

# ENGINEERING @ NEBRASKA

AUTUMN 2012

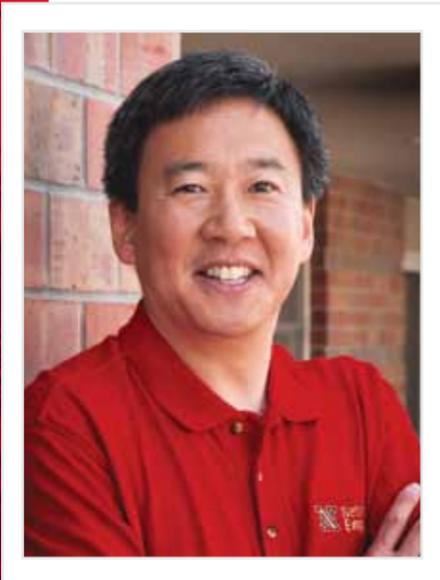


**GO THE DISTANCE**  
NEBRASKA-BUILT EQUIPMENT  
EXPLORES ANTARCTICA



**ALSO INSIDE:**  
**BSE CENTENNIAL**  
**TRACK SPIKE INNOVATION**





## FROM THE DEAN > Merging our talents and resources

As we strive to further develop ourselves as a Big Ten college of engineering, we have a proposal in the works to merge the departments of Electrical Engineering and Computer and Electronics Engineering. The Computer Engineering and Electronics Engineering majors will remain in Omaha, and Electrical Engineering will be added as a major in Omaha.

After a comprehensive look at the college, we know we must unify our talents and resources (people, financial, technology, etc.) at our three locations to better connect all of our students in and out of the classroom. By combining these two departments, we can enhance current course offerings and provide more opportunities for collaboration and interaction for our faculty and students in both cities.

It is understandable that there is uncertainty among those involved, and our CEEN students are passionate about their program and the close community they experience in Omaha. That community will continue, and I know we can all work together to ensure all students feel valued and connected.

We hope to have the merger approved by Fall 2013. We are working to make this transition as smooth and productive as possible. We will keep our Nebraska Engineering communities informed as we move forward, and discussion is an important part of the process.

This recent proposal for the college caught the interest of the Omaha World Herald, which wrote a story and a follow-up editorial (Nov. 20, 2012), noting,

“The key concern, after all, should be what’s best for the students. NU should structure its engineering programs so the resulting degrees have the highest value possible for the students earning them.

The best way to do that is through a unified engineering program that uses sound strategic planning to lift itself to a level of excellence.

All faculty, whether in Lincoln or Omaha, need to be encouraged to see themselves as a single team working toward unified goals rather than as separate teams looking to parochial concerns. NU leaders have a responsibility to promote and facilitate that spirit.

... The more that Omaha and Lincoln cooperate in that effort, the greater the benefits for everyone.”

Thank you for your attention to the college as we work to advance our potential, our ideas and our impact.

– Timothy Wei, Ph.D.  
Dean, UNL College of Engineering



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## UNL STUDENT ENGINEERS' WORK IN POLLUTION PREVENTION PROVES PRODUCTIVE

After a summer working with industry or seasoned agricultural producers, students in UNL's Partners in Pollution Prevention program ended their experiences with presentations on their P3 accomplishments.

Bruce Dvorak, P3 program director and professor and interim chair of UNL's Department of Civil Engineering, was in the audience adding up the potential benefit of this year's P3 efforts.

"The 2012 P3 interns provided assistance to 17 clients and made 78 engineering-based source reduction suggestions," said Dvorak. "If these suggestions are all implemented, they would provide the clients with over \$210,000 in annual cost savings and annual reductions of 23 tons of solid waste, 150 million gallons of water, and 2,000 MT CO2 equivalent of greenhouse gases."

The P3 program, which focuses on sustainability, just completed its 15th year. An outreach assistance program operated by the University of Nebraska Extension and the UNL College of Engineering, it is funded by the USEPA Region 7, the Nebraska Department of Environmental Quality, and a wide variety of businesses and industrial partners.

P3's undergraduate student interns conduct one-to-one pollution prevention assistance with Nebraska businesses by performing waste assessments or other waste reduction and resource conservation projects, and providing each client with a written report detailing waste minimization suggestions. More than 200 P3 interns have worked in more than 80 communities, with more than 600 clients served including dry cleaners and auto body shops, large pharmaceutical and manufacturing plants, and agriculture producers.

One of the first students involved with P3 in 1997 was Brian Wanzenried, who is now director of Environmental Safety and Health for the Gavilon Group, LLC, in Omaha. Gavilon is a commodity management firm, connecting producers and consumers of food and energy through its global supply chain network.

UNL students Alex Sellers, from South Dakota, and Lais Speranza, from Brazil, had P3 placements with Gavilon locations in Hastings, Grand Island and St. Josephs, Mo.

Wanzenried said he enjoyed the students' presentations, with recommendations that gave him "much to look at—more than I expected" for the feed-food-fuel operations in his area. Sellers

advocated enhanced energy efficiency via replacement pump motors and variable, weather-based control systems involving fans and tarps for ground storage sites, to "reduce future maintenance costs and increase environmental stewardship" by the company. Sellers calculated the investments would save \$27,651 per year and those savings would offset their purchase by the company in 6.2 months of use.

A senior majoring in Biological Systems Engineering, Sellers said the P3 opportunity helped him pursue his interest to "do more environmental work." Speranza said she was eager to make a difference in work with a large company, and her experience with Gavilon was what she hoped.

Civil engineering student Jordan Wachal and BSE student Keith Miller analyzed equipment, inputs and outputs for several farmers in areas of Nebraska. Using sensors for irrigation systems, the students were able to advise greater efficiency in powered machinery choices.

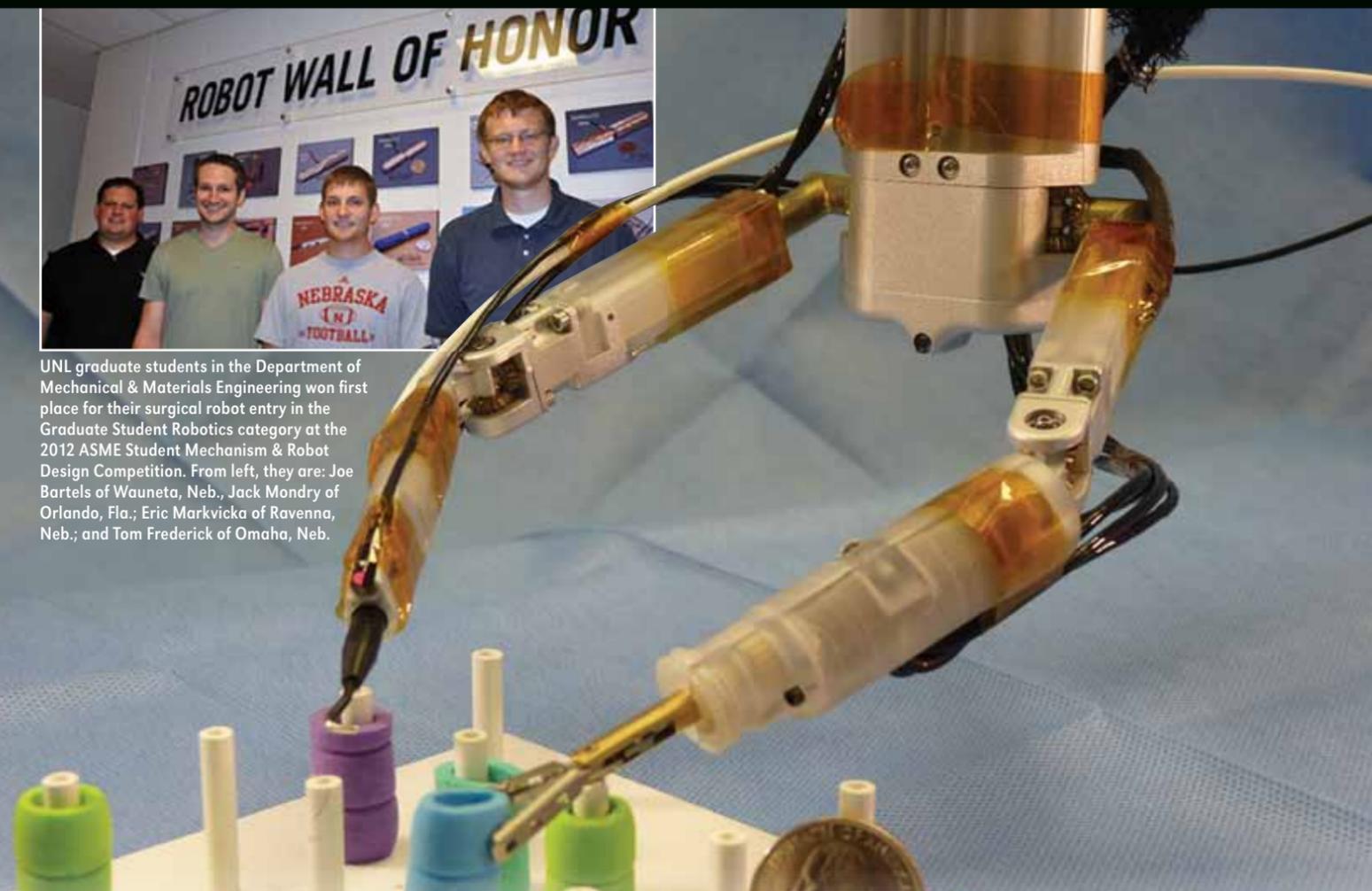
Dvorak said the P3 program helps both businesses and the interns to focus their efforts. "Based on past surveys, we know that our P3 students are much more likely to provide leadership on the job in implementing source reduction changes than other recent graduates," said Dvorak. "We anticipate that the P3 students will be leaders in implementing practical measures as part of their work to improve the environmental sustainability of the business and the industry."



