# Control Matters Versity Department of Civil Engineering Spring 2014

Engineers Without Borders in Ecuador —story on page 4

## From the department head



As I reflect upon my year as your interim head, I am amazed by two things: how quickly the year passed, and the accomplishments of our faculty and students during this transition period. I extend my sincere thanks to faculty, staff, students and our advisory council for their support and encouragement over the past year.

2014 promises to be an exciting and challenging year. The appointment of Darren Dawson as our new dean of engineering, the start of construction of Phase IV of the engineering complex, and the search for a permanent department head signal a bright future for the college and our department. I look forward to continuing to work with each of you as we move forward with these and other programs and initiatives aimed at realizing the K-State 2025 vision.

In this issue of Civil Matters, we present a glimpse of the department's activities and accomplishments over the past year. You will read about our

newest faculty member, Dr. Stacey Tucker, who joined us in August in our geotechnical area, and Jon Halbgewachs, CE '97, who received the 2013 Professional Progress Award from the College of Engineering. You will read about the accomplishments of our outstanding faculty members and the awards received by them and their student collaborators. The accomplishments of our students, who have showcased our educational and professional service programs and activities at the state, regional, national and international levels, also are highlighted in this edition.

Our faculty, staff and students extend an open invitation to drop by for a visit. We'd love to chat with you and show you around the department.

Robert W. "Bobb" Stokes Professor and Interim Head

## In this issue

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# World travel and geotechnical engineering focus of new faculty member



Stacey Tucker joined the CE faculty in August 2013. She was born in south Texas and has spent most of her life there, but has also lived in Bahrain, Germany, Turkey and Italy. While living abroad, she was able to visit many countries including Jordan, Egypt, Austria, Spain and France.

Tucker received her B.S., M.E. and Ph.D., all in civil engineering, from Texas A&M University. During her graduate work, she worked with ASCE to create the "So, you live behind a levee!" booklet, which is geared towards educating the general public about levees, such as our linear trail levee in Manhattan.

Tucker is an active member of the Geo-Institute, a technical society within ASCE, and served as the secretary for the Geo-Institute Graduate Student Leadership Council for two years. She is the faculty

## **CE professors honored with awards**

Each spring outstanding academic effort from faculty is recognized through several awards unique to the College of Engineering. Of the seven faculty members honored in 2013, three recipients are civil engineering professors.

#### Left to right:

- Asad Esmaeily, assoc. professor James L. Hollis Memorial Award for Excellence in Undergraduate Teaching
- Hayder Rasheed, professor Myers-Alford Memorial Teaching Award

Hani Melhem, professor Bob and Lila Snell Distinguished Career Award for Excellence in Undergraduate Teaching adviser for KSU's Geo-Institute Graduate Student Organization.

Tucker's research is in geotechnical engineering and focuses on advanced testing of aging infrastructure and *in situ* soils to support the global initiative of sustainability. She is an experimentalist who specializes in near-surface geophysical methods, specifically electrical resistivity imaging, ground-penetrating radar and induced-polarization imaging, as well as soil erosion testing. Her research investigates innovative methods for assessing and monitoring infrastructure, and explores unique approaches for identifying in situ soil conditions. Currently, Tucker is instrumenting an erosion function apparatus, a flume-style erosion test that measures the surface erosion of samples collected with minimal disturbance. Erosion testing is used to predict the scour around bridge foundations, to measure the erosion potential of levees during flood events, and to assess the surface stability of earthen highway and overpass slopes.

Tucker enjoys cooking, spending time outdoors, running, bike riding, fishing and hiking. She is engaged to Michael Kulesza, a civil engineer who works at a local engineering firm in Manhattan. Tucker and Kulesza plan to be married in Helotes, Texas, in October 2014.



## **K-State Engineers Without Borders**

#### Student experiences

This past January, I was fortunate enough to travel with the Kansas State University Engineers Without Borders chapter to a small village in Yakuñay, Ecuador. This trip, marking our third and final year working in Ecuador, consisted of completing a daycare center for the community. I, along with three other KSU engineering students, was able to develop a deeper understanding and appreciation for the field of civil engineering and its variances throughout the world. It was a challenging, yet fulfilling, 17-day excursion that not only shaped me as an engineer, but also as a person.

