UNIVERSITY OF NEBRASKA–LINCOLN COLLEGE OF ENGINEERING

ENGINEERING @ NEBRASKA

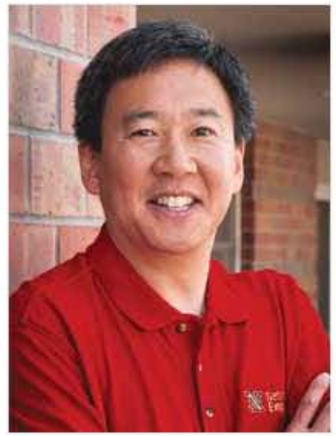
SPRING/SUMMER 2013

PUTTING IT ALL TOGETHER

ENGINEER QUILTER ERNEST HAIGHT FEATURED IN EXHIBIT

ALSO INSIDE:
E-WEEK'S CENTENNIAL
4 FACULTY WIN NSF AWARDS

FROM THE DEAN > Putting it all together



As the sole College of Engineering in the state of Nebraska, we absolutely must provide excellent engineering education, conduct high-impact research in the engineering sciences, and stay singularly focused on our service mission to the citizens and economy of our state.

For more than 100 years, this college has changed, adapted and grown to serve the citizens of not only Nebraska, but beyond these state borders. Our goal going forward is to build an engineering college for the 22nd century, strategically leveraging the infrastructure and resources in both Omaha and Lincoln, for Nebraska's future. To be among the great engineering colleges in the U.S. and abroad, Nebraska Engineering is pursuing numerous goals and initiatives, based on several immutable principles and fundamentals.

In previous editions of this magazine, we have shared our 3 Guiding Principles—excellence in the fundamentals, unimpeachable integrity, and dynamic adaptation toward excellence—and our 5 Fundamentals: offering excellence in engineering education pedagogy and practice; providing excellence in fundamental engineering sciences research; engaging in and leading critically important multidisciplinary problem-solving teams; maintaining strong, meaningful partnerships with our constituent communities; and keeping a singular focus on our service mission, individually and as an organization.

We are applying these as we define a set of engineering education initiatives. Several aspects will particularly reshape our undergraduate education.

- Our college is undertaking a comprehensive curriculum assessment and revision to ensure the core engineering knowledge and skills needed by students in each engineering discipline are delivered effectively and efficiently, college-wide.
- We are working on a freshmen engineering tools and methodologies course to provide incoming students with instant hands-on exposure to skills including machining, electronics, etc., in Lincoln and Omaha—preparing our students for future design and laboratory courses, and engaging them in practical engineering skills and experiences early in their studies.
- Another change in our course delivery methods will be adding tele-presence classes, with state-of-the-art virtual classrooms supplementing our other course delivery methods. Deployment of the first inter-campus 'NU View' classroom is anticipated this fall.

We are also creating engineering leadership/professional development curricula, intended to prepare future engineers for leadership within their professions and across society. With the hiring of Karen Stelling, former VP at Burns & McDonnell, as Professor of Practice, we have formally initiated a university-industry-government collaboration in developing pilot curricula, with initial course delivery anticipated for January 2014. It is anticipated the bulk of this curriculum will be offered primarily in Omaha initially, due to the strong industry base.

And we have a long-term goal to continue to improve our graduation rates in engineering. Components include creating professional student services staff/centers—with advising, career services and student life—and hiring a cadre of Professors of Practice to teach iconic design and leadership curricula. We will bolster our engineering student learning communities throughout the college, and further develop peer mentoring and support structures.

We're intent on building a single nurturing community around the engineering education, service and research enterprise. We're building this community throughout the college and into our students' lifecycles with us, which begins with recruitment coordinated across the entire college.

We also want to ensure our students have access to opportunities at all of our locations. One step in making access across campuses more consistent is our effort to provide our students in Omaha with opportunities for tickets to UNL sporting events, beginning with Husker football. Discussions have begun to initiate bus service to enable students from either campus to conveniently access the other as our curricula merit.

Our college embraces its challenge and opportunity of being one college in two cities on three campuses. We see it as a way to expand our student experience as well as the scope of our outreach and service to the state and industry.

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

BIG | N Nebraska Engineering

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VILJOEN NAMED CHAIR FOR CHEMICAL ENGINEERING

Hendrik "Henk" Viljoen ("vil-YOON"), Ph.D., is leading the Department of Chemical & Biomolecular Engineering, beginning July 1. Viljoen succeeds Professor James Hendrix, who served as interim department chair for the past year.

Viljoen is a Distinguished Professor with the college and has been with the CHME department since 1993. He holds Ph.D., M.S. and B.S. degrees from the University of Pretoria, South Africa, and has taught chemical engineering computation and advanced chemical engineering analysis courses at UNL. He is a member of the editorial board of Computational Biology & Chemistry, and received a 2005 UNL Multidisciplinary Research Award, among other honors. Viljoen's research is helping develop new technologies with the potential to diagnose tuberculosis (TB) in the developing world more quickly and accurately than current tests.

"After a nationwide search, it's wonderful to find leadership talent within our college," said Dean Wei. "We appreciate the service of Jim Hendrix, who has contributed much to the college through the years, and we value Henk's commitment to the college and the university, as we look forward to working with him in further growth for the Chemical & Biomolecular Engineering Department."

Chemical & Biomolecular Engineering includes 12 faculty and approximately 250 students pursuing B.S., M.S. and Ph.D. degrees at Othmer Hall.

LINZELL TO LEAD UNL CIVIL ENGINEERING

Nebraska Engineering Dean Tim Wei announced March 1 that Daniel G. Linzell, Ph.D., P.E., will lead the Department of Civil Engineering, beginning this summer.

Linzell comes to UNL from Penn State University, where he has been Shaw Professor and director of PSU's Protective Technology Center during his 14 years with the Civil and Environmental Engineering (CEE) Department. He earned his Ph.D. and M.S. from the Georgia Institute of Technology, and his B.S. at The Ohio State University—all in Civil Engineering.

His research focuses on bridge engineering, force protection and structural hardening; his research interests and experience include laboratory testing, computational simulation and structural health monitoring. Linzell has taught courses such as steel structures, bridge design, structural analysis and structural health monitoring.

Linzell has Professional Engineer certification from the Commonwealth of Pennsylvania and the State of Georgia. As a member of the American Society of Civil Engineers, he participated in several ASCE committees and served as chair of its Steel Bridge Committee. He is a member of the American Institute of Steel Construction, the Structural Engineering Institute and the Structural Stability Research Council. He is an affiliate of the Transportation Research Board and chaired TRB's AFF20(1) Subcommittee: Methods of Analyzing Steel Bridges.

"We are thrilled Dan is at UNL and know he'll have a huge impact on civil engineering and the university," Wei said. "He comes to us with demonstrated leadership, teaching and research experience and is going to be a wonderful fit in our institution. He and his family will also be a terrific addition to the Lincoln community."

The Civil Engineering Department includes more than 20 faculty and approximately 550 students pursuing B.S., M.S. and Ph.D. degrees with programs offered in Lincoln and Omaha. Studies include environmental, geotechnical and materials, structural, transportation and water resources engineering.

ELC In SoCal - Forty Nebraska Engineering students from Lincoln and Omaha campuses enjoyed visiting San Diego, Calif. during this year's annual Engineering Learning Community trip. The itinerary included a visit to NASA Jet Propulsion Laboratories, naval facilities and technology firms. Thanks go to alumni of the college, who connected the young engineers with memorable experiences--including this JPL tour featuring robotic rovers.

DZENIS TEAM'S NANOFIBERS: THINNER, STRONGER, TOUGHER

UNL materials engineers have developed a structural nanofiber that is both strong and tough, a discovery that could transform everything from airplanes and bridges to body armor and bicycles. Their findings are featured on the cover of an April 2013 issue of the American Chemical Society's journal, ACSNano.

"Whatever is made of composites can benefit from our nanofibers," said team leader Yuris Dzenis, McBroom Professor of Mechanical & Materials Engineering and a member of UNL's Nebraska Center for Materials and Nanoscience. "Our discovery adds a new material class to the very select current family of materials with demonstrated simultaneously high strength and toughness."

"Our discovery adds a new material class to the very select current family of materials with demonstrated simultaneously high strength and toughness."
-Yuris Dzenis, Ph.D.

In structural materials, conventional wisdom holds that strength comes at the expense of toughness. Strength refers to a material's ability to carry a load. A material's toughness is the amount of energy needed to break it; the more a material dents, or deforms in some way, the less likely it is to break. A ceramic plate, for example, can carry dinner to the table, but shatters if dropped, because it lacks toughness. A rubber ball, on the other hand, is easily squished out of shape, but doesn't break because it's tough, not strong.