**Students enjoy renovated study areas near Engineering Library**  
At the start of the Fall 2012 semester, leaders from the Engineering Student Advisory Board celebrated a ribbon cutting for upgrades including improved furniture and collaborative spaces.



UNL graduate students in the Department of Mechanical & Materials Engineering won first place for their surgical robot entry in the Graduate Student Robotics category at the 2012 ASME Student Mechanism & Robot Design Competition. From left, they are: Joe Bartels of Wauneta, Neb.; Jack Mondry of Orlando, Fla.; Eric Markvicka of Ravenna, Neb.; and Tom Frederick of Omaha, Neb.



## SURGICAL ROBOT BY UNL MME GRAD STUDENTS WINS ASME COMPETITION

A team from the University of Nebraska-Lincoln's Surgical Robotics Lab won first place in the American Society of Mechanical Engineers' 2012 Student Mechanism & Robot Design Competition, Graduate Student Robotics category, with their project: Miniature In Vivo Surgical Robot for Single-Incision Surgery.

Mechanical & Materials Engineering graduate students Jack Mondry, Thomas Frederick, Eric Markvicka, and Joseph Bartels presented their creation at the Chicago event in mid-August. Their platform for R-LESS (robotic laparo endoscopic single site) surgery aims to streamline the crowded operating table while still providing the dexterity necessary to perform general surgical procedures.

This is the first time a team from UNL's Surgical Robotics Lab, led by Professor Shane Farritor, entered and won at the ASME Student Mechanism & Robot Design Competition. Recent Nebraska finalists have included David Miller, fourth in the 2007 graduate level Mechanisms competition, and Chi Min Seow and team, who won the 2010 graduate level Robotics division; both were students working in the lab of MME Associate Professor Carl Nelson.

The 2012 event was ASME's 36th mechanisms and robotics gathering among its annual technical conferences.

"It's one of the longest running and most prestigious events in student robotics, with international participation," said UNL team leader Jack Mondry.

This year's Nebraska entry was Mondry's design, nicknamed "Jackbot" in the lab's tradition of naming robot iterations after their developers. Frederick and Markvicka collaborated on the robot's mechanical components, and Bartels focused on the controls for the device. The team worked on the robot for six months as part of their lab projects.

"It's easy for people to see the immediate impact this robot could have on their lives through less invasive surgical procedures," Mondry said. "We hope to see a commercialized version of the robot within a couple of years."



## 430 ENGINEERING STUDENTS HOSTED IN COLUMBUS

More than 400 engineering freshmen took a road trip Sept. 21 to Columbus to visit several businesses and learn more about the central Nebraska community and potential job opportunities. The first-of-its-kind trip featured discussions with professional engineers from the area, and visits to locations like ADM, Nebraska Public Power District, Loup Power District, BD Medical, BD Pharmaceutical, Vishay Dale, Camaco, Behlen Mfg. Co., Duo Lift Manufacturing, Katana Summit and John Crane Orion.

Dave Williams, director of retention for the College of Engineering, led the trip and worked with Dennis Hirschbrunner, a retired vice president of marketing at HDR and UNL alumnus, and Roger Helgoth, CEO of Kirkham Michael. Hirschbrunner and Helgoth are members of the college's Executive Advisory Board and facilitated connections with their business contacts at Columbus Chamber of Commerce and companies the students visited, to generate more involvement between Nebraska companies and UNL engineering students.

"Our goal is to expose students to the exciting careers they can have with an engineering degree and to the opportunities right here in Nebraska, and in Columbus," said K.C. Belitz, president of Columbus Area Chamber of Commerce. "Our area, and the nation as a whole, will need many more engineers than are currently graduating from U.S. universities and we are excited to be able to encourage these students by connecting them to the 'real world' of engineering. We couldn't be more pleased that the College of Engineering chose Columbus to help them achieve that goal."

The trip is part of a new community initiative for the college's Engineering Learning Community and exposed students to Nebraska companies who want to hire them when they graduate. The learning community began with a residence hall cluster of engineering students who form helpful study groups. A wider group of 40-plus College of Engineering students travels each Spring Break to U.S. cities such as Chicago and Boston, where they meet with engineering alumni.

## COMMITTED COUPLE: NANOSCIENCE FACILITY DEDICATED WITH NEBRASKA ENGINEERING ALUMNI NAMESAKE

With its namesakes present, UNL's Voelte-Keegan Nanoscience Research Center was dedicated Sept. 27. UNL Civil Engineering alumnus Don Voelte '75 and his wife, Nancy Keegan (also an engineer and former chair of the University of Nebraska Foundation Board of Directors), praised not only the facility but also the people and tools working inside to make lives better.

The couple's \$5 million donation was matched by a competitive federal grant from sources including the National Institute of Standards and Technology, plus a university commitment, to fully fund the \$13.9 million building. Completed earlier in 2012, the center's 32,000 square feet include lab spaces for scientists and engineers to collaborate in nanotechnology. Advances shaped at the nanoscale level include better materials for electronics, such as computers and cell phones, and for disease detection.

Located at 16th and W streets, across from Scott Engineering Center and adjacent to Jorgensen Hall (home to UNL's Physics and Astronomy programs), the facility will house as many as

20 research groups, said David Sellmyer, director of the Nebraska Center for Materials and Nanoscience, who added that a facility of this caliber is rare.

The new facility offers researchers access to specialized tools like a \$2 million high-resolution electron microscope purchased with a grant from the National Science Foundation. Another high-tech area is a clean room that eliminates dust particles in high-level research.

Nancy Keegan and Don Voelte CIVE '75 stand in front of the UNL nanoscience facility, dedicated in 2012, that bears their names. The building was funded in part by their \$5 million gift.



## ENGINEERS WITHOUT BORDERS-USA UNL STUDENT CHAPTER RETURNED TO MADAGASCAR FOR TWO MORE SUCCESSFUL PROJECTS

by Libby Jones

This last summer seven UNL students and two faculty members took a life-changing trip to Madagascar with UNL's Engineers Without Borders-USA student chapter (EWB-NU) to install solar powered lights at a school without power and to help a remote rural community gain access to clean drinking water.

Ben Pavlik (EWB-NU president, Ph.D. student, Chemical Engineering), Erik Knudsen (Senior, Mechanical Engineering), Ian Parsley (Senior, Biological Systems), and Jodi Sangster (Ph.D. student, Civil Engineering) along with Dr. Dean Patterson (Research Professor, Electrical Engineering) and myself (EWB-NU Faculty Co-Adviser, Associate Professor, Civil Engineering) all worked together with members of the Kianjavato community and schools to install solar panels to power lights in a classroom. The people of Kianjavato cited providing electricity to schools as a priority during our assessment trip in May 2010. Currently a few gas generators supply electricity but at a high cost. With gas over \$5/gallon in Madagascar and the daily average wage at less than \$1/day, power is essentially non-existent in Kianjavato.

Schools were viewed by the people of Kianjavato as needing electricity to power lights for classrooms. This May's trip made their wishes come true for one classroom. The school superintendent plans on holding evening study sessions for students preparing for their high school and college entrance exams. This is something they have wanted to do for years but have not been able to do without good light. We plan on continuing to work with the schools to install lights in all of the 48 classrooms in the community of 7,000 people over the next several years.



The solar power installation was just the first part of the work. The solar power team welcomed the water quality team to Madagascar at the main airport as they left to return home. Sangster and I stayed to work with Stacey Joy (Master's student, Civil Engineering), Amanda Dunekacke (Sophomore, Civil Engineering), and Matt Pirog (Senior, Biological Systems Engineering) on the water quality project. The people of Kianjavato, Madagascar lack access to safe water. A biosand filter is a point of use water treatment system that is sized for daily use by households that do not have safe or treated water sources available. Biosand filters remove 95 to 99% of organic contaminants, including bacteria, viruses, protozoa, worms, and particles. They are low cost (about \$15 per filter) and low maintenance and can typically treat about 20 to 60 liters of water per hour.

In June 2011, EWB-NU students and faculty traveled to Madagascar to introduce biosand filters to the people of Kianjavato by hosting a workshop on biosand filters and installing biosand filters in five schools as a pilot project. This year we hosted a second workshop and completed

installation of at least one biosand filter in every public school in Kianjavato. At the end of this year's workshop, the participants formed their own association to continue to build and install biosand filters in the community and they asked us to return to help them with their gravity fed water supply system in need of repair. What a wonderful way to end a trip and to help us start on our work to return this next year!