One of EWB's core values, which prior to joining the organization would not have occurred to me, is to develop a structure that is sustainable to the community. With this in mind, our chapter strove to

ensure the needed tools and materials were readily available for the people of Yakuñay should they need them. In addition, to assure that sustainability could be achieved, community members were provided with the necessary education to make repairs. With a merger of our critical thinking skills and the natives' cultural values, our group developed unique approaches to produce everyday amenities for them. From caging reinforced concrete beams to mixing materials by hand, we gained a deeper appreciation for the evolution of engineering and the differences between our practices and theirs. The hands-on experiences, along with the cultural integration, provided each of us with valuable skills in our discipline that we will carry with us throughout our professional careers.

Noura Saadi, CE senior







"It was a challenging, yet fulfilling, 17-day excursion that not only shaped me as an engineer, but also as a person."

## **ASCE chapter update**

In 2013, ASCE reduced the number of officer positions from more than 20 to 10, in addition to the steel bridge and concrete canoe captains.

The special projects/activities chair for the spring semester continued working with the Sunset Zoo to design a shade structure for the cheetah exhibit. In the end, the project was too expensive for immediate implementation but the design was useful in raising awareness as to how much money should be allotted for a shade structure project in the future.

During the fall semester of 2013, our



California.

people.

ASCE student grillers, left to right, Vince Studer and Weston Koehn.

## **ITE chapter activities**

The K-State ITE Student Chapter promotes the advancement of the transportation and traffic engineering profession by fostering the close association of students with the profession and ITE.

Last year the group attended a webinar titled "Safety Solutions in Rural Missouri." The presentation covered innovative methods and practices used in rural Missouri. Speakers from the Missouri Department of Transportation highlighted method of applying uniform safety improvements across a tiered number of miles of the overall highway system.

In the fall semester, students took a field trip to the Bluemont Avenue construction project at the intersection of Manhattan Ave. and Bluemont Ave. Manhattan city engineer, Peter

Clark, assisted students in touring the project site and explained the different stages of the intersection expansion project. Later in the semester, student chapter officers welcomed Jay K. Lindly, director of University Transportation Center for Alabama (UTCA) and K-State alumnus, who was visiting the K-State CE department, as a guest speaker. He shared his experiences with the students in an informal environment both as a researcher and transportation personnel.

This spring the student chapter hosted David Church, current director of the Missouri Valley – ITE (MoVITE) Kansas Section. He has worked as a transportation engineer for several years at organizations such as Kansas DOT, Caltrans and Parsons Brinckerhoff. He shared his experiences from some of his recent projects.

new special projects/activities chair began working with retired faculty member Jim Koelliker to implement a new ADAcompliant bridge on the Konza Prairie trail. We also scheduled a tour of the water treatment plant in Manhattan after Brian Clow, Carollo Engineers, talked to us about the water treatment plant project that his firm worked on.

Kansas State ASCE Student Chapter hosted the annual KSU/KU Joint Dinne. Nov. 6, 2013. Benedictine College in Atchison, Kan., is working on developing an ASCE Student Chapter at the college and we were able to invite them to this event as a mechanism for helping the students develop their chapter. Three civil engineers from Burns & McDonnell's transmission and distribution section came to present about their work on the Sunrise Powerlink project in

Each semester our ASCE chapter hosts a picnic sponsored by KSPE. We had a large turnout of approximately 150

## Women in Civil Engineering

The women of WCE (Women in Civil Engineering) strive to encourage women in the fields of science and engineering. We facilitate academic success through workshops, team-building exercises, mentoring, industry field trips and social events. WCE seeks to provide the resources necessary for women to excel in academia and professional development. Our mission is to increase the awareness and interest in engineering among the female population. Also, it is a goal to provide a sustainable networking system within the Kansas State University College of Engineering.

## **Chi Epsilon news**

Chi Epsilon continues to extend its reach by inducting nine new members in the fall of 2013: Andrew Bernica, Jacob Cronewett, Claudia Gonzalez, Matthew Gotobed, Caleb Mitchell, Jacob Paperi, Donald Powers, James Scott and Michael Stancic. These new members took over the officer positions for 2014 to establish new member involvement in the chapter.