Dzenis and colleagues developed an exceptionally thin polyacrilonitrile nanofiber, a type of synthetic polymer related to acrylic, using a technique called electrospinning. The process involves applying high voltage to a polymer solution until a small jet of liquid ejects, resulting in a continuous length of nanofiber.

They discovered that by making the nanofiber thinner than had been done before, it became not only stronger, as was expected, but also tougher. Dzenis suggests that toughness comes from their nanofibers' low crystallinity. In other words, it has many areas that are structurally unorganized. These amorphous regions allow the molecular chains to slip around more, giving them the ability to absorb more energy.

Most advanced fibers have fewer amorphous regions, so they break relatively easily. In an airplane, which uses many composite materials, an abrupt break could cause a catastrophic crash. To compensate, engineers use more material, which makes airplanes and other products heavier.

"If structural materials were tougher, one could make products more lightweight and still be very safe," Dzenis said.

Body armor, such as bulletproof vests, also requires a material that's both strong and tough. "To stop the bullet, you need the material to be able to absorb energy before failure, and that's what our nanofibers will do," he said.

Dzenis' co-authors are colleagues Dimitry Papkov, Yan Zou, Mohammad Nahid Andalib and Alexander Goponenko in UNL's Department of Mechanical & Materials Engineering, and Stephen Z.D. Cheng of the University of Akron, Ohio.

This research was funded by the National Science Foundation, the Air Force Office of Scientific Research and a U.S. Army Research Office Multidisciplinary University Research Initiative grant.

-Gillian Klucas

NEBRASKA DOMINATES TOP FIVE IN IBM/IEEE SMARTER PLANET CHALLENGE

Two teams led by Nebraska Engineering students earned top-five status in the 2012 IBM/IEEE Smarter Planet Challenge, an international competition for college/university teams improving the world's technology solutions.

Achieving fourth place was "SEER," a project to enhance television viewing by adding additional video input sources on-screen for a layered multimedia experience. SEER team leader Robert Boulter, a senior Electronics Engineering major, said the team used its $2,000 prize from the Smarter Planet Challenge to develop a furter prototype.

The SEER team worked in-class and during additional hours each week during fall semester at Omaha's Peter Kiewit Institute. The interdisciplinary group includes Hong-Yen Hoang, an accounting major at the University of Nebraska at Omaha; Marc McCaslin, a senior Electronics Engineering major; Sara Shinn, a senior who majors in Computer Engineering with UNL and Computer Science at UNO; and Timothy Struble-Larsen, a senior studying Electronics Engineering.

Another UNL team earned fifth place in the 2012 Smarter Planet Challenge with its Geographic Information System (GIS)-based Wind Farm Suitability and Planning Study. Led by Salman Kahrobaee and Dingguo Lu, Electrical Engineering graduate students, team members also included UNL GIS and Remote Sensing students Tarlan Razzaghi, Anthony L. Nguy-Robertson and David Gibbs.

Lu and Kahrobaee had worked on the initial concept in a Wind Energy class taught by Jerry Hudgins, professor and chair in the Electrical Engineering Department. They further developed their work with teammates and UNL School of Natural Resources Professor Don Rundquist to help layer data on site topography, wind patterns and other environmental factors for more informed and effective placement of wind turbines.


Seer Team


Wind Farm Team

"It's great that what we learned in class can apply to real challenges," said Lu. Kahrobaee added, "It was fun to work this project with students from other disciplines." Their team's $1,000 prize will help them refine their work for potential commercialization.

FOR THE FUTURE: UNL WOMEN ENGINEERING STUDENTS LEAD SCOUTS' STEM SESSION

The industry-wide initiative "Introduce A Girl to Engineering Day" got an early start in 2013 as UNL women engineering students helped a Lincoln Brownie troop earn their "Inventor Badges" on Feb. 12.

UNL's Society of Women Engineers chapter became role models for the younger girls' interests in science, technology, engineering and math. The SWE members guided the girls in finding new ways to solve problems by looking at what's needed to address a challenge, generating possibilities and deciding on steps to develop ideas, then presenting their innovations.

Brownies' inventions at the event included robot alarm clocks to help elementary school girls remember what to wear and bring each morning for different days' activities. The Brownies also considered alternative delivery methods to get their lunch to school, if they forget it at home.

Katy Conroy, a junior majoring in Biological Systems Engineering, used her past experience as a counselor at YMCA Camp Kitaki, as well as her expertise in problem-solving from engineering studies, to lead the session. Her UNL SWE colleagues included Kristen Cope, Gaby Arellano, Rachel DeFusco, Victoria Fry and Vasudha Sharma.

Troop 20489 leader Danielle Erdley said, "The SWE students did a great job … the (Brownie) girls really enjoyed themselves" with the session.


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

The national Society of Women Engineers recently announced a partnership with Girl Scouts USA to connect girls with female role models and grow girls' interest in science, technology, engineering and math careers.

DOWNTOWN UPGRADE: DURHAM SCHOOL STUDENTS HELP NONPROFITS IMPROVE FACILITIES

Sure, Lincoln Haymarket development projects' new arena, offices and residences are exciting for UNL Durham School of Architectural Engineering and Construction community members to be involved in, but that's not the only need for construction expertise in the city.

Professor Tim Wentz's ARCH 333 / CNST 305 class each year helps a local organization with planning for facility needs: renovations that may not be glamorous, but make a big difference in the quality of day-to-day services for local people in need. This hands-on work benefits the selected nonprofits and provides real-world learning that integrates prior courses' concepts for upper-level Durham students.

Wentz has led student teams for a daycare site, a campus historical building's return to functional use, and a 1910 church becoming a community center. He chooses worthy organizations where students can "apply the fundamental concepts of mechanical systems to solve an identifiable set of problems." He has found that, with a half-dozen teams of three or more students, multiple approaches yield varied problem-solving outcomes each term.

The 2012-13 location—Cornhusker Place at 721 K Street—is where "men and women with limited financial resources heal the wounds of substance abuse and become productive, contributing citizens," according to the CP mission statement.

In a project overview and during site visits, Wentz's students learned the realities of CP operations: "Our building has been utilized for the past 70 years for a variety of functions, most not aligned with the services that our agency provides today. Additionally, several of the services we provide require specialized operating areas. Some of these have been added within the building as capital funding has been available, some have not. The building's infrastructure … has been a drawback to its functionality to some extent … and questions about how to improve those infrastructure issues impact decisions about how best to use the building to meet service additions going forward." Cornhusker Place also stipulated renovation costs should not exceed $100-$130 per square foot.

On the Blackboard course hub, students studied the Request for Proposal about the project and expectations. Crucial in each student's grade (and the primary deliverable for CP) was the team response, focusing on energy efficiency and sustainability factors to minimize resource consumption in HVAC and plumbing systems, and building envelope modifications that improve the indoor environment. Incorporating appropriate Leadership in Energy and Environmental Design (LEED) credits was another expectation.


Student teams provide a "drawdel" showing their construction learning applied to project wall and roof sections.


Prof. Tim Wentz with UNL's Durham School of Architectural Engineering and Construction connects students with worthwhile community projects.

The 12-20 page project papers (with additional bibliographies and spreadsheets on heating and cooling loads and water consumption) were augmented by teams' 20-minute project interviews with CP representatives. Each team also provided a "drawdel"—half model, half drawing—depicting proposed wall and roof sections.

Several teams pushed beyond the LEED Silver levels to pursue LEED Gold certification, without significant cost increase for the client. Wentz and CP representatives praised one group's unique approach to the kitchen and dining aspects, co-locating them on the same floor and adding commercial equipment from the project wish list, while keeping the budget parameters and sacrificing only under-utilized space.

"The class did a phenomenal job of understanding our needs and the needs of our clients," said CP Executive Director Phil Tegeler. "We will use the class work to move ahead in our discussions about next steps for our building. The university's partnership in this project is greatly appreciated and will have lasting impact for our programs."

At Cornhusker Place, viewed from the west, Durham School students applied their skills. From a student's course evaluation: "I enjoyed trying to help Cornhusker Place better their building and operations … very important to Lincoln."

QUILTING LIKE AN ENGINEER

by Jonathan Gregory

Ernest B. Haight (1899-1992) attended the University of Nebraska from 1919 to 1924, earning a B.S. in Agricultural Engineering. When Dean of Engineering O.J. Ferguson saw Ernest's high grades, he asked him to consider a dual degree in Arts and Sciences to earn Phi Beta Kappa honors, which Ernest did.

After graduation Ernest returned to the land his grandparents, Lewis and Elizabeth Haight, homesteaded in Butler County, Neb., in 1871. The Haights were successful farmers and Ernest went into partnership with his father, Elmer, and younger brother, Lewis. Their prosperity eroded during the Great Depression. But Ernest and his wife, Isabelle, and their five children endured, recovered and made a living. They retired from farming in 1972.