Over 92% of the \$56,000 needed for these two projects (project costs, airfare, travel expenses, translators, etc.) was raised, donated or self-funded by the students. If you'd like to learn more about the work of these students and perhaps help them with future

projects, please contact Dr. Libby Jones at libby.jones@unl.edu or Karen Moellering at kmoellering@nufoundation.org.

# WISSARD

## HOT WATER DRILL SYSTEM

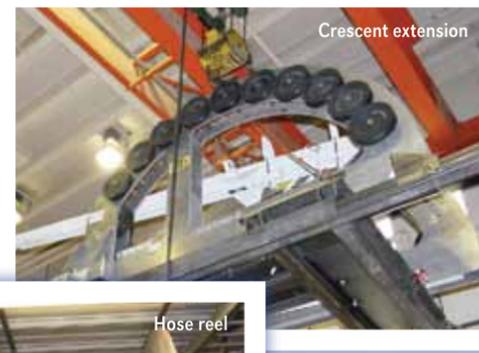
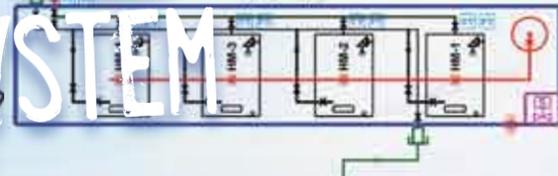
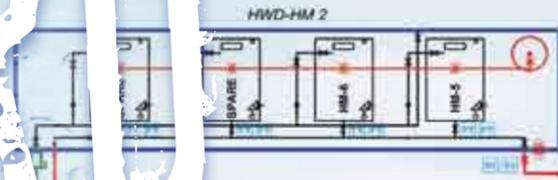
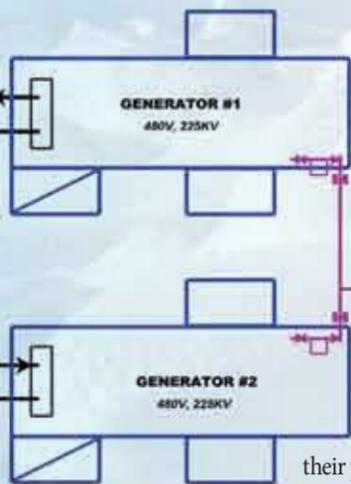
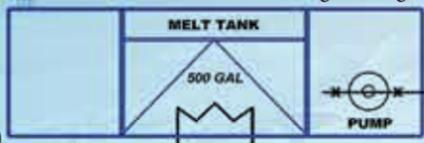
### NEBRASKA-BUILT, EXPLORING ANTARCTICA

Amid 2012's hot Nebraska summer, the UNL Engineering and Science Research Support Facility (ESRSF—or simply “the Engineering Shop”) and partners developed components for a different temperature extreme—the remote ice fields of Antarctica—with the Whillans Ice Stream Subglacial Access Research Drilling (WISSARD) project. The Engineering Shop's work now travels far south to fulfill a groundbreaking research promise, with many challenges surmounted along the way and more ahead.

ESRSF Manager Jim McManis said the Engineering Shop began work in March 2011 for the project through the ANDRILL Science Management Office (SMO) at UNL. His team understood the importance that the SMO and its partners “came up to speed quickly with the tasks required to design, build, test and deploy a hot water drill system ... for clean drilling into sub-glacial environments” planned in the austral spring of 2012.

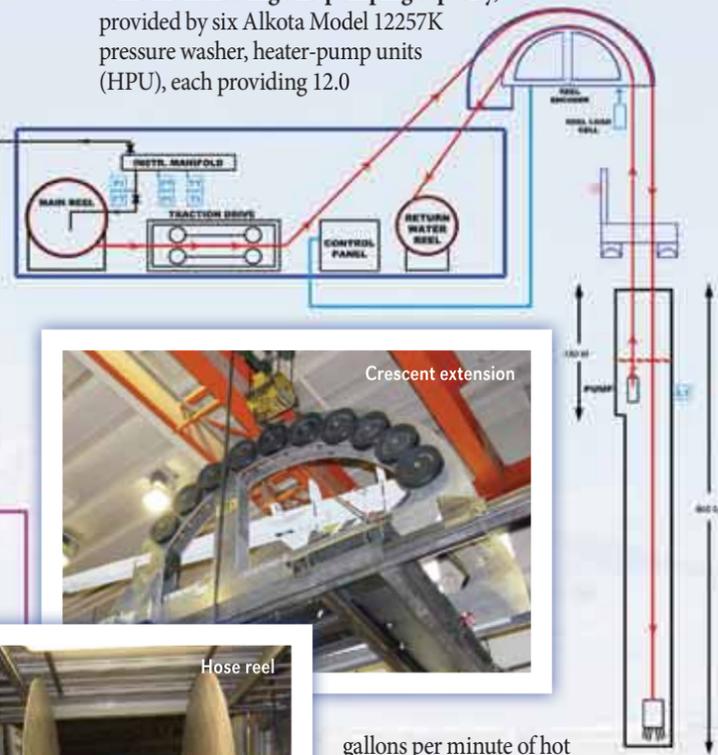
“This hot water drill system will be traversed from McMurdo Station across the Ross Ice Shelf to the site on the Whillans Ice Stream over subglacial Lake Whillans,” said ANDRILL SMO Executive Director Frank Rack, Ph.D. “The drill will be used to melt a 30 cm-diameter hole through 800 meters of ice to provide access for sampling and measurement devices that

will be lowered into the subglacial lake on a wireline to collect water, sediment, and microbiology samples.” The ESRSF team, working closely with their partners from SMO and the Northeast Professional Engineering Consultants Group, designed, machined and fabricated components for the hot water drill system (HWDS) “to provide up to 72 gallons per minute (gpm) of hot water at up to 2,500 pounds per square inch (psi) pressure at a temperature of 95 degrees C, using a 1,000 meter-long, 1-1/4” internal diameter (ID) continuous length of thermoplastic hose,” according to SMO reports.



#### SYSTEM FEATURES INCLUDE:

- The main heating and pumping capacity, provided by six Alkota Model 12257K pressure washer, heater-pump units (HPU), each providing 12.0



Ross Ice Shelf. ESRSF technicians Mike Long and Mark Stroup custom-machined the hot water manifold system as well as other parts for the heater units, and John Hudgens and David Birdzell provided fabrication and welding support for the heater unit installations and hose reel structural frame.

- A **Water Filtration and Decontamination Unit (WFDU)**, containing 2 micron and 0.2 micron filters and UV filters at 185 nanometers and 254 nm, located between the main 3,700 gallon water supply tank (WST) and the two HPU containers.

- A **500-gallon insulated Melt Tank (MT)** to provide start-up water for the system by melting snow using heated glycol pumped through a series of heat-radiating immersion plates that form a recirculation system. Waste heat is utilized from the two 225 kilovolt (kV) generators that provide power to the HWDS and the camp infrastructure. ESRSF's Hudgens and Birdzell provided technical support to fabricate and assemble the frame that supports the melt tank.



The WISSARD team includes members of the ANDRILL Science Management Office at UNL, ESRSF, and partners including vendors and consultants.

- **Generators** are linked to a **power distribution module (PDM)** to monitor and control the power output to the distributed modules: a Hose Reel Module (HRM), which incorporates the main hose reel and 1,000 meters of hose, two traction drives, and a return reel and hose attached to the return pump (the main and return hoses to pass through the roof of the HRM and be guided over crescents). Birdzell, ESRSF's lead electrician, working with Chad Carpenter of the SMO, installed the high- and low-voltage electrical network. It was a unique application of Birdzell's electrical knowledge and skills, amid a project stage with 12- to 15-hour work days to meet the project deadlines.

A crescent extension system mounted on the roof of the HRM aligns the hose over the work deck and moonpool where the hot water drilling will take place. ESRSF welder Hudgens and machinists Stroup and Mike Long took the lead in machining, fabricating and welding the rail assembly. Specifically, Hudgens' skills ensured the quality of welds would meet or exceed the stringent requirements for operation in the harsh environments of Antarctica. Long and Stroup machined heavy duty steel parts for the trolley system to handle large forces that will be inflicted on the crescent trolley system during drill operations.

Half of the HWDS was delivered to Port Hueneme, Calif., in December 2011 and shipped to Antarctica on a cargo vessel that arrived in March 2012. The remaining half of the system was finished and pre-tested in August 2012 at UNL, including the reel container and the command and control system for the hot water drill.

Further testing of the system in Antarctica and deployment to Lake Whillans for the WISSARD Project are scheduled for late 2012 and early 2013, with a potential further season planned in 2013-2014, pending an extension of ARRA funding from NSF, among other factors.

The majority of the equipment is currently being staged on the ice near McMurdo Station and moved out to a test location on the McMurdo Ice Shelf for testing of the hot water drill with the additional work decks, and science and logistics modules that will be used in the field, Rack said. If everything goes well, there will be a decision to prepare the equipment for the traverse along the South Pole Traverse Route, and ultimately to melt a hole through the ice to provide access into Lake Whillans.



Melt tank

"Spikes cost pennies, but they have great effect on a track athlete's performance, especially at higher levels of competition," Adams said.



Alex Adams (left), Shawn Bernard, Tommy Brinn and Walter Bircher of Blue Inventor LLC gather at UNL's indoor track with their product, TiteSpike, in place on the track shoe.