The chapter continues to serve Tuttle Creek with its biannual service projects. In the fall, the chapter staked young trees in the campsites that surround the area. In the spring, plans are to continue helping with maintenance activities there.

Members mentor freshman students through the CE101 mentoring program. In March, officers will travel to Salt Lake City, Utah, to attend the national Chi Epsilon conclave, with a goal of gaining ideas from other chapters to better our group and increase involvement in the department.

## **Concrete canoe team hull design** lighter and brighter

The concrete canoe team, with team captains Jenny Swabb, Nathan Pohl, and Katlyn Dotson, placed 8th in the 2013 regional competition with its craft the "USS Wildcat."

Under direction of team co-captains Pohl and Dotson, the 2013-2014 canoe is named "Cat Splash Fever," with an amusement park theme and display to build around.

With increased membership, the team has been able to make several advancements in the construction and design of the canoe hull, implementing proven aspects of the past as well as new innovative ideas.

Structural changes have been introduced to improve performance and to reduce weight. Variations on the ribs, added as an experiment last year, have been improved to increase the struc-



tural integrity of the canoe. As always, reducing weight from the previous year was important. However, more was done to achieve this than just changing the mix design, as in previous years. There has also been a significant decrease in height and length, changing the canoe to a height of approximately 16 inches and a length of 18 feet.

A strong base has been laid the last few years for the future leaders of concrete canoe. A new captain, Jacquelyn Ewald, has been chosen for the 2014-2015 term to continue and improve the concrete canoe team.

## Nine consecutive national appearances for steel bridge team

The 2013 K-State steel bridge team, led by Chris Rottinghaus and Andrew Wiederholt, placed first overall at the regional competition held in Edwardsville, Ill. The bridge took first in stiffness with 0.438 inches of deflection; lightness at 167 lbs; and structural efficiency at \$2,107,500. The team also finished third in display, and construction speed at 19.72 minutes. The bridge's final score was determined by the sum of its structural efficiency and construction economy costs. Structural efficiency is affected by the bridge's weight and deflection, while the construction economy is based on construction speed and number of builders.

The first-place finish qualified the team for national competition hosted by the University of Washington in Seattle. The team shaved five minutes off its regional build time and placed sixth out of 48 teams in stiffness. K-State



finished 36th overall.

Cale Armstrong and Robert Schweiger hope to lead the 2014 team to national competition for the 10th year in a row. Fabrication on this year's bridge began in January and is anticipated to be complete by mid-March. Design of the bridge is a thin undertruss. However, unlike recent years, there will be no cantilever. Most of the bridge will be assembled using double-shear connections. Regional competition will be held April 24-26 in Stillwater, Okla.; nationals will take place in Akron, Ohio, May 23-24.

### Student team competition results KANSAS STATE

Steel bridge team: **1st place overall** 2013 ASCE Mid-Continent Student Steel Bridge Conference, Southern Illinois University; qualified for national competition

in Seattle, Wash. Concrete canoe team: 8th place overall 2013 ASCE

**Regional Conference** 

### 2013 fall **CE banquet awards**

**ASCE** Advisor of the Year Award Dunja Peric

**ASCE Outstanding Faculty Award** Hani Melhem

**CE Graduate Council Outstanding Graduate Faculty Award** Kyle Riding

**Chi Epsilon UG Teaching Excellence** Award Asad Esmaeily

Chi Epsilon Student Advocate of the Year Award

Sunanda Dissanayake **Outstanding Colleague Award** 

Asad Esmaeily **Outstanding Research Award** 

Hayder Rasheed

**Outstanding Teaching Award** Hani Melhem

**Outstanding University and Professional Service Award** Dunja Peric

**Outstanding Staff Award** Jeanette Grauerholz

Outstanding M.S. Award Syeda Rubaiyat Aziz

**Outstanding Ph.D. Award** Mohammadreza Mirzahosseini

## **'66, '82** Larry Emig

## **Reflections on service and career**

In 2009, three years after retiring from the Kansas Department of Transportation, I accepted a request from Jim Koelliker, interim head of the CE department, to become a member of the K-State CE advisory council. My last meeting on the advisory council will be in April 2014. It has been both a privilege and an honor to have served with other CE graduates.