In the dark hours after farming all day, and during the winter months after the crops were laid, Ernest made quilts—nearly 300 from 1934 to 1986. The most remarkable thing is that he made quilts from the mindset of an engineer. It was about the process for him.

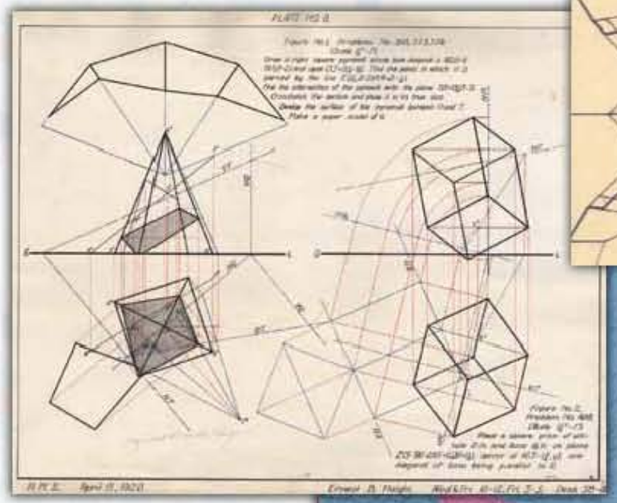
"As an engineering college graduate I think in terms of methods as well as aesthetics," he said.

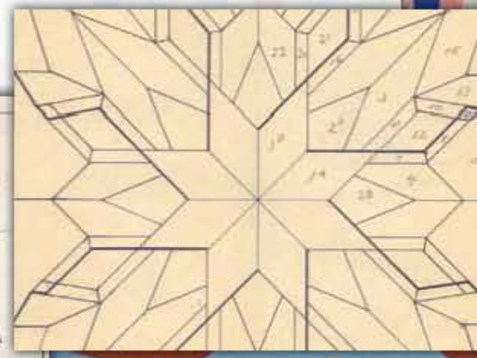
He spoke of maintaining tight tolerances in quilt construction, of the importance of "extreme accuracy," and of using "assembly-line" processes to make quilts. He also looked at every quilt as a puzzle—a problem to solve in the most efficient and accurate way.

Joe Cunningham, another male quiltmaker, recently observed that when men take up quilt-making it's often in a "spirit of competition" with women or to answer an inner challenge. For Ernest, it was both.

Ernest's first quiltmaking venture began because he "couldn't keep his mouth shut." Isabelle was finishing a quilt her grandmother had pieced 20-25 years earlier. He noticed that, "In many of the blocks, the corners of the pieces didn't fit too well. It was so obvious to me, I had to mention it, and she came right back with, 'Well, if you can do better, prove it! If not, keep still.' Soooooo, what else could I do?"

Ernest drew upon a range of experiences to meet Isabelle's challenge. As a boy, he spent countless hours in the machine shop on the Haight farm, learning the properties of materials and becoming confident in using tools and machines. As a teenager, he built a two-cylinder steam engine using materials and parts on hand. He under-engineered the boiler and it blew up, so he modified it to run on compressed air. Even his failure increased his range of skills and mechanical knowledge.





Ernest was also accustomed to precision work. As a newlywed he made Chinese wood puzzles, sometimes called burr puzzles, in which the precisely cut pieces interlocked along three axes. One of these was a combination of 27 puzzles with 216 pieces measuring just five inches in each direction. The assembly required tweezers.

Of course, Ernest had the benefit of a university education in engineering that broadened his experience of materials and processes, advanced his mathematical knowledge, and honed his problem-solving process. He had every reason to believe he could easily design and draft a precise quilt pattern, learn the properties of cotton cloth, master a sewing machine and produce a quilt with greater precision than his wife's grandmother had.

But something went wrong. Possibly due to the plastic nature of cloth, he assumed that maintaining a consistent width seam was not essential—he thought all the pieces could be made to fit with a little nudging and tugging as he coaxed them under the needle. The quilt pattern he chose required 56 identical block units assembled in an 8 by 7 grid. When sewing blocks together into rows, Ernest soon discovered that his blocks were inconsistently sized, and therefore, the "corners of the pieces didn't fit too well," just like Grandmother's quilt.

Ernest-the-engineer puzzled over the problem, arriving at a salvage plan. He measured each block and sorted them from largest to smallest. He placed the largest blocks together in a row at one end of the quilt and the smallest in a row at the other end, and then sorted the remaining blocks into rows by size in between. With a little nudging, his corners met precisely, but the quilt was 3" wider at one end than the other! Of course, he didn't call the quilt's skewed dimensions to Isabelle's attention.

THIS PAGE: Top – Ernest Haight and his quilts, 1951, Boston Studio, David City, NE. Inset - Ernest B. Haight, 1924, Dole Studio, Lincoln, NE. Above, right – Ernest Haight in his sewing area, 1965.

PAGE 7 IMAGES: Top left – Drawing of Pyramid and Cube, Applied Mechanics / Design Geometry class, Ernest Haight, 1920 (image credit: International Quilt Study Center & Museum). Top right – Blazing Star quilt, hand-drawn pattern. Ernest Haight, c. 1937. Bottom right – Blazing Star quilt, pieced by Ernest Haight, c. 1937; hand quilted by Elmer W. Haight, c. 1937 (image credit: IQSCM).

BACKGROUND – Quilt of a Thousand Prints (Sunshine and Shadow), machine pieced by Ernest B. Haight, c. 1950; hand quilted by Flora Burr Haight, c. 1950 (image credit: IQSCM).

QUILTING LIKE AN ENGINEER

- continued -

Ernest had discovered that quiltmaking challenged him intellectually and mechanically. Years later, he stated that each quilt design was like a puzzle: "…the choice of color, how best to fit the pieces together, how to 'modify' the pieces to avoid unnecessary seams…or ways to use 'assembly-line' methods in piecing the blocks."

"I rarely make more than one or two quilts of the same pattern—I have solved THAT problem," he added.

Ernest substituted assembly-line piecing for the age-old method of creating pattern templates and tracing around them on the material before cutting out the pieces with scissors. For example, rather than cut out hundreds of little squares only to sew them back together into dozens of identical designs as most quiltmakers did, he sewed together long strips of fabric side-by-side and then made cuts perpendicular to the seam lines to create pre-sewn units, reducing both cutting and sewing time and increasing consistency.

Hand quilting—the insertion of functional stitches with needle and thread to hold together the layers of a quilt—is labor intensive. Ernest did not do hand-sewing so he left the hand-quilting to others. But he could machine sew quilt tops faster than others could quilt them. To widen this bottleneck in production, Ernest mechanized the quilting process with a simple approach that required only eight to 12 hours per quilt, a mere fraction of the time required for hand-quilting. Whereas machine quilting with industrial sewing machines was common in the mattress and garment industries, quilting with a domestic sewing machine for personal use was rare. Ernest's innovation was an early influence on the development of a thriving home-based machine-quilting industry today.

Ernest assumed that understanding the mathematical relationships inherent in geometric forms and drafting those forms were basic skills possessed by everyone with a high school education. Because Ernest's experience and education had embedded these skills and the underlying principles into him, he found such tasks simple.

Nevertheless, quiltmaking exercised and expanded Ernest's abilities to solve problems and create efficient processes. As a result, for more than 50 years, Ernest made his original quilts like an engineer.

© Jonathan Gregory, 2013. jgregory3@unl.edu.
Jonathan Gregory earned his M.A. in Textile History with an emphasis in Quilt Studies from UNL in 2007. He is currently Assistant Curator of Exhibitions at the International Quilt Study Center & Museum (IQSCM) at UNL (www.quiltstudy.org). Gregory is researching Ernest Haight for his doctoral dissertation and is curator of "The Engineer Who Could: Ernest Haight's Half Century of Quiltmaking," at the IQSCM.

The Engineer Who Could: Ernest Haight's Half-Century of Quilt Making
June 7, 2013 - March 2, 2014
International Quilt Study Center & Museum | UNL East Campus
quiltstudy.org

Top photo: Ernest Haight demonstrating strip piecing to the Lincoln Quilters Guild, 1973 (Mary Ghormley, Quilt Papers, University Archives and Special Collections, University of Nebraska-Lincoln Libraries). Second photo: Original Pattern quilt with Crosses and Pyramids, machine pieced and quilted by Ernest B. Haight, c. 1973 (image credit: IQSCM). Third photo: Untitled quilt (Tumbling Blocks), machine pieced and quilted by Ernest Haight, c. 1950 (image Credit: IQSCM). Background: Large Star quilt, machine pieced by Ernest Haight, c. 1961; hand quilted by Flora Burr Haight, c. 1961 (image credit: IQSCM).