Photos: Craig Chandler, University Communications

# UNL STUDENT TRACK-SPIKE INVENTION LEADS TO POTENTIAL BUSINESS

The TiteSpike and TiteSpike wrench help track athletes by making their shoe spikes easier to change. TiteSpike, created by UNL students, includes a through hole and a small wrench that attaches to a shoelace tip.

If necessity is the mother of invention, then track athletes who also are engineering students will look for a solution to a perennial problem: The difficulty in changing the small metal spikes on the bottom of their running shoes.

University of Nebraska-Lincoln mechanical engineering major Alex Adams developed a new spike-changing system that helps wearers more easily remove and tighten the tiny screw-in pieces. His invention has led to the start of a new venture, Blue Inventor LLC. He's chief executive officer, and three UNL student colleagues are also involved in the startup business: Walter Bircher of Omaha, Shawn Bernard of Benkelman and Chauncey Thomas Brinn of Otsego, Mich.

Adams, of York, is a junior and a former Husker athlete. His invention includes the modification of traditional spikes in two ways to create a product called the TiteSpike. He first added thread-locking technology to prevent spikes from falling out during competition. His second adaptation was a "through hole" in the TiteSpike to aid spike insertion and removal using the TiteSpike Wrench, another patent-pending creation by Adams. The small wrench is fused to a shoelace tip so it won't be misplaced or lost.

Traditional spikes can stick in a shoe's threads and ruin it, Adams said. Yet the mechanics of spikes' insertion and removal basically hasn't changed for decades.

"Spikes cost pennies, but they have great effect on a track athlete's performance, especially at higher levels of competition," Adams said.

Blue Inventor LLC worked with NUtech Ventures, the nonprofit organization responsible for building partnerships between the University of Nebraska and the private sector. NUtech Ventures filed patent applications on behalf of Blue Inventor LLC and connected the startup with potential business partners to manufacture and sell TiteSpike.

Adams began working on his invention with UNL's Advanced Surgical Robotics Lab during summer 2011. While using lock nuts for a lab project led by engineering professor Shane Farritor, Adams said he realized this mechanism could be adapted to change track spikes. This spring, Adams took the College of Engineering course, Entrepreneurship for Engineers, co-taught by Farritor and David Conrad, executive director of NUtech Ventures. Class sessions prompted Adams to refine the Tite Spike design, and he then completed an Entrepreneurial Boot Camp offered by NUtech last May.

"NUtech would like to work with more students like Alex," Conrad said. "People often hear startups and licensing and think only of faculty researchers. In reality, students and postdocs are critical components of an innovation ecosystem, and can help make UNL's culture more entrepreneurial."

Adams said he and his partners are grateful for the advice and mentorship.

"The UNL resources and courses helped me to keep things simple and focus on the product's usability," Adams said. NUtech Ventures also connected him with another mentor: UNL alumnus Kim Blair, founding director of the Massachusetts Institute of Technology's Center for Sports Innovation, who offered additional sports business advice.

Adams' brother, David -- a UNL electrical engineering graduate who competed in the 2012 U.S. Track and Field Olympic Trials in Eugene, Ore. -- inspired the TiteSpike inventor to send his products with Husker Olympians to the London Games. Blue Inventor LLC also obtained approval from three international organizations for use of the TiteSpike in London -- the International Association of Athletics Federations, the International Olympic Committee, and Mondo, a track surfacing company.

Adams has done his own machining and testing on a small scale for the TiteSpike and TiteSpike Wrench, and is deciding whether to attempt licensing his products or to scale up production with U.S. manufacturers. He also offers the TiteSpike and TiteSpike Wrench to runners through the Lincoln Running Co., the UNL Athletic Department and area high schools.

— Carole Wilbeck

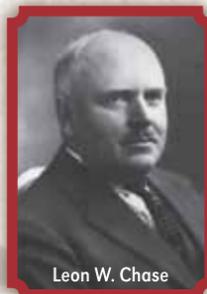
**Nebraska**  
Engineering

# BIOLOGICAL SYSTEMS Engineering

## 100 YEARS of Engineering, Education & Research

The department has been known by several names over the century:

- 1907–Farm Mechanics Department
- 1910–Agricultural Engineering Department
- 1990–Biological Systems Engineering Department



Leon W. Chase

- College of Industrial Arts 1877  
–Teaching in Engineering and Agriculture
- 1904 Farm Machinery Hall
  - 1907 Farm Mechanics Department
  - 1909 Colleges of Engineering and Agriculture
  - 1910 Agricultural Engineering Department
  - 1919 Chase Hall completed

### First Agricultural Engineers

- Oscar Van Pelt Stout (1895 School of Agriculture)
- J. Brownlee Davidson (ME 1904)
- Leon W. Chase (ME 1904)
- C.K. Shedd (1919 1st Engineer-in Charge of Tractor Testing)
- Jacob Waggoner (held first degree in Agricultural Engineering in U.S., from Iowa State College in 1910)

### 1912 First Neb. Graduates with degree in Agricultural Engineering



Ivan D. Wood

- Ivan D. Wood
- Eber B. Lewis
- Claude D. Kinsman

### 1914 First M.S.

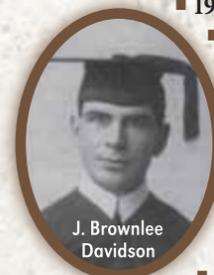
- Ivan Wood  
–First Extension Agricultural Engineer

### Oscar Van Pelt (O.V.P.) Stout

- 1888 Civil Engineer degree
- 1890-91 Instructor in Civil Engineering
- 1893 In Charge of Civil Engineering Department
- 1895 Agricultural Engineer in AG School
- 1895 Irrigation Engineer in Experiment Station
- 1907 P.E. First year of Engineering licensure in U.S.
- 1912 Dean of the College of Engineering
- 1918-19 Major of Engineers, U.S. Army
- 1920 Irrigation Engineer, USDA
- 1928 Honorary Membership in ASAE
- 1932 Honorary Doctorate by University of Nebraska
- 1932 First Recipient of the Cyrus Hall McCormick Gold Medal from ASAE  
–Declared “Father of Agricultural Engineering”



Oscar Van Pelt (O.V.P.) Stout



J. Brownlee Davidson

### L.W. Chase and J.B. Davidson

- 1903 L.W. Chase was Instructor in Mechanical Engineering
- 1904 J.B. Davidson was Instructor in Forge and Farm Machinery
- 1904 Davidson taught Farm Machinery and Chase taught Foundry and Forge
- 1905 Davidson went to Iowa State College
- 1907 Chase led Farm Mechanics Department
- 1904 senior thesis by Chase and Davidson—designed, cast, and assembled a 2-cylinder engine and tested using home-made prony brake.
- 1907 were founding members of ASAE
- Were founding members of Sigma Tau Engineering Honorary (now Tau Beta Pi)
- 1908 Published two texts: Farm Machinery and Farm Motors  
First texts in new profession of Agricultural Engineering
- 1914 J.B. Davidson received first professional degree in Agricultural Engineering from University of Nebraska
- 1914 L.W. Chase received reciprocal professional degree in Agricultural Engineering from Iowa State College
- J.B. Davidson was first president of ASAE
- L.W. Chase was 6th president of ASAE
- Both were judges from 1908-1913 for the Winnipeg Plowing contests
- Chase tested 90 tractors near Fremont, Neb. in 1917 using three dynamometers
- Chase provided technical input to Nebraska Tractor Test Law in 1919 while in the Army in Washington, D.C.

### C.K. Shedd

- Taught Farm Machinery at University of Nebraska
- 1919 First Engineer-in-Charge of new Tractor Testing program at University of Nebraska
- USDA Engineer at Kansas State, Missouri, and Iowa State  
–Best known for developing design loads for grain bins

### BSE's new leader for a new century

As the department celebrates 100 years since its first graduate in 1912, new BSE department chair Mark Riley—who began work October 15—looks forward to leading its programs.



Mark Riley

A Michigan native with degrees in chemical engineering from the University of Michigan and Rutgers, Riley spent the past 15 years at the University of Arizona, where he became department head of Agricultural and Biosystems Engineering in 2009.

Finding himself at home among bio-engineers, Riley advanced the field as founding editor-in-chief of the peer-reviewed Journal of Biological Engineering ([jbioleng.org](http://jbioleng.org)).

His favorite part of teaching is engaging students in learning—leading classes with “not just equations but trying to help young engineers understand what matters and why engineering is so important to our economy and our environment.”