I recall many enjoyable experiences while getting to know and work with Jim and other CE department heads: Yacoub Najjar, interim; the late Alok Bhandari, appointed; and currently Bobb Stokes, interim. Each provided outstanding leadership for faculty, staff and 12 advisory council members, and promoted the highest quality of education for all students as a top priority. I felt this same level of interest for students being expressed

by those who spoke at Alok Bhandari's funeral in 2013. He was very much loved as a department head and passed away at a young age.

It has been enlightening to meet twice a year with the department head and hear updates on many issues from him, the dean of engineering, faculty and students. Recent issues the council has assisted with include ABET accreditation, funding for the department, curriculum review, student activities and research ideas. At our September 2013 meeting, we commented on the draft CE 2025 Strategic Action and Alignment Plan. The plan as approved is available online at the CE website: http://www.k-state.edu/2025/ documents/dept-integrated-plans/ ENG\_Civil%20Engineering\_Integrated\_2025\_Plan.pdf

I hold both B.S., 1966, and M.S.,

### 2013 Professional Progress Award recipient



Jon Halbgewachs, Ellsworth, Kan., a 1997 graduate of Kansas State University in civil engineering, was a recipient of the 2013 Professional Progress Award given by the College of Engineering in recognition of his professional career accomplishments during the first 20 years following graduation.

Halbgewachs is a senior vice president and the Kansas operations manager for Kirkham Michael and Associates, Inc. in Ellsworth. In addition to his office managerial duties, he manages road, bridge, airport, water and sewer design projects; bridge and structure inspections; construction services; and various planning proj-

ects across Kansas. Halbgewachs is a licensed professional engineer in Kansas and Nebraska, and is a member of the American Council for Engineering Companies, National Society for Professional Engineers, Kansas Society of Professional Engineers, American Public Works Society and the K-State Alumni Association.



1982, degrees in CE from K-State. After graduation in 1966, I began work for the Kansas State Highway Commission/KDOT and participated in its engineering training program. I also worked in the departments of planning and development, and secondary roads. Since 1987, I worked with cities and counties as the chief of local projects until my retirement. A dedicated staff of engineers, technicians and others worked with consultants to assist the development and annual letting of approximately \$80 million in projects for improving local governments' roads, streets and bridges.

While a student, I chaired a committee that constructed a pre-stressed concrete diving board for Engineering Open House. This experience in a professional student chapter contributed to my being active in the following: American Society of Civil Engineers, Kansas Society of Professional Engineers, National Society of Professional Engineers, American Public Works Association, American Road and Transportation Builders Association, National Association of County Engineers and Transportation Research Board committees. I am proud to have had the opportunity to assist in creating the national "Put the Brakes on Fatalities Day" safety program, which is now managed by the ASCE Transportation and Development Institute's Transportation Safety Committee.

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## **Ongoing research at K-State improves function of** concrete railroad ties

Prestressed concrete railroad ties are becoming increasingly popular in the United States and are an essential component for higher speed railway lines. In order for these prestressed concrete ties to function adequately over their expected service life, the prestressing force must be fully introduced into the railroad tie at a location well before the rail load is applied.

Research at Kansas State University is being conducted to evaluate the best combinations of concrete and prestressing steel to meet this objective, and to ensure the long-term performance of these ties. Civil engineering graduate students Naga Bodapati, Matthew Arnold, Joseph Holste and Amir Momeni, as well as numerous CE undergraduate students, have been conducting experimental research in Fiedler Hall as part of a \$2.1 million multi-disciplinary project being

funded by the Federal Rail Administration, LB Foster/CXT Concrete Ties and the KSU University Transportation Center.

In addition, a group of six CE personnel collected data during a threeweek period at the CXT Concrete Tie Manufacturing facility in Tucson, Ariz. Lead principal investigator of this multi-disciplinary project is

Professor Robert Peterman. Results from concrete railroad tie research by the KSU team have been published in 23 peer-reviewed articles since 2011. In addition, Joseph Holste was named a winner at the Capitol Graduate Research Summit in Topeka, Kan., in February 2014 for his poster titled "Transfer bond test used to predict transfer length of concrete railroad ties."



Joseph Holste discusses his research presentation at the Capitol Graduate Research Summit.