UNL Formula SAE photo credit: David Wilson

IN THE DEED THE GLORY

Students steer UNL car teams to achievements

Whether speeding across pavement in a racecar or climbing muddy steeps in an offroad vehicle, Nebraska Engineering students found success in 2013 Society of Automotive Engineers (SAE) competitions. Both teams improved on their past records and, though they sacrificed many hours of sleep and free time, team members gained experience to make them stand out in consideration by future employers.

The UNL teams spend months designing and building their vehicles according to precise guidelines, and apply testing and research in hopes to give their entries an edge in competitions. Along with enhancing their technical skills, students on the SAE teams also grow their "people skills" including teamwork and leadership.

In a major event at Western Washington University in May, the UNL Baja team finished third overall by earning second place in the endurance race and first in the acceleration event. Team captain Zach Blackford, a mechanical engineering student, said UNL entered two vehicles in the competition, and the freshmen car was the acceleration winner with a time of 5.58 seconds.

"In Washington we scored in the top ten for almost every event, and we were in the top ten for design at both competitions—very difficult for a small team, "Blackford said.

Weeks later, at the international Baja SAE championship in upstate New York, the UNL entry broke a suspension component.

UNL's Formula SAE team rose in the standings of the 2013 international Formula SAE competition that brought approximately 80 teams and more than 1,000 students and participants to Lincoln in June. The Husker Motor sports team placed 22nd in Cost Presentation, 25th in Design Presentation, 48th in Business Presentation, 10th in Acceleration, 39th in Skid Pad events, 38th in Autocross and DNF in Endurance events, due to a loose component on the vehicle in the last lap.

Electrical engineering graduate student Chris Wilson led the UNL Formula SAE team, with many Nebraska Engineering students adding expertise. Both teams thank their sponsors and fans, and look forward to competing in 2014.

UNL rover competes at NASA in RASC-AL Robo Ops

If you think parallel parking a car is difficult, try navigating a robotic vehicle through an obstacle course when you're 900 miles away from the scene. As NASA guides rovers to remotely conduct scientific research on other planets, Nebraska Engineering attempted a version of that work in June.

UNL was one of eight teams chosen for the 2013 RASC-AL Exploration Robo-Ops Competition, an engineering challenge sponsored by NASA and organized by the National Institute of Aerospace.

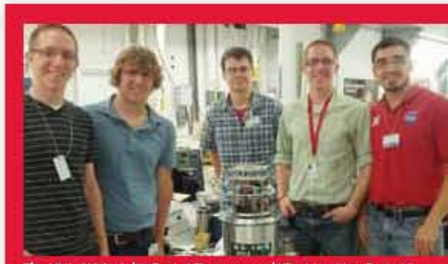
The selected teams built planetary rover prototypes to compete in "the Rock Yard" at NASA's Johnson Space Center in Houston. UNL's "Rover of the Corn" faced teams including Arizona State University, the University of Maryland and Worcester Polytechnic Institute.

Each team, comprised of graduate and undergraduate students, received $10,000 to fund rover development, materials, testing equipment, hardware and software.

After months of building and refining the rover, UNL team leader Joe Bartels traveled with teammate Eric Markvicka to Houston, while teammate Tom Frederick led "mission control" tasks back in Prof. Shane Farritor's robotics lab at UNL's Scott Engineering Center. According to the competition rules, each rover must be controlled from the home university campus via a commercial broadband wireless uplink. The only information available to the rover controller for performing the tasks would be transmitted through an on-board rover video camera(s) or other on-board sensors.

Tele-operated by the university teams, the rovers navigated a series of obstacles while accomplishing a variety of tasks such as picking up specific rock samples and carrying them through the course.

The rover had a difficulty with its arm mechanism, which limited its ability to grasp and transport rock samples. Outreach to the public was another goal of the competition, and the UNL team video can be viewed at *http://go.unl.edu/rover*. Learn more about the team at unlrover.com.



The UNL AIAA club's Rocket Team earned "Best Looking Rocket" at the USLI 1MileHigh competition in Huntsville, Ala., in April. Several members of the team also built a payload launched by NASA in June.

For Nebraska Engineering, the annual Engineering Week marks a memorable milestone in each academic year—as it has for the past century. According to a history compiled by Professor John Boye, in 1894 the Department of Electrical Engineering began hosting an exhibition for "Charter Day" (Nebraska's birthday, Feb. 15) with displays that "amazed" the public. He wrote, "It was not until 1913, when other departments got involved, that the Open House became E-Week."

At Lincoln's City Campus, E-Week returns each April, as spring semester senior projects near completion; engineering programs in Omaha celebrate the occasion in February with the observance of National Engineers Week. In both settings, when E-Week arrives the speed of the academic term increases and workload pressures rise. Yet, E-Week is also a time to let off steam with fun activities for engineering students—typically events featuring refreshments ("free" is a favorite food group) while department teams compete for "bragging rights."

100 YEARS OF E-Week

• established 1913 •

Festivities have changed through the years—could those early engineers have foreseen the feuds* that would develop with law students in the 1920s, or the 1950s crowds that would find reassurance in homegrown innovations as the Cold War was waged? Today's E-Week Open House attracts hundreds of middle and high school students to try hands-on engineering excitement and grow the community of engineers. We're proud to honor the tradition of revealing what engineers can accomplish: with senior projects ranging from a laser guitar to a futuristic vehicle or a new process to feed or fuel the world.

*For more about the engineering/law rivalry, see http://go.unl.edu/feud.

Here's to a new century of Nebraska Engineering experiences and expertise!

"It was a great time to celebrate and present on what we had accomplished and contemplate our next steps in our careers and lives. Getting to E-Week was stressful at times, but it felt like a reward by the end of our senior year."

-Donna Lounsbury
B.S. in Biological Systems Engineering, 2009
Salt Lake City, UT
Solution Architect, Cerner Corporation

"My co-chair and I were wearing suits and ties (that was the engineering uniform back in the day) and were out on campus trying to sell "E-week Buttons". I came up with the idea of presenting one to Governor Exon. We walked down the mall to the State Capitol, walked in, found the Governor's office and asked if we could present him with an E-Week button from the university. He was very receptive and ushered us into his office. My co-chair pinned the button on his suit and he allowed us to take a few pictures. He spent about 15 minutes with us listening to our description of E-Week."

-Thomas Johnson
B.S in Electrical Engineering, 1971 Fullerton, CA
Electrical Wholesaler, Long Beach, CA

"My most vivid memories of E-Week were when I was a child/student living in Seward. My father would take my 2 brothers and me to the Thursday open house during E-Week and we would tour the buildings. I believe all the buildings are now used for something besides engineering. I always liked the water running in some apparatus in Richards Hall, breaking concrete in Bancroft Hall, and making plastic tees in Avery Hall. These trips eventually resulted in all 3 boys in my family later graduating from the UNL College of Engineering. E-Week was very influential in my life well before the beginning of my college education."

-David Kroon
B.S. in Chemical Engineering, 1970 Spring, TX
Portfolio Manager, Houston, TX
Allgeier, Martin & Assoc. Inc., Joplin, MO

Page 10: Nebraska Engineering students plan and conduct E-Week events.
Page 11: above - an E-Week dirigible survived sabotage in 1927; at E-Week in the 21st century, a "drone" keeps the crowd's eyes on the skies. Above, left: the Tesla Roadster owned by Professor Dan Cox (UNL Electrical Engineering alumnus and current faculty) added excitement to 2013's E-Week Open House. Former NASA astronaut, Nebraskan Clay Anderson, visits a student group after giving a keynote speech at the E-Week Centennial in April 2013.

EMERGING ENGINEERS

The UNL College of Engineering is the proud home to four new National Science Foundation CAREER Award winners in 2012-13.

Faculty Early Career Development Program Awards from the National Science Foundation are prestigious honors for pre-tenure faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research.

Developing today's complex computer software can involve thousands of people working—sometimes at cross purposes—in numerous locations on millions of lines of interconnected code.

ANITA SARMA, assistant professor of computer science and engineering, earned a five-year, $500,000 Faculty Early Career Development Program Award from the National Science Foundation to develop her solution to help streamline today's complex software development process.

She aims to resolve problems that arise when programmers are unaware of what others have done or when merging code into one program can delay development by months or even years. Worse, software may be released with defects.

"My research goal is helping software developers be more efficient and productive," Sarma said.

Real-time monitoring is a start. A programmer can know, for example, when others are working on the same file. But so far flagging of potential conflicts has not solved the issues.

"What I'm doing is proactive," she said. "In what context is Developer A making the change, and how are the changes going to affect Developer B's work right now?"

Sarma uses data-mining techniques to analyze software records, then makes predictions about future programming. She can then model relationships between tasks, called constraints: if x happens, then y results—toward a constraint-solving program.

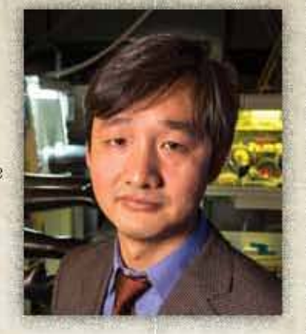
Her solution will be available as a plug-in for Eclipse, a popular program for developing software.