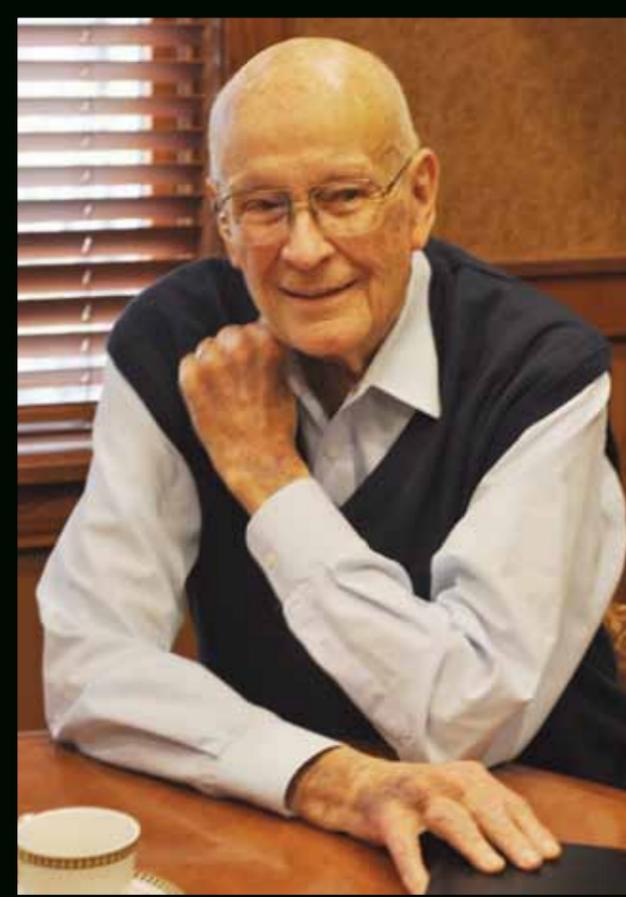
Riley values his skills as a “matchmaker”: bridging academia and industry, and even different disciplines within engineering and life sciences. “The engineer and the life scientist don’t always speak the same language and often have different goals,” Riley said, “but I enjoy finding ways to help them communicate and work together.”

From growing up in Detroit, he learned early on that new visions are necessary. For example, “we’ve got to rethink manufacturing,” Riley said. “Any new products can’t have wastes that contribute to landfills; we need to use all the energy and byproducts available. It is exciting to come to Nebraska to continue the development of smart machinery, biomedical devices, renewable energy and agricultural products. We need to explore more deeply the human-machine interface by using our expertise in machinery testing integrated with our biomedical applications.”

The Albuquerque-based company Riley co-formed with his business partner Dr. Robert Klein, RediRipe, grew from his research involving sensors—in this case, labels indicating fruit ripeness. Nebraska Innovation Campus intrigues Riley, and he’s eager to learn more and help BSE faculty and students be involved.

“Our diverse department has phenomenal people—faculty, staff and students—and it’s a great time to be doing this kind work,” Riley said. “There’s a wonderful blend here of the traditional and the futuristic, but at the end of the day the key is how well our work helps people lead healthier and more prosperous lives.”

# In His Words ... Wisdom From a Lifelong Career at 3M



Dr. Lester Krogh, '45 CHME

The vast experiences and knowledge of our alumni are a valuable asset for the college. Under the direction of UNL College of Engineering Dean Dr. Timothy Wei, staff are embarking on a project to video-interview graduates to capture these stories and share with students, faculty and other alumni.

In September 2012, Dr. Wei began this initiative with one of our esteemed Chemical Engineering alumni, Dr. Lester Krogh, '45, of St. Paul, Minn., by taping three hours of his recollections from college through his 40-year career at 3M.

From his humble beginning in the small town of Ruskin, Neb., Krogh came to the University of Nebraska at age 16 to become a chemist: "I found out chemical engineering had more chemistry so that's what I became." He received his master's degree from Nebraska and then earned his Ph.D. from the University of Minnesota. His career began and ended at 3M, where he retired as senior vice president of Research and Development.

Below are samples of Krogh's words of wisdom and memories as one of 3M's leaders.

## In the Beginning

At 3M, I was immediately assigned to a completely new field of photochemistry. We had recently introduced a pre-sensitized printing plate -- a graphic plate. They were looking for new compounds to put on that plate. I never succeeded better than the ones already being used, but on the other hand I also had some positive plates put on the market which were successful.

About that time I had an offer from the director of the chemistry section of Central Research to go to the Coated Abrasives division. The director was recruited to be the technical director and he asked me to set up a research group there. I spent 10 years with coated abrasives -- sand paper; I think these were the most interesting years I spent during my entire 3M career.

## Being Inventive

One of the things I started with was trying to find ways of adhering coated abrasives to polyester backing -- Mylar -- and found some ways in which to do it and patented them. About that time we were into magnetic tape -- which was a big thing at 3M in those days -- television was just coming in and the original television recorders were very tough on tape. It was almost like you had an old-fashioned battery machine just banging away at this stuff. It couldn't keep the coating on the tape at all. With what I discovered, they were able to do that and were very successful with videotape. About the time I retired, some 30 years later, they finally phased it out. It was quite a long lasting thing and also said something about 3M.

## Encouraging Innovation

At 3M it was decided that, in coordination with R&D, all technical people get 15 percent of their time to work on anything they wished. Not very often used, but it certainly was an incentive and when I was

*"Always be inquisitive ... You've got to be a little bit daring. Creating something new is what you are trying to do, all the time."*

the R&D vice president, I wanted to increase participation. People kept saying they didn't use their 15 percent. Well, we found out our technical director was sometimes the reason they did not use it, for the simple reason the director wanted results. So that kind of said don't take time off to work on something. We set up a fund that I could sponsor as VP of R&D, and we got a couple of senior corporate scientists to help out. A small committee would look at proposals from anyone in the laboratory for anything they wanted to work on, and we would give them money if we thought it was a pretty good idea. The first round, we had about 10 of these and before a year was out, three of them went on the market. It just keeps right on going and tells you that management has to sponsor research.

## In Management, Don't Second Guess

This can kill more things than you can imagine. Something management and 3M always says is 'don't worry about failing.' If you aren't failing, you aren't doing your job. I talked to people in various meetings and mentioned this to one fellow who said, 'That's why it's so difficult to try new products. As soon as it fails, you're gone. You don't have a job.' We've never fired anyone for failing. If they didn't work hard or didn't try, sure. But failing on a project, no.

## Easy communication, from the top

At 3M, we learned very early that communication at the top was our key to success. Abrasives was in the oldest building 3M owned--a very productive place. And back in the '50s, we had the best coffee around ... Steve and Don on the first floor would come every morning for coffee and just talk -- lab and management were great like that. Every once in a while, our major competitor would bring out something better than us. One thing I appreciated

about our team was that they were good in a number of fields. We'd analyze what [competitors] did with a variety of products and within two weeks we'd have something better.

## Advice for Students

One of the things that you have to be careful of as an engineer is that you don't hide anything. Tell the truth, all the way. If the experiment went lousy, tell them. If you can't figure it out, get help. One of the important things at 3M is you can talk to anybody; there is no restriction.

Always be inquisitive. Be very curious as to what happened. You've got to be a little bit daring. Creating something new is what you are trying to do, all the time. You've got to know the science, too. We've had to turn projects off because people didn't realize a scientific barrier showed it's not possible to do this. And unless you understand that, sometimes you waste your time. Talking to other people can quickly help you understand what else to do.

## The Nebraska Connection

When I came close to retiring, a number of Nebraska graduates in chemical engineering were at 3M, some who graduated shortly after WWII. Just before I retired, four of us from Nebraska were still in the top ranks of 3M -- Lew Lehr '44 was the chairman of the board, Gerry Mueller '50 led engineering, Lauren Morin '50 was manufacturing, and I had research. We all retired at about the same time and I was the last of the "Nebraska Mafia" to retire.



Lester Krogh, '45 B.S. Chemical Engineering and '48 M.S. Organic Chemistry, meets with Nebraska Engineering Dean Tim Wei.

Learn a lesson on "sticking with it" -- from the invention of Post-It Notes. Go to <http://go.unl.edu/postit> to learn the story of "an adhesive that wasn't supposed to be made" (but became Post-it Notes) while Nebraska Engineering's Lester Krogh '44 CHME led research at 3M Co.



Luke Smith

## LUKE SMITH: ENGINEERING MIND, ENTERPRISING APPROACH

**L**uke Smith has traveled far, geographically and on his career path, since earning his bachelor's and master's degrees in electrical engineering at UNL. Yet, a new challenge this fall finds him

reaching back to Nebraska, working as a mentor with clients of NUtech Ventures—the technology commercialization group that's helping new business grow from the university.

After graduating, Smith entered the U.S. Army and later earned an MBA from Westminster College in Salt Lake City. He advanced to lead engineering organizations, manufacturing operations and product divisions in large public companies. In 1995, he entered the world of startups: rising to serve as chief executive for several technology-based companies. As a result, he has extensive experience obtaining funding for startups, and shares that expertise to consult, mentor and serve on several boards in the startup space.

Amid this heady mix, Smith applies an engineering mindset that's rarely idle—a trait shaped at UNL. Recalling an important figure in his electrical engineering studies, Smith said: "Professor Nick Bashara brought me into his electrical engineering materials department" and helped Smith as a student join a project funded by the National Science Foundation—which enabled Smith to gain grant and fellowship support and to produce two publications, one as an undergraduate, in prominent journals.

"This was invaluable experience," said Smith, "to get outside of the classroom and explore the materials program, that's been the basis for my career—a good, solid base." Dr. Ezekiel Bahar is another faculty favorite: "He always had high expectations for his students and kept us busy with homework. This taught us the complex stuff we needed and helped develop our discipline. Now ... I can better appreciate his sense of humor."

Smith also praised his ROTC experience ("There's no greater place to learn leadership skills," he added), and his five years in the Army benefited his 35 years in the semi-conductor industry, by galvanizing his can-do approach.