### Virtual lab for assessment of parameters affecting confined concrete performance

An accurate and realistic prediction of the performance of a reinforced concrete structure depends on analytical models and methods, especially material models. Various models have been proposed to simulate the stress-strain relationship of concrete confined by conventional and/or unconventional reinforcement.

These models are mostly scaled against a limited number of specific experimental data by the model developer. The range of parameters affecting the accuracy of the model is therefore limited to those considered in the limited number of experiments.

A virtual laboratory using ABAQUS, calibrated and verified against available experimental data, has been created by graduate research assistant, Zohren Kiaepour, under the supervision of her major professor and adviser, Asad Esmaeily, providing a tool to do a virtual experimental parametric study on various important parameters such as material type, amount, arrangement and alignment on the performance of confined concrete. This virtual lab can also simulate the performance of reinforced concrete structural members under any load pattern.





Figure 1: Concrete mesh and steel cage mesh for a sample reinforced concrete short column



Figure 2: Virtual lab performance of a sample under concentric load compared to the real experimental performance

## Learning from the pristine to treat the polluted

The occurrence of toxic trace elements, such as arsenic and selenium, in surface and ground water is of great concern to regulatory agencies, industry dealing with contaminated wastewater and populations exposed to elevated levels of these elements in their drinking water. Natalie Mladenov, CE assistant professor, has been investigating the mechanisms responsible for the mobility and sequestration of arsenic and other toxic trace elements in polluted ground water environments.

In a National Science Foundationfunded study, Mladenov and her graduate student Hersy Enriquez collected samples from an arsenic-contaminated site in an otherwise pristine wetland, the Okavango Delta of Botswana, to



## New version of KSU\_RC to be released soon

KSU\_RC, a Windows-based computer application, provides the necessary tools through an intuitive user-interface and analytical process for a reliable and realistic assessment of the performance of reinforced concrete structural members, namely, columns. This application was originally developed by Asad Esmaeily, CE associate professor. Benchmarked against experimental data, and updated occasionally to add features and improve compatibility with the newer versions of Windows, KSU\_RC is widely used by private and public professional and educational agencies and institutes. It analyzes the moment-curvature, forcedeflection and axial force-bending moment response of a column with various geometry, reinforcement type and arrangement, under any loading and displacement pattern. It serves as a useful tool in evaluating various material models, cyclic rules and analytical procedures, and assessment of new methodologies in design and construction, namely retrofit of the existing reinforced concrete columns.

The new version of this application is under development by Ph.D. graduate





research assistant, Fatemeh Shirmohammadi, whose adviser is Esmaeily.

Fundamental improvements addresses research needs and requests by users including a completely revised user interface, intuitive steps, more options and functionalities for data entry and retrieval, visual interaction and graphical demonstration; bi-axial analysis under any

better understand the ways in which arsenic may be sequestered in situ.

Mladenov and her collaborative team, which also includes Ganga Hettiarachchi from KSU agronomy and colleagues from the Okavango Research Institute, determined that reactions involving organic carbon, sulfate-reducing bacteria and dissolved sulfur species can lead to the sequestra-

tion of arsenic, even in sandy wetland soils. These results now shed light on how constructed wetland systems can be used to treat arsenic- and seleniumladen wastewater from coal-fired power plants. With funding from the Electrical Power Affiliates Program at K-State, Mladenov, her graduate student Jose Paredez, and other team members are applying these principles in bench-scale testing of wetland cells for the treatment of flue gas desulfurization wastewater from coal-fired power plants.

At left, graduate student Hersy Enriquez and a colleague from the Okavango Research Institute pump ground water samples from an arsenic-contaminated aguifer in Botswana in southern Africa.



Figure 1: An example of the cross-section meshing with various regions for plain and confined concrete and steel



Figure 2: An example of cyclic force-deflection response of a column under a constant axial load compared to experimental data

load/displacement history; 3-D graphs with interactive functionality for retrieving desired data; adjustable meshing and mesh optimization for a desired accuracy of analysis; flexibility in choosing analytical models and options; new models including unconventional material in addition to custom models; various sections including composite and custom sections; and more.

Read more online at www.ce.ksu. edu/faculty/esmaeily/KSU\_RC.htm.