Sarma also is using her CAREER award to develop curricula designed to teach college and high school students how to collaborate more effectively. Short, hands-on activities will help students learn to listen effectively, build on and negotiate ideas together and engage in constructive scientific arguments. She said she hopes the fun and engaging exercises will encourage more young people to choose science careers.

JINSONG HUANG, assistant professor of mechanical & materials engineering, envisions a future when solar energy devices will become so inexpensive and pliable that nearly any surface, including windows and clothing, will harness the sun. He earned a five-year, $400,000 Faculty Early Career Development Program to continue his research into solar cell development.

"Solar is one of the most renewable and convenient energies," Huang said. It's currently expensive, compared to other sources, so "we want to make solar competitive with other types of energy."

So far, silicon-based solar cells are efficient, but expensive to produce and limited in their use, Huang said.



Organic polymers, or plastics, which are cheaper and more flexible, are less energy efficient. Huang and his colleagues are working to improve organic polymers' efficiency as a semiconductor. They discovered that placing a layer of ultrathin ferroelectric polymer between each electrode and the organic polymer increases the solar cell device's energy efficiency.

With a goal of increasing the material's energy conversion efficiency up to 15 or 20 percent, Huang said "we are almost halfway to that." This CAREER award will help Huang continue perfecting organic polymer solar cells using ferroelectric material to increase efficiency.

With cheaper material and fabrication costs, organic polymers may allow solar cells to be made as quickly and easily as printing off the daily newspaper, Huang said. The material's pliability may allow future solar cells to be easily and inconspicuously incorporated into clothing, laptop bags and tents, or even added to existing buildings by simply pasting them onto windows.

Huang is preparing an educational workshop on solar engineering and engineering careers, aimed for Nebraska high school students. A demonstration of Huang's research is also being developed for the University of Nebraska State Museum.

Each year, more than a million Americans receive stents to prop open clogged heart arteries and other blood vessels, but many can suffer reblockages. **LINXIA GU**'s research may help save people from this debilitating and sometimes fatal complication.

Gu, assistant professor of mechanical & materials engineering, earned a five-year, $406,248 NSF Faculty Early Career Development Program Award to continue her research.

Stents or stent-based techniques are popular treatments for coronary heart disease and other arterial narrowing, as well as for aneurysm repair. These tiny mesh tubes are inserted using a minimally invasive procedure to keep arteries open.

Sometimes, however, vascular cells within the arterial wall react to the stent by making new cells that can build up and restrict blood flow, called in-stent restenosis.

To understand the fundamental mechanism of restenosis, Gu said, "I try to look at it from the cell-tissue-stent interface to see what causes this kind of arterial response."

She uses powerful resources at UNL, including the Holland Computing Center, and a scanning probe microscope with the Nebraska Center for Materials and Nanoscience, to advance cellular modeling and tissue mechanics.

Gu aims to integrate cell and tissue behaviors to better predict what is occurring during in-stent restenosis. This knowledge will help researchers improve prevention and treatment options, and help manufacturers design better stents. This multi-scale strategy also could be used to interpret other clinical observations, such as aortic aneurysm and traumatic brain injury.

She is also eager to use her NSF award to recruit women and students from other underrepresented groups into the mechanical engineering field. She'll recruit graduate and undergraduate students, particularly women, to work on and learn from this project.

UNL biomedical engineer **ANGELA PANNIER** is using nanotechnology to develop a gene delivery tool that could unleash the power of gene therapy.

Pannier, assistant professor of biological systems engineering, earned a five-year, $419,051 NSF CAREER Award to continue her research on a gene delivery tool to employ DNA in correcting genetic problems, treating disease or boosting healing.

A Nebraska Engineering alumna, Pannier works on 3-D nanostructured surfaces that use the spaces between nano-sized columns to hold large amounts of DNA, similar to a toothbrush loaded with toothpaste. Touching the nanostructure to the cell unloads the DNA.

She is also designing the surfaces so that touching the ends of the columns, or bristles, to the cell alters it in ways that make it more or less receptive to receiving genes. The genes could come from the nanostructured surface itself, or elsewhere, such as the bloodstream.

Her work could help deliver genes to cure genetic diseases, such as cystic fibrosis or hemophilia, or even treat some cancers, cardiovascular conditions and other diseases. The nanostructure surfaces also could be used in biotechnology research and in sensors to help detect molecules in the environment, such as toxic gases or microbial contaminants.

Part of UNL's Center for Nanohybrid Functional Materials, Pannier collaborates with UNL electrical engineers Mathias Schubert and Eva Franke-Schubert to fabricate and study the nanostructured surfaces.

"We think that (these surfaces) are going to change the field of biomaterials and drug and gene delivery because you can deliver so many different things. It's unlimited, really," she said.

With her CAREER award, Pannier enhances UNL's biomedical engineering curriculum by emphasizing learning through primary literature and hands-on laboratory exercises. She also will provide research experiences for high school and undergraduate students, as well as design outreach workshops and curricula for high school teachers to use in their classrooms.

THE MEANING OF A MILE

Recent Durham School grad battles back from stroke to greatly value "normal days."

When Omaha runners dedicated miles they ran this spring to those affected in the 2013 Boston Marathon bombings, UNL Durham School alumnus Derek Bierd added his to the total. His miles were especially meaningful, because Bierd knows a thing or two about out-of-the-blue experiences that can devastate a life, and how to work back from terrifying circumstances.

In October 2010, Bierd was a Construction Engineering student who had just run a half marathon. On a Monday morning before going to class at The Peter Kiewit Institute, the former Millard North High School football player collapsed at his home. He could barely move amid excruciating pain; in the next day's blur of hospital care, he worried to his parents and girlfriend, "I think I'm going to miss class."

That day, surgeons removed a blood clot from the base of his cerebellum, and Bierd was told he was lucky that immediate treatment had enabled him to pursue a full recovery. He worked back from wheelchair to walker, then made himself "hobble" around his neighborhood; a mile that he formerly ran in under 8 minutes took 20 after the stroke.

Bierd was back in classes in a remarkable two and a half weeks after his stroke, but in engineering—never easy—he faced a frustrating mental comeback in addition to the physical rehabilitation. Though he fortunately had no memory loss or personality change, as sometimes happens with stroke victims, solving engineering's math and reasoning problems took two to three times longer, especially in the early stages of his recovery.

Aiding his efforts in physical and occupational therapy (the stroke was on the right side of his brain and affected use of his left hand) were Bierd's family and friends. Durham School faculty worked with him to get his coursework back on track. Later in 2010, doctors repaired a hole in Bierd's heart, through which the clot passed, yet he graduated as planned in May 2011.

Now Bierd works as an engineer for Kiewit Companies, hired on with Kiewit Underground and currently on loan to KieCore: a group streamlining the companies' processes such as estimating, business development and finance. "For an organization with 10,000 employees, making processes more efficient is a huge endeavor," Bierd said, adding that he has enjoyed new horizons with his recent focus on purchasing.

Growing up, he'd always been fascinated by watching progress at construction sites, which led him to study at UNL. He said his interest in engineering stemmed from his childhood enjoyment of Legos, and their step-by-step way of building is how he has reclaimed his life.

Bierd said after his stroke he takes nothing for granted and hopes his story can inspire others addressing great challenges in life. A "normal" day is something to be grateful for, he said, as each day can be viewed as a second chance and an opportunity to improve.

-Carole Wilbeck

Derek Bierd runs a leg for a team in the October 2012 Market to Market Relay between Omaha and Lincoln. Bierd also ran the Omaha Marathon in 2012.

ACCOMPLISHMENTS >

Steve Parkison, a junior electrical engineering major, was chosen to receive a Goldwater Scholarship. Each year, about 300 college sophomores and juniors--aspiring scientists, mathematicians and engineers--receive this honor nationwide, with awards up to $7,500 a year for educational expenses. Parkison has worked with UNL's Lance Perez, professor of electrical engineering and associate vice chancellor for academic affairs, for two years in the Mobile Communication and Coding Lab. Parkison is also vice-president of the Institute of Electrical and Electronics Engineers student chapter. In addition, he participated in an engineering study abroad trip to Italy led by Ece Erdogmus, associate professor of architectural engineering, and interned at Johnson Space Center working on systems for crewed spacecrafts. Parkison hopes to earn a doctorate and conduct research in robotic perception and computer vision in academia or private industry.

COE faculty recognized at UNL Promotion & Tenure ceremonies in April were: Florin Bobaru and Linxia Gu (MME); Mehmet Can Vuran (CSE); Ron Faller and Ayse Kilic (CIVE); Jim Goedert, Lily Wang, Zhigang Shen and Terri Norton (Durham School); Angie Pannier (BSE); Wei Qiao and Eva Franke Schubert (EE); and Yaoqing "Lamar" Yang (CEEN).