"With my first startup, Synergy Semiconductor, I joined as VP of Operations," Smith said. "Until then, the company had never met its revenue goals—but once I got there, we never missed. We had the same people and hardware, but our methods and results changed. Leadership focused on people, giving the team proper direction and the opportunity to do what they do best—and produced rapid and dramatic performance improvement."

Next, as COO for Ottawa-based communications chip maker Philsar, he took the company from "nearly bankrupt" to a sale value of \$280,000,000

Canadian in 15 months. Smith cited his quick-study process as: learning the lay of the land by researching all the company's disclosures, looking at its pieces of intellectual property and finding pockets of entrepreneurship.

Similarly, his assessment checklist now with new business 'mentees' is to ask: "What's your vision--where do you want to be?" Smith explained: "To start a business, you need a competitive advantage and a core competence. You also need an idea of what your second act might be, and how to build beyond that. If you don't have good answers to those questions, then maybe your development is meant to be more of an acquisition than an ongoing company."

Though he now lives in Scottsdale, Ariz., he takes pride in his Nebraska background and 'Husker heritage.' "If there were more 'tech' opportunities (in Nebraska), I'd be living there," Smith said—which is why he's working on bringing that activity home. He invites members of the Nebraska Engineering community to connect with him in pursuit of this goal.

Learn more about Smith's role with NUtech Ventures at <http://go.unl.edu/gru>. To contact him, visit <http://www.nutechventures.org/connect/team/luke-smith> or find him on LinkedIn.



### Tesla co-founder Martin Eberhard visits Nebraska Engineering

A radiant red Tesla Roadster in the parking lot of Nebraska Hall has earned admiration for its sleek sportscar lines and sustainability. The car belongs to Don Cox, '59 B.S. and '60 M.S. ELEC, who returned to Nebraska after retiring from an active career in mobile communications (and most recently, teaching at Stanford University, where he earned his Ph.D.). This fall, Cox (fourth from right, standing) taught a course on electric vehicles for UNL Electrical Engineering, including field trips for students to test drive the car; best of all, Cox brought Martin Eberhard (fourth from left), his friend and co-founder of Tesla Motors, to speak at Nebraska Engineering. Eberhard, with degrees in computer and electrical engineering, wowed the crowd by answering a variety of questions about engineering and startups.

Professor **Jim Hendrix** is serving as interim chair for the Department of Chemical and Biomolecular Engineering. William Velandar, who held the D.R. Voelte Jr. and N.A. Keegan Endowed Chair in Engineering, continues as a CHME professor while he works on building an NIH center in years ahead. An active search is in progress for a new department leader.

Electrical Engineering graduate student **Yue Zhao** was honored with a Best Paper award at IEEE's Transportation Electrification Conference and Expo (ITEC 2012). He co-wrote the paper with EE Assistant Professor Wei Qiao and Long Wu, a researcher from the John Deere Co. Their work focused on "Oscillation mitigation for sliding-mode observers in sensorless control of IPMSMs," which has relevance in the development of hybrid electric vehicles—an area of interest to many companies.

Research led by **Namas Chandra**, professor of Mechanical & Materials Engineering, appeared in the September issue of Popular Science in "Labs That Go Boom." The feature focused on UNL Trauma Mechanics work to study the impact of shock waves from improvised explosive devices on the body and brain, and help develop protective armor for soldiers.

**Tobias Louw**, Chemical & Biomolecular Engineering graduate student, earned a prestigious UNL Fling Fellowship, including a \$20,000 stipend, tuition and fees for the 2012-13 academic year.

**David Swanson**, Computer Science & Engineering research professor, is the principal investigator with "Open Science Grid Consortium: The Next Five Years: Distributed High Throughput Computing for the Nation's Scientists, Researchers, Educators, and Students," a project receiving an NSF sub-award (via the University of Wisconsin-Madison) for \$283,000.

**Chen Li**, Civil Engineering graduate student, received a UNL Othmer Recruitment Fellowship, including an \$8,000 stipend and a departmental assistantship for three academic years.

**Cho Wing "Solomon" To**, professor of Mechanical & Materials Engineering, was named a Fellow of the American Society of Mechanical Engineers in 2012. Distinction as an ASME Fellow is the highest elected grade of ASME membership, recognizing exceptional

engineering achievements and contributions to the engineering profession.

**Engineers Without Borders – NU student chapter** won a \$1,000 Give Back BIG Award from UNL's Center for Civic Engagement in 2012; the chapter also earned this honor in 2011.

Mechanical & Materials Engineering Assistant Professor **Jung Yul Lim** received a Scientist Development Grant from the American Heart Association (AHA). Lim's lab focuses on engineering stem cell fate using extracellular cues; in this AHA-funded project, Lim's research will be applied to an obesity study toward preventing heart diseases and stroke. With this three-year, \$214,500 grant, his team aims to inhibit stem cell adipogenesis (creation of fat) by applying mechanical signal (cell stretch) and soluble factor (retinoic acid) aspects. Exploring the mechanical-biochemical interaction, the research also looks to reveal the cellular and molecular mechanisms involved in how fat is generated.

Computer Science & Engineering doctoral student **Xin Dong** serves as entrepreneurial lead in research with CSE Associate Professor Mehmet Can Vuran to develop wireless underground sensor networks providing agricultural producers with real-time information about soil moisture and changing conditions for more efficient irrigation management. They received a \$50,000 NSF Innovation Corps award, under the I-Corps program's goal to help guide commercialization for scientific discoveries that offer great benefits to society. Their project also involves CSE Professor Stephen Reichenbach as a mentor and Suat Irmak—professor of Biological Systems Engineering, interim director of the Nebraska Water Center and leader of the Nebraska Agricultural Water Management Network—as an adviser.

Research involving **Jinsong Huang**, Mechanical & Materials Engineering assistant professor, appeared in two prominent journals. Huang co-wrote "Understanding the effect of ferroelectric polarization on power conversion efficiency of organic photovoltaic devices," in

the September 2012 cover story of the journal Energy & Environmental Science. The Nov. 11 edition of Nature Nanotechnology featured Huang's paper, "A nanocomposite ultraviolet photodetector based on interfacial trap-controlled charge injection," detailing a way to detect light at a much longer distance than is currently possible, using nanocomposite hybrid photodetector (HPD) devices.

Civil Engineering's **Karen Schurr**, P.E., and **Carrie Mohlman** earned honors at ARTBA's "Women Leaders in Transportation Design & Construction" event in the summer of 2012. Schurr received the Ethel S. Birchland Lifetime Achievement Award. Named after ARTBA's executive director from the mid-1920s, it is given to individuals who have demonstrated outstanding leadership, long-term service in the industry's public or private sectors and dedication to the advancement of innovation and other women leaders. She was applauded for her leadership and work teaching at UNL and in

from left, Reichenbach, Dong, Vuran and Irmak



her prior service with the Nebraska Department of Roads. Mohlman gained the Future Industry Spotlight Award, which celebrates students who have achieved an outstanding academic record and demonstrated extraordinary leadership skills within and outside of the academic environment. As a graduate research assistant maintaining a 4.0 grade average, she conducts research on commercial driver fatigue and compiles commodity flow surveys for counties in Nebraska. She also volunteers with the "Road, Rails and Racecars" afterschool mentoring program for middle school students, which encourages young adults to explore careers in the transportation field.

The Durham School's **Lily Wang** received two awards at the 2012 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) conference in San Antonio. Wang, associate professor of Architectural Engineering, took home the ASHRAE Distinguished Service Award and the ASHRAE Ralph G. Nevins Physiology and Human Environment Award. The Distinguished Service Award recognizes society members who add their time and talent to the organization. The Ralph G. Nevins Award is given to a researcher under the age of 40 for significant accomplishments in the study of bioenvironmental engineering and its effect on human comfort and health.



Lily Wang

Architectural Engineering students **Adam Buck, John May, Jami Harper, Patrick MacBride, and Alaina Williams** won first place in the national 2012 ASHRAE Student Design Competition, HVAC System Selection. The team was coached by Nebraska Engineering alumnus Joe Hazel with Farris Engineering.

**Yongfeng Lu**, professor of Electrical Engineering, was elected president of the Laser Institute of America for 2013.

**Wei Xiong**, a graduate student in Electrical Engineering, earned second place for his research paper in the 14th Annual ICALEOR Best Student Paper Award Contest this year. His topic, "Three-Dimensional Micro/Nano-Fabrication by Integration of Additive and Subtractive Femtosecond-Laser Direct Writing Processes," was developed in work with UNL's Laser-Assisted Nano Engineering (LANE) Lab, led by Professor Yongfeng Lu.

Construction Management student **Gretchen Gould** was an intern for Kingery Construction in Lincoln during the summer of 2012.

Mechanical & Materials Engineering Professor **Mehrdad Negahban** is the author of a textbook, *The Mechanical and Thermodynamical Theory of Plasticity*, published in April 2012 by CRC Press.

Professors **Ezekiel Bahar** and **Delmar Timm** were recognized by UNL—each with 45 years of service, to Electrical Engineering and Chemical & Biomolecular Engineering, respectively. For more 2012 UNL employee milestones, see <http://go.unl.edu/q7j>.