## Searching for greener asphalt roads

Born and raised in an oil-rich country, Iran, Nassim Sabahfar (M.S. '12), doctoral student in civil engineering, never imagined that she would spend a significant part of her academic life at K-State working on asphalt, a product obtained from the petroleum crude refining process and widely used in paving roads. Of course, K-State has one of the best facilities in the nation to study asphalt, not to mention its long standing relationship with Conoco, a leading producer of asphalt.

The U.S. transportation infrastructure is in dire need of the type of innovation Sabahfar is trying to do. According to a fairly recent estimate by the U.S. Congress National Surface Transportation Policy and Revenue Study, current annual spending for highways, roads and bridges is approximately \$68 billion. It has been estimated that over the course of the next 50 years, annual cost of maintaining our nation's aging infrastructure will rise to about \$185 billion. Nearly 94% of the nation's paved highway network of about two



Nassim Sabahfar (right) helps Masoumeh Tavakol (left) and Ananna Ahmed (center) run a Texas overlay test in the advanced asphalt laboratory.

million miles is asphalt surfaced. As of 2009, 3,900 asphalt plants here produced 360 million tons of hot-mix asphalt (HMA) valued at approximately \$24 billion.

Last year, the Kansas Department of Transportation (KDOT) laid almost three million tons of HMA. At about \$65 per ton, that translates to nearly \$200 million in annual spending on asphalt roads. Due to recent increases in the price of petroleum

### Perić named Visiting Fellow at University of New South Wales, Sydney, Australia

The title Visiting Fellow was conferred upon Dunja Perić, CE associate professor, by the University of New South Wales (UNSW), Sydney, Australia, in 2013. Perić's twomonth visit to the university during the summer of 2013 was entirely funded by UNSW. She worked on a collaborative research project, which addressed the inception of instabilities in variably saturated soils. Unsaturated soils are found above the ground water table and a significant amount of civil infrastructure has been built on the top of them

throughout the world.

So far the collaborative research has resulted in three conference papers and one referred journal paper. Perić will be presenting the results of this research at two premiere international events in 2014: 10th International Workshop on Bifurcation and Degradation in Geo-materials, which will be held in Hong Kong, China, in May 2014; and Unsaturated Soils: Research and Applications conference, which will be held in Sydney, Australia, in July 2014.

crude, the price of asphalt has been at an historic high. Thus contractors are using more and more of recycled or reclaimed asphalt pavement, commonly known as RAP, in HMA. The estimated usage of annual RAP in Kansas varies from 0.6 to 0.75 million tons.

Although this recycling promotes greener roads in terms of conservation of natural resources and results in economy resulting from using asphalt in RAP, long-term performance of the recycled HMA mixtures with high RAP content has not been established. Sabahfar, with fellow master's students Masoumeh Tavakol and Ananna Ahmed, are studying benefits and limitations of high RAP content in HMA in three different research projects sponsored by KDOT. The trio is advised by Mustaque Hossain, Munger Professor of Civil Engineering, who spearheaded the development of a viable asphalt research program at K-State with significant support from KDOT and the Kansas Asphalt Pavement Association. The work done by these graduate students would establish practical guidelines on the use of RAP in HMA to ensure long-term performance of these recycled materials in greener asphalt roads in Kansas and the nation.

## Water research evokes international response

One might say David Steward made a "splash" in the world of water.

A professor of civil engineering, Steward led a team of colleagues to investigate future availability of groundwater in the High Plains Aquifer, and how reducing its use would affect cattle and crops.

The resulting work of the fouryear study, "Tapping unsustainable groundwater stores for agricultural production in the High Plains Aquifer of Kansas, projections to 2110," was published last summer in the scientific journal Proceedings of the National Academy of Sciences of the United States of America, or PNAS.

PNAS, often cited as the oldest and premiere scientific journal in the U.S., and one of the three most prestigious in the world, has been in existence for 141 years. Since 1945, 81 K-Staters have been published in its pages—but no engineers.

Steward became the first.



Fudan University in China.

Funding was provided by the National Science Foundation, U.S. Department of Agriculture and K-State's University Transportation Center.

