubmarine patrol. After the war he went to college on the G.I. Bill at the University of Nevada, Reno. With his partners Gus Leptien and Frank Cronin, he started the engineering and surveying firm, Leptien-Cronin-Cooper in Martinez, which continues to this day. He was given a lifetime achievement award by the American Public Works Association and was also a fellow in the American Congress of Surveying and Mapping and a founding member of CELSOC.

### Henry Ehrlinger III

A 1957 graduate in metallurgic engineering, Henry passed away on May 25, 2007 in Carrier Mills, IL. Born August 5, 1925, he was in the military service six weeks after his 18th birthday during World War II, seeing service in the Phillipines on Luzon and the battle of Manila with the 754th Tank Battalion. His mining career took him to Texas, Nevada, Arizona, Illinois, Pennsylvania and almost 10 years in Mexico. He was an active member of the Society of Mining Engineers and served as chairman of the Industrial Mines Division. He retired in 1993 from the Illinois State Geological Survey.



## In Memoriam

### William C. "Bill" Walbridge, Jr.

Bill graduated in 1959, obtaining his BSEE with honors and went on to obtain an MBA in 1963 from the University of California, Berkley. Born in Stockton, CA on December 5, 1933, he passed away on November 11, 2007 after succumbing to metastatic melanoma. He graduated from Yuba City High School in 1950 and joined the Navy shortly thereafter, serving on the USS Rogers in the electronics "gang". He graduated with honors and the Gold Medal from Yuba Junior College before moving to the University of Nevada, Reno, after which time he spent his career in the electric utility industry. He was the CEO of the Sacramento Municipal Utility District from 1975 to 1982 and CEO of the Seminole Electric Cooperative Inc. headquartered in Tampa, FL from 1982 to 1996. An ardent history buff, he enjoyed his membership in Historic Reno Preservation Society and served as its treasurer until the onset of his final illness. In 1993 he received the university's Outstanding Professional Achievement award.

### Donations

**Bill Pillsbury**— Class of 1950 CE Scholarship Endowment. Checks should be made out to UNR Foundation – 1950 CE Scholarship and sent to UNR Foundation, Mail Stop 162, Reno, NV 89557.

**Charles Frederick Coe**—Coe Family Scholarship Endowment. Contact Melanie Perish, College of Engineering, Dean's Office, Mail Stop 256, University of Nevada, Reno, Nevada 89557-0256, telephone 775.784.6433.

**Bill Walbridge, Jr.**—Walbridge Scholarship. Checks should be made out to UNR Foundation and sent to Melanie Perish, at the above address.

**Wedco, Inc. Scholarship Endowment**—Checks should be made out to UNR Foundation – Wedco, Inc. Scholarship Endowment and sent to UNR Foundation, Mail Stop 162, Reno, NV 89557.

#### How are we doing?

##### Your suggestions are welcome!

We are always looking for your suggestions to enhance the Engineering News. Ideas for news features or special columns are welcome.

Email: [scasas@unr.edu](mailto:scasas@unr.edu)

#### How You Can Help

If you are interested in assisting the College of Engineering in any of its endeavors, you can do so by sponsoring or setting up a scholarship, program, project, or including the College of Engineering in your estate planning.

Please contact Melanie Perish at 775.784.6433 or email [mperish@unr.edu](mailto:mperish@unr.edu).

#### Engineering News

Published semi-annually

Phone: 775.784.6925

Fax: 775.784.4466

Email: [scasas@unr.edu](mailto:scasas@unr.edu)

If there are any errors in your address or you are receiving more than one copy of this publication, please contact Sally Casas on 775.682.7757 or email [scasas@unr.edu](mailto:scasas@unr.edu)



## Up Close: Interview with Dr. Ted Batchman, Dean

*Continued from Page 1*

### **In terms of job placement after graduation, are students today finding employment in their chosen fields?**

Thirteen years ago we did a study on where our students went after graduation. Outside of Civil Engineering, the majority took jobs in California. Today, as a result of the economic development and diversification in northern Nevada, less than 40% go out of state. And the conditions are continuing to improve.

### **Tell me more about your new position.**

It is in the area of renewable energy. Currently, I am co-teaching an introductory Engineering and Political Science course called "Introduction to Renewable Energy." About 50% of the students are non-engineering majors. This is indicative of the interdisciplinary nature of this field.

We are currently building a research and educational facility at the Redfield campus. The vision is that it will become the northern Nevada center for renewable energy. The opportunities to develop and demonstrate technologies there are excellent.

This is also a tremendous opportunity for the University and the State to secure a leadership position in the nation with renewable technologies such as geothermal, wind, bio-diesel, fuel cells, and the generation and storage of hydrogen and to become a net-exporter of renewable energy. Other states and educational institutions are talking about doing this, but none have our potential.

My role will be to ensure things come together, to assume a development leadership position. It is important that whatever we produce is economically feasible and something people can use.

We have the support of industry. And we also have the support of politicians like Senator Harry Reid.

It is an area in which the political, social, and economic aspects intertwine. Technology alone will not make it happen; it will also need policy to encourage its use. I equate it with seat belts, which were first installed in automobiles in the 1950's and for many years were simply considered an option. It wasn't until there was information on their benefits and states mandated their use that people recognized their value. The same is true for energy. There needs to be both education and public policy to create awareness and encourage people to change.

It is truly a very exciting area in which to be involved.

## Spring Calendar Events

March 22nd—March 30th : Spring Break

May 6th : Engineering Spring Celebration

May 8th—May 14th : Finals Week

May 14th : Honor the Best

May 14th : Final Day of Instruction

May 16th : Advanced Degree Commencement

May 17th : Undergraduate Commencement

May 19th : Spring Semester Ends

May 26th : Memorial Day

July 4th: Independence Day

August 25th : Fall Semester Begins

September 1st : Labor Day



College of Engineering  
University of Nevada, Reno  
Mail Stop 256  
Reno, NV 89557-0256

Non-Profit Org.  
U.S. Postage  
PAID  
Reno, Nevada  
Permit No. 26