Tim Kinoshita, BSE graduate student, was one of four UNL students to receive a 2013 William N. Wasson Student Leadership and Academic Award from the National Intramural-Recreational Sports Association. Awarded to just 36 college students nationwide each year, the honor recognizes outstanding active participants, employees or volunteers in collegiate recreational sports departments. The award's criteria include self-improvement through leadership, academic success, activities, volunteerism and promoting inclusion. UNL is the only higher education institution in the nation to have at least one Wasson Award winner each year since the award's inception in 1993 and leads the nation with 63 total recipients.

UNL Distinguished Teaching Awards this year included BSE Professor Curt Weller and Associate Professor and Interim Chair Roger Sash (CEEN).

Tom Frederick, MME graduate student, is part of Elegant Instruments, the team that won first place at the graduate level in UNL's New Venture Competition in March. Elegant Instruments is a specialized brush system developed to address problems using art brushes on pathology samples. Iterations of the tool have been developed and tested at the University of Nebraska Medical Center.

UNL named professorships announced in 2013 included Hong Jiang, Willa Cather Professor of Computer Science and Engineering, and Myra Cohen, named Susan J. Rosowski Associate Professor of Computer Science & Engineering.

At the annual Architectural Engineering Institute conference, Durham School architectural engineering student Kate Fickle was elected secretary of the national AEI student organization. Ece Erdogmus, associate professor of architectural engineering, won a Best Paper award.

Carl Nelson, associate professor of Mechanical & Materials Engineering, was part of the team that developed a rehab device that won a 2013 da Vinci Award. The Intelligently Controlled Assistive Rehabilitation Elliptical Training System, or ICARE, helps patients with disabling conditions learn to walk again.

Emily Hubl, a junior majoring in Biological Systems Engineering, was awarded the Jack Miller Scholarship. A member of the Scarlet Guard Board of Directors, she has also been active in the Professional Society of Engineers, Engineers without Borders and the CASNR Leadership Council. She studied engineering in Italy in 2011 and was a member of the NASA Microgravity University Team from 2011-12. Hubl is a student researcher at the USDA ARS Durso Laboratory and a fellowship intern at the Nebraska Center for Materials and Nanoscience.

John Woollam, George Holmes Distinguished Professor at UNL, was honored with the APS 2013 Prize for Industrial Applications of Physics. He also leads the J.A. Woollam Company of Lincoln, which specializes in producing spectroscopic ellipsometers for research and industry. In addition, Woollam has funded a series of graduate fellowships at UNL.

Lowell E. and Betty Anderson Distinguished Professor Ravi Saraf's chemical engineering research was highlighted in the journal Nature. He has developed a single electron transistor to measure the performance of biofuel producing organisms or test the effects of drugs on individual cells.

Walter Bircher (MME), John Bader (BSE) and Emily Miller (IMSE) were among 13 UNL students inducted this spring into the Innocents Society, an honorary group with selection based on leadership, scholarship and service to the university and greater community.

Yongfeng Lu, Lott Distinguished Professor, and his Laser-Assisted Nano Engineering (LANE) lab team with the Department of Electrical Engineering have discovered how to grow large-area high quality graphene outside the conventional process. Published earlier this year in Advanced Materials (impact factor 13.77) and commented by the reviewers as a "breakthrough in graphene research," this method makes graphene growth much more efficient and cost-effective.


Emily Hubl

Annual UNL Parents Association honors, based on nominations from UNL students and parents, were awarded in February to Associate Professor Tim Wentz (Durham School), Associate Professor Wieslaw Szydlowski (MME), Professor Michael Hoffman and lecturer Dave Russell (EE), and Professor Roger Hoy and Assistant Professor Deepak Keshwani (BSE).

Wei Qiao, assistant professor of Electrical Engineering, led a team that earned a First Prize - Best Paper Award from the Institute of Electrical and Electronics Engineers' (IEEE) Industrial Applications Society, Renewable and Sustainable Energy Conversion Systems Committee. Qiao co-wrote the paper titled "Current-Based Diagnosis for Gear Tooth Breaks in Wind Turbine Gearboxes" for the organization's 2012 Energy Conversion Congress & Expo. This honor will be celebrated at the IAS committee's annual meeting during ECCE 2013: September in Denver.

Allison Drain, a senior in chemical engineering, won first place at the AIChE regional conference this spring; her research on breast cancer cells earned her the opportunity to present at the national conference this fall in San Francisco.

Changbum Ahn, assistant professor with the Durham School of Architectural Engineering and Construction, received the Best Paper Award at the 2013 International Conference on Construction Engineering and Project Management (ICCEPM) in Anaheim, Calif. His paper's topic was "Construction Equipment Activity Recognition from Accelerometer Data for Monitoring Operational Efficiency and Environmental Performance."

Milford Hanna, professor emeritus with Biological Systems Engineering, was named to the Nebraska Hall of Agricultural Achievement. He joins 200-plus members dedicated to preserving and improving Nebraska agriculture.

Engineers Without Borders NU Student chapter was the group winner, and EWB-NU's Stacey Joy, CIVE graduate student, was the individual winner in UNL's Spirit of Service Awards for campus organizations. Erik Knudsen, an MME senior, was named as UNL Student Organizations' Outstanding Member of the Year. Their solar project was chosen for a $3,000 Thomas Waters Foundation grant from EWB-USA. Continuing their work in Madagascar, the water quality team traveled in May and the solar team plans to go to Kianjavato in July. The cost for the trips to Madagascar exceeds $70,000 annually for airfare, equipment and supplies, living expenses and rental vehicles. The students contribute their own monies and engage in fundraising activities throughout the year, yet in April more than $20,000 was still needed for this year's trips. Donations can be made at http://ewb.unl.edu/support-ewb-nu-your-donation. For more information see http://ewb.unl.edu or www.facebook.com/UNLEWB.

Zhao 'Ellen' Peng, Ph.D. student studying acoustics in The Durham School's architectural engineering program, was selected to receive a 2013 ICA-ASA Young Scientist Grant. This award helps young scientists attend the International Congress on Acoustic conference in Montreal. At the conference, she presented "Effects of reverberation and noise on speech comprehension by native and non-native English-speaking listeners." She was also selected to be a representative on the Acoustical Society of America's national Student Council, representing the area of Architectural Acoustics for the 2013-16 term. Peng and undergraduate student **Adam Buck** were honored with the Institute of Noise Control Engineers' 2013 Leo Beranek Student Medals for excellence in the study of noise control. Buck was also awarded a 2013 Robert Bradford Newman Student Medal for Merit in Architectural Acoustics. Durham School faculty nominated him for work measuring the just noticeable difference of reverberation time using a transformed up-down adaptive method.

Ph.D. student **Carl Hart**, who studies hybrid computational method for acoustics simulations, received a 2012 Acoustical Society of America award for Outstanding Paper by a Young Presenter in Noise, for his participation at the ASA Kansas City Meeting in Fall 2012

Steve Goddard, Computer Science & Engineering department chair, began serving July 1 as interim dean for the College of Arts & Sciences.

Matt Dwyer, Henson Professor of Computer Science & Engineering, is now serving as interim chair of the CSE department.

Turner's award fosters international collaboration


Joe Turner

Joe Turner, Robert W. Brightfelt Professor with Mechanical & Materials Engineering, was chosen to receive a Friedrich Wilhelm Bessel Research Award from the Alexander von Humboldt Foundation in Germany.

The Humboldt Foundation grants up to 25 Friedrich Wilhelm Bessel Research Awards annually to promote international scientific cooperation. Award winners are chosen for their outstanding research record and are invited to spend a period of up to one year cooperating on a long-term research project with specialist colleagues at German research institutions.

Turner's award, including 45,000 Euros (approx. $60,000), will allow him to conduct research with his nominator, Prof. Konrad Samwer, at the University of Goettingen. Turner and Samwer share an interest in micro- and nanoscale materials characterization methods. Turner also plans to establish additional research connections with other German labs.

"I'm honored to have been chosen for this award and I'm excited about the research collaborations to be established," said Turner. The work with Professor Samwer will focus on the application of contact resonance atomic force microscopy (CR-AFM) and nanoindentation to map elastic and anelastic properties of bulk metallic glasses (BMG) near stress concentrations, such as cracks, with nanoscale resolution.

"BMGs can fail in a ductile or brittle manner and the failure mechanisms are not well understood but are known to be dependent on length scale," Turner said. "My group has worked on the mapping analysis methods for CR-AFM measurements that we will apply to several materials." He foresees the collaborative research opportunity leading to advances in the failure-resistance of these materials used in electronics, as sensors, for bio-implants and more.