Students **Paul Kubitschek** (Computer Engineering) and **Mirzo Mirzokarimov** (Electrical Engineering) lead UNL's American Institute of Aeronautics and Astronautics (AIAA) rocketry team in work for Rock-Sat-C, a months-long payload design competition. Last June the team participated in RockOn, a workshop at NASA's Wallops Flight Facility.

CSE Professor **Sebastian Elbaum** received \$449,033 from the National Science Foundation (NSF) for his project "Solving the Search for Relevant Code in Large Repositories with Lightweight Specifications."

In Biological Systems Engineering student **Emily Hubl's** USDA Agroecosystem Management Research Unit position, she continues her summer work in areas of environmental, food and biomedicine with a specific focus on pathogens.

MME Professor **Ram Bishu** was named an ASQ Fellow, based on his "ongoing training of quality management professionals on topics including statistical process control, Six Sigma, process reengineering through design of experiments, and configuration of quality in information systems" and his "experience in product and process evaluation and use of sophisticated statistical techniques (that) provide invaluable knowledge to a generation of quality advocates."

**Myra Cohen**, associate professor of Computer Science & Engineering, received a \$332,104 NSF award for the project: "A Web Infrastructure for Research and Experimentation in User Interactive Event Driven Testing."

**UNL Chemical and Biomolecular Engineering** was named an Outstanding Student Chapter for 2012 by national AIChE.

UNL Chemical and Biomolecular Engineering faculty and students represented the university at the American Institute of Chemical Engineers' national conference, held in Pittsburgh in October. UNL earned several honors there:

## UNL chemical engineers active at national AIChE conference

Senior Travis Jackson received one of the AIChE Donald F. and Mildred Topp Othmer National Scholarship Awards for the 2012-13 academic year.

UNL's Chem-E car finished "in the middle of the pack" at the national event. Each car, the size of a coffeemaker, must be assembled on-site and travel for 50-100 feet while carrying a 50-100 mL payload of water, with power supplied by designated chemical reactions.

Graduate student Hunter Flodman earned the AIChE Separations Division Graduate Student Research Award.



Chem-E car team

Assistant Professor Sri Kidambi chaired a Biomaterials session and two of his research group members—Amita Daverey (postdoc) and Allison Drain (undergraduate/UCARE)—gave presentations with him on Patterned Co-Culture of Breast Cancer Cells and Stromal Cells As an in Vitro Breast Cancer Model and on Topography Mediated Regulation of HER-2 Expression in Breast Cancer Cells. UNL Biological Systems Engineering Assistant

Assistant Professor Angela Pannier chaired a Gene Delivery session, and BSE grad students Tim Martin and Tadas Kasputis also gave oral presentations at the AIChE event.

The team didn't fare quite as well at a follow-up competition in Wisconsin, but the 2013 team is now at work, led by Mechanical & Materials Engineering senior Zach Blackford.

## FORMULA SAE TEAM

at an international Formula SAE event—its first time in Lincoln—the University of Nebraska-Lincoln placed 50th of 81 registered teams with scores of 66.4 in cost, 42.1 in presentation, 50 for design, and 7.5 in autocross, for a total of 166 points. But these numbers don't tell the whole story.

Here's a more telling set of figures: in its first year of competing, with just 18 months to prepare (most teams are veterans with years of competition experience), Nebraska achieved a victory: its Formula SAE car made it to the starting line

as the home team in SAE's Lincoln event, and the performance of both car and team earned respect.

The June 20-23 event, relocated by SAE from California, drew more than 1,000 participants from teams across the nation and from Mexico, Japan and Brazil. The UNL team worked to build a car that would be competitive with their peers and to help students learn from the experience. The team, now led by Mechanical & Materials Engineering student Chris Wilson, is eagerly preparing for the 2013 competition in Lincoln in June.



## BAJA TEAM CLIMBS TO TOP FIVE AT OREGON

UNL's Baja SAE team finished fourth among 79 collegiate teams at the 2012 Baja SAE Oregon competition in May—the highest finish achieved by the Nebraska Engineering team at this major competition.

"We were extremely close to getting third," said Corey Kruse, former team captain. "We ended up getting sixth place in the rock crawl, sixth place in the hill climb, 14th in maneuverability and ninth place in acceleration. We finished fifth overall in the dynamic events (those four individual events pooled together) and ninth place in the endurance race. We also got 16th in design and 15th in cost." Kruse said these results combined to give Nebraska the fourth place finish overall.

The team didn't fare quite as well at a follow-up competition in Wisconsin, but the 2013 team is now at work, led by Mechanical & Materials Engineering senior Zach Blackford.



UNL's 2012 Baja SAE team

In Memoriam



Bill Splinter

**Dr. William "Bill" Eldon Splinter '43**  
**AGEN**, George Holmes Professor Emeritus of Biological Systems Engineering, died Sept. 26 in Lincoln. He was 86.

Today@UNL noted: "He served UNL as a professor, department head, dean, vice chancellor and museum director." UNL College of Engineering Dean Tim Wei said, "In many ways Bill was the heart of our Agricultural

Engineering and Biological Systems Engineering programs, and he will be greatly missed."

Splinter was born Nov. 4, 1925 and grew up at his family's irrigated farm near North Platte. Attending college in Lincoln, he chose Agricultural Engineering as a major and later described entering that program of study as finding another home: "I had now found people who spoke my language." He earned a bachelor's degree from the University of Nebraska in 1943, and received a M.S. and doctorate from Michigan State University in 1951 and 1955. Splinter was a veteran, serving in the U.S. Navy, including duties as a radar operator.

He taught at Michigan State and North Carolina State before returning to Lincoln in 1968 to head Agricultural Engineering (now Biological Systems Engineering). Splinter was elected to the National Academy of Engineering in 1984. He also served as national president of the American Society of Agricultural Engineers, and was a member of the American Association for the Advancement of Science.

At Nebraska, Splinter was named interim vice chancellor for research in 1990, and was vice chancellor for research from 1992 until retiring in 1993. He returned as interim dean of engineering (1994-95), a post he again held from 2001-02. In September 2002, he served as interim director at the University of Nebraska State Museum. He played a vital role in developing the Lester F. Larsen Tractor Test and Power Museum. He retired as director of the tractor museum in 2011.

UNL's Splinter Lab is named in his honor, and he called it one of the greatest honors in all of his professional recognition. He wrote,

"This facility has special meaning to me as I had laid out the design to specifically house the major noise generating functions of the department ... the tractor testing lab, the engines lab, the machinery lab and the shop along with flexible research laboratories."

With his late wife, Eleanor, he established both a student scholarship fund and an endowed professorship at UNL. As recently as this month, Splinter was working on the history of the Biological Systems Engineering programs, for their centennial being celebrated this year.

A memorial service was Oct. 1 at First Lutheran Church in Lincoln. The College of Engineering extends our sympathies to Splinter's family—his wife, Betty; and his two sons, two daughters, and grandchildren—and friends, especially in the UNL BSE department.

**Wendall Clayd Robison** died Sept. 17; he was 89. Born in Des Moines, he was a WWII U.S. Navy veteran. Robison was a professor of Electrical Engineering at UNL for 39 years and retired in 1988. The college extends condolences to his wife, son and two daughters, grandchildren and great-grandchildren.



Donna Koch

**Donna Koch**, with a 31-year career as a research librarian in the University of Nebraska-Lincoln Library system, died Oct. 30. She was especially devoted to the Engineering Library and the students it serves, and had helped students prepare their Engineering Learning Community presentations for the annual Spring Break city visits with alumni. Director of Retention Dave Williams, who leads the ELC trips, said, "Donna worked closely with our students to introduce them to resources available in the Engineering Library and incorporate credible research. ... Traveling with our groups, she was very student centered and focused, and enjoyed getting to know the students beyond a superficial level. Her positive nature, dedication to students, and professionalism will be missed." In a message to the COE community, Dean Tim Wei said, "As our college remembers Donna, we value her work and appreciate her friendship with us, and we extend our sympathies to her family."

1970s

**Daniel N. Wolff**, P.E., '70 MECH of Waverly, Neb., received the American Society of Mechanical Engineers' Safety Codes and Standards Medal. Wolff is a staff engineer with The Manitowoc Company's Crane Division, based in Manitowoc, Wisc., and was recognized for more than 25 years of service on ASME's B30 Standards Committee as well as related leadership contributions.

**Ronald B. Kratzer**, P.E. '73 EE (right) was joined at the Fall 2012 UNL Career Fair by his son, Scott Kratzer '06 MECH. While recruiting alongside 140+ employers at the Career Fair's Engineering Day, Ron shared that he is a manager of System Planning with Lincoln Electric System, and Scott is a mechanical design engineer with Emerson in Marshalltown, Ia. With Emerson, Scott works on smart wireless capabilities for industrial instruments and controls; his team recently earned a patent for an antenna application.



Scott and Ronald Kratzer

1980s

**Mark Hoffman** '85 MECH is director of 787 Engineering with the Executive Program Management Office at Spirit AeroSystems, Inc. in Wichita Kan. He's responsible for "Section 41": the aircraft's front end cabin. He also led development of the Dreamliner's pylon suspension for mounting the aircraft's engine under the wing.

1990s

**Tom Pick** '93 BS MECH, '97 MS IMSE is the engineering manager for BD in Columbus, Neb. He led tours for 100 of the 400+ Nebraska Engineering Learning Community students who visited Columbus industries on an afternoon in September. At the east and west sections of BD's local operations for consumer health industry products, the students saw needle manufacturing assemblies and robotics for sterilization processes.