Using measurements of ground water levels in the past and present day in the High Plains Aquifer region, Steward and the team developed a statistical model that projected ground water declines in western Kansas for the next 100 years and the resulting effect it will have to cattle and crops, and the region's overall economy.



"The paper was written with this journal in mind, but I never dreamed with its land-grant mission of education, that should be disseminating this type of

Collaborators on the project included K-State faculty members Michael Apley, professor of clinical sciences; Stephen Welch, professor of agronomy; and Scott Staggenborg, adjunct professor in agronomy; K-State graduate and consulting engineer Paul Bruss, M.S., CE 2011; and Xiaoying Yang, former postdoctoral research assistant at K-State, now at

"In the end, we offered an analysis of the consequences of change, both we'd get in it," Steward said. "Yet K-State, today and in the future, for a society dealing with a shrinking aquifer," research and outreach, is exactly the place Steward said. "It was key to provide a scientific basis to support the public debate on water use.

> "I believe our research is resonating with people because they already accept the limitations on aquifer storage—they understand this and have been voluntarily reducing their water usage. People were ready for this type of data and its projected scenario, because it offers hope that something can still be done to preserve a way of life."

#### Media reaction

A media flurry about the research began in late August when K-State's News and Editorial Services released a story on the study.

From this came a national and international response resulting in print, radio and television exposure. Media outlets providing coverage were NPR, Scientific American, USA Today, The Economist, Associated Press, Fox News, UPI, Reuters, Clear Channel Radio, NBC News and many othersas well as international news sources in 13 countries including Uruguay, Germany, Japan, China, New Zealand, Korea, Poland and Arabia.

Read the PNAS report—selected as the research highlight paper at the United Nations Educational, Scientific and Cultural

## **Recognizing academic excellence**

### Top dissertation prize awarded to engineering graduate student

The Council of University Transportation Centers has selected Ranjit Godavarthy, a December 2012 doctoral graduate in civil engineering at Kansas State University, to receive its Wootan Outstanding Dissertation Award in recognition of his dissertation prepared as part of his doctoral studies.

The dissertation, "Network and design concepts for accommodating large trucks at roundabouts," was completed while Godavarthy was a student at K-State under the direction of Gene Russell, professor emeritus of civil engineering. Other committee members included Professors Sunanda Dissanayake, civil engineering, and Margaret Rys, industrial engineering.

Related research for the paper was funded in part through the University Transportation Center in the civil engineering department. The prestigious award recognizes Godavarthy's scholarship as the best among

submissions from nearly 60 other universities in the U.S. Department of Transportation University Transportation Center program.

Godavarthy received the award and a \$2,000 stipend at the Council of University Transportation Centers annual awards banquet in Washington, D.C., Jan. 11, 2014.

While completing his M.S.and Ph.D. studies at K-State, Godavarthy also won numerous poster competitions at transportation conferences, received the 2010 Thomas J. Sebrum Student Paper Award for "making the most significant contribution to transportation and/ or traffic engineering," and served as president of the student chapter of the Institute of Transportation Engineers.

He is currently an associate research fellow in the Upper Great Plains Transportation Institute at the North Dakota State University.

### **Civil engineering graduate students** take top honors

• Ahmed Al-Rahmani, CE doctoral student, won first place and \$1,000 in the national competition of the International Highway Engineering Exchange Program for his paper "An Artificial Intelligence Approach to Objective Health Monitoring and Damage Detection in Concrete Bridge Girders." His major professor is Hayder Rasheed, professor of civil engineering.

• Alireza Shams, CE doctoral student, placed in the top three with his poster, "Development of an ANN Model to Predict Crash Frequency at Highway Intersections," when presenting at the 2013 ITE Midwestern District Annual Conference in Milwaukee, Wisc. His major professor is Sunanda Dissanayake. Three other CE students from the K-State ITE Student Chapter, Hojr Momeni, Ishani Dias and Milad Saghebfar, also presented posters.

### **Faculty accomplishments**

- The K-State University Transoprtation Center's Annual Kansas Transportation Engineering Conference has received the University Professional and Continuing Education Association Central Region's 2013 Mature Noncredit Program Award for providing transportation engineering experts from across the state, region and nation the opportunity to collaborate and discuss moving the Kansas transportation industry forward. UTC director is Robert Stokes, CE professor and interim department head.
- Bob Peterman, CE professor, has been named a fellow of the Precast/ Prestressed Concrete Institute.
- Steve Starrett, CE assoc. professor, has been named a fellow of the Environmental and Water Resources Institute, a technical institute of the American Society of Civil Engineering with more than 22,000 members.