In Memoriam

Lyle Eugene Young died Dec. 20 at age 93 in Lincoln. He was a professor of civil engineering with the UNL College of Engineering from 1953 until his retirement in 1986. He served as the college's associate dean for 22 years and interim dean for the Omaha and Lincoln campuses for two years.


Lyle Young

Young was born in Brandford, N.D., grew up in Granite Falls, Minn., and earned his degrees in civil engineering from the University of Minnesota.

He worked as a civil engineer for the Pennsylvania Railroad until he was drafted in June 1942; later that year, while in the United States Army Air Corps, he married Marguerite Swenson. He served in World War II for 28 months in the South Pacific and was honorably discharged with the rank of captain in March 1946. The story of those years is told in the book *Dearest Marguerite: Letters from a Soldier to the Wife He Left Behind*, written by his wife.

He taught returning soldiers at the University of Minnesota College of Engineering for eight years, before moving to Lincoln. He was a member of Sigma Tau, Tau Beta Pi, Sigma Xi, Chi Epsilon, and is listed in Who's Who in Engineering. He was past president of the Lincoln chapter of the Society of Professional Engineers and was a member of the American Society of Engineering Educators.

Survivors include his wife, their four children, eight grandchildren and 10 great-grandchildren.

Lester Krogh, Ph.D., '45 CHME, '48 M.S. Chemistry, died Jan. 25. Featured in the Autumn 2012 issue of Engineering@Nebraska, he was a 38-year employee of 3M and a member of the National Academy of Engineering. To learn more about Dr. Krogh's active career, visit http://go.unl.edu/postit.

William "Bill" Eldon Splinter, Ph.D., 86, George Holmes Professor Emeritus of Biological Systems Engineering, died Sept. 26 in Lincoln.


Bill Splinter

Splinter grew up at his family's irrigated farm near North Platte. He earned a bachelor's degree in Agricultural Engineering from the University of Nebraska in 1943, and received a M.S. and doctorate from Michigan State University in 1951 and 1955. He served in the U.S. Navy as a radar operator.

He taught at Michigan State and North Carolina State before returning to Lincoln in 1968 to head Agricultural Engineering (now the Biological Systems Engineering Department). 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 held several positions, including vice chancellor for research, interim dean of engineering (1994-95 and 2001-02) and interim director at the University of Nebraska State Museum. He helped develop the Lester F. Larsen Tractor Test and Power Museum and retired as director in 2011. The Larsen Tractor Museum is collecting donations to fund a Splinter Memorial Art Gallery; for more information contact Lance Todd at (402) 472-8389 or ltodd6@unl.edu.

He helped design UNL's Splinter Lab, named in his honor. With his late wife, Eleanor, he established both a student scholarship fund and an endowed professorship at UNL. His last project was working on a history of the Biological Systems Engineering programs, for the department's centennial in 2012.

Winfred C. Zacharias '?? CHME, died Jan. 24 at age 87 in Midland, Mich. One of six siblings, Zacharias was born on a small farm in North Dakota. He served in the Army of Occupation in France and Germany as World War II concluded in Europe. Upon his return to the U.S., he earned his B.S. degree in Chemical Engineering from the University of Nebraska.

He married Joyce F. Fuhrman in 1952 and began his career with The Dow Chemical Company. The couple raised six children, and they had seven grandchildren and four great-grandchildren. She died in 1990.

Zacharias earned an M.S. degree in Chemical Engineering from the University of Michigan while with Dow. His 34-year career there included leadership positions in Research and Development, Economic Evaluation, Corporate Insurance, and U.S. Treasury divisions.

After retiring from Dow in 1986, he and six fellow Dow 'graduates' founded the consulting firm Omni-Tech International, Ltd. Until he retired from Omni-Tech in 2002, Zacharias headed its administration, finance and international activities and served on its board. He was also active in developing community resources in Midland and firmly believed in giving back to the community. He was a longtime supporter of the UNL College of Engineering.

Norman L. Scott, '56 CIVE, died April 22 at his home in Fort Lauderdale. He founded the Consulting Engineers Group, Inc., in 1966; he was a past president of the American Concrete Institute (ACI), served as director of Prestressed Concrete Institute (PCI) and had more than 15 papers published in journals of ACI, PCI and more.

Scott valued education and made his first gift to the University of Nebraska Foundation the year he graduated; he later established the Norman Scott Faculty Support Fund for the UNL Department of Civil Engineering and was a founding contributor to the Civil Engineering Alumni Excellence Fund in 2004. He served on advisory committees for the Civil Engineering Department as a research and development advocate. The University of Nebraska Foundation describes Scott as instrumental in creating UNL's Les Martin Professorship of Civil Engineering.

1940s

Roland Nyquist, '43 CHME, is retired and lives in Kearney. Responding to the call for E-Week Memories, he replied, "As I recall we scared a poor white duck as it calmly swam in a small tub of water by dropping in a few drops of a surfactant which immediately caused it to sink. After several runs, we thought the poor duck had had enough as the feathers had absorbed enough of the surfactant that it could no longer swim." He noted that in his UNL years during World War II, "several of our classmates were in advanced ROTC and some were called into active duty" while others had educational deferments that enabled them to finish their degrees. He worked with Shell Oil's Research & Development organization in Emeryville, Calif., then entered naval officer training. He later returned to Shell as a process engineer at the company's oil refinery in Wood River, Ill.

1950s

Arvel Witte, Ph.D., '57, '59 MS MECH, Rolling Hills, Calif., is retired from TRW Space and Defense. He shared his E-Week project memories of running a liquid air machine demonstration and supporting a steam engine project. He received the O.J. Ferguson Outstanding Senior Award in 1957 and remembered having "a lot of good professors--Vickers, Newhouse, Ludwickson, Loeb and Ferguson--and friends: Fran Ostdiek, Marvin Goodding and others." He went on to earn his Ph.D. in aeronautics at Caltech in Pasadena.

1960s

M.P. Papadakis, '63 MECH, is retired from careers as an airline pilot and law school professor. He responded to the college's alumni survey about E-Week and added: "In 50 years since graduation I accumulated 25,000 flight hours," starting with his military service on Navy carriers and in R and D tests. He also flew for Delta airlines as a 727, 737, 757, 767 and L 1011 captain. He went to law school and "flew every weekend and holiday so as to be a lawyer and law professor in the work week." He also noted having investigated, evaluated or helped litigate 450 airplane accidents.

Howard Smith, '65 MECH, Northville, Mich., is retired from 35 years in automotive engineering, most recently as a technical specialist in vehicle thermal management, with Ford Motor Co. He recalled his early 1960s E-Week project: "I made an auto simulator to demonstrate reaction times in applying the brake, recording the time from accelerator to brake pedal and showing distance traveled at various vehicle speeds."

North Sherrill, '69 CHME, lives in Grand Rapids, Mich., and is associate pastor of Our Savior Lutheran Church. He formerly worked with Reichhold Chemicals in Sterling Forest, N.Y., and E.I. duPont Co. in Deepwater, N.J. Adding to UNL E-Week memories was his task to show a chemical process—"something quick … (so) people could see instant results. We dipped hot dogs in liquid nitrogen, pulled them out, held them up, and then hit them against the table, which broke them into several pieces. People stood and stared rather dumbfounded at what liquid nitrogen can do. Of course, we warned them to keep their fingers out of it." Later in his engineering career, he was involved in the early development of orthopedic casts wetted out with urethane polymer. The project stalled at the time but some years later he visited a friend in the hospital who was fitted with one of those plastic casts, and now the colorful versions are in wide use. He advises current engineering students: "You never know the future of your projects, no matter how ridiculous and impossible they may seem."

1970s

Gene Kocmich, '71 MECH, is retired from work as a senior systems engineering with Northrop Grumman. When he thinks of UNL E-Week, he remembers being "surprised at how many people attended and their interest." Another surprise: "I didn't attend the follow-up meeting and initially didn't believe classmates when they told me I had received recognition for the outstanding display. It is one of two awards from my college years that I still proudly display."

Bill Glaser, '71 '77 MS CIVE, Minden, Nev., was honored with the Nebraska Alumni Association's Distinguished Service Award in 2013. He has been president of the Nebraska Alumni Chapter serving the northern Nevada areas of Carson City, Reno and Lake Tahoe for the last six years. He has initiated such annual events as a Nebraska Book Award to five high school seniors for excellence in English, a Nebraska Golf Tournament, and a Nebraska Spring Dinner. He has served as project manager on large construction projects at San Diego International Airport and the State of Nevada Department of Transportation.

David K. Hemsath, '79 CSCE, is a security and privacy architect/consultant with IBM Corp., in Austin, Texas. His UNL E-Week memories include: "visiting the college during E-Week my senior year of high school at Omaha North; (and) participating in one E-Week as an engineering student, showing some primitive text games on the university's old NUROS time-sharing system, and putting together a poster session using the old Calcomp pen plotter and FORTRAN programming to graph artillery shell trajectories using an empirical formula I found in an old engineering text at the Nebraska Hall library." At UNL he also crossed paths with "an old IBM 1620 'scientific computer' running another demonstration, with all its doors open for cooling circulation."