2000s

At UNL's Fall 2012 Career Fair, **Glen Stach** '00 and **Jeremy Baum** '01 (both CONM) added their perspectives on behalf of JE Dunn.

**Alex Person** '07 CENG is a product support engineer with National Instruments in the Compact Rio software group based at Austin, Tex.

**Bryan Ingram** '08 MECH is a mechanical engineer with Segra Engineering & Technical Services in Overland Park, Kan. His work includes stress analysis and piping design for power plants.

**John D. Smith**, E.I. '08 CIVE is a roadway engineer with HDR in Omaha. He has worked on improvements in the Qwest Center field area for the College World Series, and on projects for Ellsworth AFB in South Dakota. He's currently studying to take the P.E. exam.

**Kate Hinsley** '09 CHME is a process engineer with Koch Nitrogen Co., LLC in Beatrice.

**Ryan Hulme** '09 AGEN is a design engineer with product marketing for Orthman in Kearney. He works on GPS guidance serving implements for strip tillage and precision nutrient placement applications.

Alumnus Burton earns OPPD Engineer of the Year honor

Omaha Public Power District's Society of Engineers (OSE) has honored Tom Burton, OPPD's manager of Design Engineering, as its 2012 Engineer of the Year. The annual award recognizes an OPPD engineer for his or her significant contributions to the engineering profession.

Burton, who earned his B.S. degree in Mechanical Engineering at UNL, has worked 32 years for OPPD and currently leads its Mechanical/Civil and Electrical Engineering areas. He has demonstrated "technical ability and attentiveness to the needs and development of fellow engineers," according to an OPPD release. Burton was project manager on the \$10 million North Omaha Coal-Handling Upgrade Project in 2000 that modernized the system and allows the plant to move coal faster. Burton also mentors young engineers, volunteers at the Stephen Center homeless shelter and is a deacon with Holy Cross Catholic Church in Omaha.



Tom Burton



Glen Stach and Jeremy Baum

2010s

**Scott Barker** '10 BSE is an environmental engineer with Koch Nitrogen Company.

**Eric Jonza** '10 BS, '12 MS CIVE is a bridge engineer with HDR.

**Holly Lohmeier** '10 IMSE is a manufacturing engineer with Schneider Electric North America. She works on LEAN project materials handling, plus developed and oversees the Lincoln site's train system for production supplies. She also focuses on continuous improvement for the company.

**Dave Painter** '11 CHME is a project engineer focused on maintenance and reliability for Cargill in Ottumwa, Ia.

**Brock Weeldreyer** '12 CHME is a process engineer with POET Plant Management. He works on optimization for making today's plants more efficient. He interned two summers with the company and was hired soon after he graduated.

Stelling welcomed at 2012 Masters' Week

When a vice president of Burns & McDonnell speaks to a Nebraska Engineering class, students listen. When that VP is an alumna of your college, her words carry even more meaning.

That was the case when Karen Stelling returned to UNL in November for 2012 Masters' Week. Each year, the Nebraska Alumni Association invites graduates who've excelled in their careers to return to campus and engage with current UNL students, faculty and staff.

During her visit, Stelling talked with students about the opportunities of challenges ("with a tight deadline, you learn more at a faster rate") and teamwork ("you know you'll finish the project—the question is, will your contributions be remembered for making the time more or less productive").



Karen Stelling

Stelling, a 1987 UNL graduate who majored in mechanical engineering, joined Burns & McDonnell 24 years ago as a design engineer, working her way up in a male-dominated field. Today she encourages young people to pursue engineering by co-chairing the Kansas City Metropolitan Area Industry Council for Project Lead the Way, an engineering curriculum for middle and high school students. Stelling also serves on Nebraska Engineering's Executive Advisory Board.

## CAREER DEVELOPMENT

# Meet the challenge. Be the leader. Define the future. M.Eng. (online degree)

From a career in central Nebraska to a position requiring trips around the country, University of Nebraska–Lincoln College of Engineering students Chelsea Clark and Michael Shaw have jobs that are putting their current Master of Engineering program to good use, no matter what the setting.



Chelsea Clark

Chelsea Clark of Kearney, Neb., works as a New Programs Manager for Eaton, a large diversified industrial company. In her current role she is responsible for managing all of the new valve program launches.

“Working with new business is always exciting,” Clark said. “I get the chance to work directly with the customer from time of design conception through production. I really like this type of environment. It is very fast paced, and it constantly challenges me to change directions and react quickly.”

But she is looking to prepare for the next step in her career, so two years ago she applied and was accepted into the UNL College of Engineering’s Master of Engineering with a concentration in Engineering Management program online.

Through the program, Clark is not only boosting her resume, she is also improving her knowledge of engineering concepts and effective administration and management skills. With a coordinated effort between the College of Engineering, which has been providing distance education for more than 25 years, and the UNL College of Business Administration, Clark is taking courses that apply to her engineering profession as well as business courses to push her career forward.

“A lot of the engineers I work with automatically think the next step in their education has to be an MBA,” Clark said, “but this program mixes things up. It is a little more interesting for us because it applies more directly to what we do, but it also offers the business side that we need.”

The engineering courses have allowed her to reconnect with information she learned during her undergraduate degree and discover new concepts

and theories. Many of the projects and real-life examples have been applicable to her job, teaching her how to analyze data and solve problems in new ways.

The flexibility of the online format has also made the program more accessible for Clark who works 60 hours a week. Her peer Michael Shaw couldn’t agree more.

Shaw is a project manager for ConAgra Foods with teams throughout the country. He makes it a priority to visit his teams at least once a month to observe progress and provide face-to-face feedback and coaching relative to organizational and personal objectives. What this doesn’t leave time for in his schedule, however, is going to class.

“I knew that if I wanted to earn my master’s degree, I would need to find a distance program to fit my schedule,” Shaw said. “I reside in Nebraska and have come to respect the state’s university system, so once I realized UNL had a long distance program, the decision to enroll was relatively easy.”

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Shaw has enjoyed the online format as it has allowed instructors to leverage available technologies and the Blackboard system. The graduate program has also improved the quality of his output and his confidence as he feels well-rounded and can carry on conversations with respect to a wide array of business and operational topics.

Clark and Shaw plan to complete their programs in the year ahead.

“There’s no doubt that a master’s degree makes me more marketable to future employers, but there’s really more to it than that,” Clark said. “I am a better engineer than when I started, but I’m also a much more well-rounded employee.”

“The MBA courses were almost all new concepts for me, and I have a much better understanding of the decisions senior managers face than I used to. Having a diversified background can only help my future opportunities and may open doors to some of those senior level positions.”

For more information about the program, visit [online.unl.edu/UNLEngineering](http://online.unl.edu/UNLEngineering).



One of the first things you learn in the College of Engineering is how to calculate things.

# Like the cost of your education.

Earning a degree in engineering takes a lot of late nights and weekends. It also takes a lot of money. That’s why scholarships are so important to the next generation of engineers.

As someone who has successfully completed the program, your College of Engineering is asking you to give back to the college that gave you so much. The up-and-coming engineers need private support for scholarships to help them realize their career dreams. And they could really use your help right now.

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## FOR THE FUTURE:

### A “robot uprising”—in awareness

**A** “robot take-over” in Nebraska? It’s actually more like a partnership, with a showcase of technology—and Nebraska versions of it—featured now at the Strategic Air & Space Museum in Ashland.

The museum hosts **ROBOTS: The Interactive Exhibition**—until January 6, 2013. Sponsored by the Ford Motor Company and built by Global Experience Specialists, Inc. (GES), the exhibit is based on the Twentieth Century Fox movie, **ROBOTS**—which depicts a world populated entirely by mechanical beings, including genius inventor Rodney Copperbottom and his friends, the Rusties.

The Museum has also partnered with the University of Nebraska at Omaha, the University of Nebraska Medical Center, the University of Nebraska-Lincoln, and the NASA Nebraska Space Grant Consortium to present a complimentary exhibit, **Innovations: Inside Nebraska Robotics**, with cutting edge robotics research and development from these campuses of the University of Nebraska.

“It is great to showcase the world-class work of UNL engineering students, and our strong collaboration with UNMC in research and education,” said UNL Mechanical & Materials Engineering Professor Shane Farritor. “We’re also excited to show our robots to young Nebraskans who might be considering STEM fields. We need to build more excitement in STEM areas and prepare young Nebraskans as strong engineers.”



**A young Nebraskan gets hands-on with a robotic arm while visiting the Strategic Air and Space Museum.**

Museum visitors can become a Robotic Explorer in deep space, underwater or on the surface of Mars. Another feature, **Build-A-Wonder-Bot**, offers robotic help with daily chores. Visitors can also try maneuvering robotic arms similar to Industrial Robots. And a **Future of Robots** display offers further possibilities to re-shape our world.

The Strategic Air & Space Museum, located between Lincoln and Omaha near Interstate 80, utilizes over 300,000 square feet of exhibit, education, and event space to ignite the thrill of discovery and innovation in guests of all ages. Learn more at <http://sasmuseum.com/exhibits/featured-exhibits/>

– Carole Wilbeck