1980s

Joseph A. Mortensen, '80 BS Interdisciplinary Program in Engineering, is a retired Marine colonel and test pilot who was appointed as chief of staff with the Test and Evaluation Group, Naval Air Systems Command (NAVAIR) located at the Navy's flight test center in Patuxent River, Md. NAVAIR provides full life cycle support of Naval aircraft, weapons and systems—including research, design, development, systems engineering, acquisition, and test and evaluation.

Jeff Kacirek, '86 CSCE, is a software engineering manager with Garmin in Olathe, Kan. His duties include managing team design work for aviation software.

John D. Korff, CSP, REM, '88 IMSE, was promoted to Environmental & Occupational Safety Health Program Manager for the FAA's Logistics Center in Oklahoma City, Okla.

1990s

Nathan E. Wegener, '92 MECH, relocated to Brisbane, Australia in 2012 to oversee Cerner's Technology Services and Managed Services teams for providing IT services to the company's clients in Australia and the Asian Pacific.

Jess Sweley, '99 BSE, '12 FDST, was honored with a 2013 Early Achiever Award from the Nebraska Alumni Association. As senior director of research, quality and innovation at ConAgra Foods in Omaha, he leads a team of 30+ scientists, engineers and culinologists responsible for new product and technology development on such brands as Orville Redenbacher's, Marie Callender's, Healthy Choice and more, including new product launches.

2000s

Brandon Moser, '01 CSCE, '05 MBA, works with EF Johnson Technologies in Lincoln on the company's engineering team that writes software for public safety radio. At the UNL Career Fair earlier this year, he recalled his initial connection with EF Johnson at the event in 1998; he then joined the firm as an intern and now recruits prospective team members. He reports that seven of EF Johnson's 19 internship positions are now being filled by UNL students.

Toby Samuelson, '04 MAE, with Farris Engineering, and **Rebecca Prendergast Cherney**, '09 MAE (formerly with Farris, now with AES / Lincoln), worked on lighting for the University of Nebraska at Omaha Roskins Hall Project featured in the April issue of the Illuminating Engineering Society's LD&A Magazine.

Andres Torres

Andres Torres, P.E., '05 MSCE, earned his MBA from the University of Nebraska at Omaha in May 2013. He also received the "40 under 40 award" honoring entrepreneurs, executives and professional men and women of Greater Omaha, Council Bluffs and Sarpy County. With Valmont Industries since 2005, he manages a team of engineers and project administrators focused on design completion of projects in more than 25 countries, and has trained and worked in Valmont's global facilities in China, India, France, Poland, and the U.S. He is active in the American Society of Civil Engineers and Engineers Without Borders and has conducted community service, including talks with local schools about civil engineering.

Paul Ridder and Dustin Van Cleve

Paul Ridder, '07 MECH, and **Dustin Van Cleve**, '08 MECH, are product engineering managers with Intersystems in Omaha. Ridder works on enclosed belt conveyor systems used around the world. Van Cleve's work includes bulk weighers and screeners.

Jeremy Muehlbauer, '08 CSCE, is a software engineer with Cerner Corp. in Kansas City, Mo., working on the company's web services and cloud technologies, and most recently serving with its JAVA development team.

Sunita Gupta, '06 CSCE, '08 MS ELEC (and MBA), is a design certification engineer with Garmin in Olathe, Kan.

2010s

Blaine Hoppenrath, '11 IMSE, is a supervisor of Engineering Support with BNSF Railway Company at its Flagstaff, Ariz., office.

Blaine Hoppenrath

Adam Pillard, '12 IMSE, Springdale, Ark., is a logistics engineer with JB Hunt. His work involves writing code for the company's pricing software.

Sydney Schaaf, '12 MECH, writes that she is working with Ford Motor Co. in Detroit on frontal and small offset rigid barrier crash safety development for the 2015 Ford Mustang.

First recipient of Suh scholarship announced

Former Nebraska and current Detroit Lions standout Ndamukong Suh, a graduate of the College of Engineering's Construction Management program, announced Matthew Stier of Blair as the first recipient of the scholarship Suh initiated with the college in 2010.

The feeling is "awesome," Stier said. He graduated May 19 from Blair High School and will begin studies at UNL this August in the CM program.

On May 18, Suh and his family accompanied Stier and his family on tours of the UNL engineering buildings, Memorial Stadium and other campus locations. They ended the day with a reception hosted by the Suh Family Foundation at Lincoln's Lied Center for the Performing Arts. Suh introduced Stier to guests including representatives of Husker athletics and the Durham School of Architectural Engineering and Construction.

"My hope for Matthew is that he runs with this opportunity and enjoys his experience at UNL," Suh said.

The Ndamukong Suh Scholarship provides $10,000 for an aspiring engineer to study at UNL. Before becoming the second overall pick in the 2010 National Football League draft, Suh pledged a $2.6 million gift to UNL, with $600,000 dedicated to start an endowment fund to support the dreams of future engineers.

Heier zip lines to new heights in alternative energy, lands at Clinton Global Initiative University

Casey Heier graduated in May 2013 as a biological systems engineering major with a minor in energy sciences. The Columbus, Neb., native's experience was a springboard for his actions as an alternative energy advocate.

In December, Heier expanded his learning by traveling to Costa Rica for 12 days with the GREEN (Global Renewable Energy Education Network) program, an organization that aims to make "the words of a traditional textbook jump off the page and into the minds and hearts of our students" through hands-on education at renewable energy facilities and sustainable site visits.

In Costa Rica, students spent mornings in classes on a specific renewable energy topic: geothermal, wind power, solar and more. Each afternoon, the group shuttled to sites where the morning's topic was in action, including a wind farm, a hydro power plant and a biomass facility processing sugar cane products, which was Heier's favorite visit.

"They made sugar and ethanol, and also generated their own electricity from burning the stalks, which are waste material," said Heier, who was impressed that 80 percent of Costa Rica's total energy used (including transportation fuels, cooking gas and more) is from renewable sources, and 95 percent of the country's electricity is produced from renewable sources. The sugar cane plant "sold the excess power (beyond what the plant could use) back to the grid," he added.

Heier's time in Costa Rica brought to life many concepts he had studied for the UNL energy sciences minor. His passport also includes travels as operations director for the World Energy Project, a non-governmental organization he helped found with several UNL classmates; WEP conducts humanitarian engineering work at several locations in Africa, including schools and hospitals. In Uganda, while awaiting materials for a WEP project, Heier helped teach English.

Another recent adventure, closer to home, put him in the same room with former President Bill Clinton and political humorist Stephen Colbert, as a participant with the 2013 Clinton Global Initiative University in April in St. Louis. Heier said he was most eager to hear another leader: Zafar Adeel, director of the United Nations University's Institute for Water, Environment and Health, who spoke on world water solutions. Heier chose Energy for Education as his CGI commitment, extending the work of WEP in projects where young people involved can learn from the energy improvements in their communities.

This fall, Heier will begin graduate studies with Stanford University's Master's in Atmosphere/Energy Engineering program, but he reminds younger engineering students that it's important to seek extraordinary ways to live what you learn—and UNL is a great place for doing that.

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BUILDING THE 22ND CENTURY CONFERENCE

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http://buildingthe22ndcentury.unl.edu

By the beginning of the 22nd century, the global population will rise to 15-20 billion residents. Existing natural resources will be severely depleted and much of the world's population will live in megacities. What will these cities look like? What questions must be asked now to prepare for a future with unimaginable discoveries and challenges?

The UNL College of Engineering, in collaboration with the College of Architecture, is hosting the "Building the 22nd Century" Conference to begin creating a thoughtful vision of the future built environment.

The conference will feature engineers, architects, futurists, industry representatives and experts in a variety of areas, including:

- Ray Kurzweil, inventor, author and director of Engineering at Google
- General Stanley McChrystal, former U.S. Forces Commander
- Henry Cisneros, former U.S. Secretary of HUD
- Dror Benshetrit, founder of Studio Dror
- Shohei Shigematsu, partner with OMA*AMO
- Kent Larson, director of the MIT Media Lab's Changing Places group
- Janice Perlman, founder and president of the Mega-Cities Project
- Cindy Frewen Wuellner, chair of the Association of Professional Futurists Board

The college invites you to join us Oct. 14-16, 2013 for this exciting discussion on future megacities. For more information or to register, go to: http://buildingthe22ndcentury.unl.edu.

October 14-16, 2013 CenturyLink Center, Omaha, Nebraska

Nebraska Engineering Alumni: please share your updates at
www.engineering.unl.edu/alumni/alumniUpdateForm.shtml