#### In memory

Kuo-Kuang "Tony" Hu (ČE M.S., Ph.D. '69), civil engineering professor emeritus, died June 28, 2013, in Palo Alto, Calif. He served as a professor of applied mechanics and civil

engineering at Kansas State University from 1969 until his retirement in 2000 He authored or co-authored dozens of papers during his career and collaborated with colleagues on several patents, one being a stiffness decoupler which focused on developing a preventative method to minimize the destruction of structures during earthquakes. Hu is survived by his wife, Sue Hu, two sons, one daughter and four grandchildren.

## **Educational objectives and student outcomes**

The civil engineering B.S. program at Kansas State University was first accredited by the Accreditation Board for Engineering and Technology (ABET) in 1936, the

#### **ABET program educational objectives**

The educational objectives of the civil engineering program at Kansas State University are that most graduates, within three to five years, will-

- 1. Be successful in their civil engineering careers; and
- 2. Pursue professional development, advanced degrees and registrations as appropriate for their careers.



### **KANSAS STATE** UNIVERSITY College of Engineering Department of Civil Engineering

## **Distance education master's degree courses**

The civil engineering department offers graduate-level courses leading to a master of science degree in civil engineering to off-campus studentsno matter where they live. All courses needed for the degree will be offered online or by other multimedia delivery methods. Students only need to travel to K-State once, at the end of their program, for an oral examination conducted by their graduate committee. A master's degree can also be counted as a year of credit toward earning a professional engineering license. For information on earning this license, go to the Kansas Board of Technical Professions online at http://www.kansas.gov/ksbtp/.

Division of Continuing Education	
131 College Court Building	
Vanhattan, KS 66506-6001	

Summer 2014 CE 333 CE 703 CE 704 CE 752 CE 790 CE 816 Fall 2014 CE 732 CE 742 CE 745 CE 751 CE 775 CE 786 CE 790 CE 816 CE 828 CE 854 CE 861 CE 874 Email: info@dce.ksu.edu Phone: 1.877.528.6105



first year accreditation was given for engineering programs. K-State's CE program has been regularly accredited since then. The last ABET general review was in fall 2011.

#### **ABET student outcomes**

- (a) an ability to apply knowledge of mathematics, science and engineering;
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- (c) an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- (d) an ability to function on multidisciplinary teams;
- (e) an ability to identify, formulate, and solve engineering problems;
- (f) an understanding of professional and ethical responsibility;
- (g) an ability to communicate effectively;
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social context;
- (i) a recognition of the need for, and an ability to engage in, life-long learning;
- (j) a knowledge of contemporary issues; and
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Statics

Responsibility in Engineering: Codes and Professionalism Responsibility in Engineering: Leadership and Diversity Advanced Hydrology Prb/Civil Engineering Ethics Case Studies **Topics/Retrofitting Historic Buildings** 

Advanced Structural Analysis I Advanced Steel Design **Structural Dynamics** Hydraulics of Open Channels **Traffic Engineering** Land Development for Civil Engineers and Planners Prb/Sustainability and Green Engineering Topics/Water Quality Engineering: Fate/Transportation Advanced Soil Mechanics Analysis of Ground Water Flow Environmental Engineering Chemistry Sustainable Transportation Asset Management

www.dce.ksu.edu/engineering/degrees/civil/

## **Undergraduate scholarship recipients**

Cale Armstrong—Beavers Heavy Construction Scholarship, R.D. and Mary C. Andersen Scholarship, College of Engineering Student Leadership Scholarship

Robert Behm-Ralph and Dora Rogers Memorial Scholarship

Andrew Bernica—Shelby K. Willis Civil Engineering Scholarship, Walter M. and Alice K. Bellairs Scholarship

Joseph Burgett—Bartlett & West Inc. Civil Engineering Scholarship

Gregory Canales—Stephen and Deloris Berland Civil Engineering Scholarship

Caleb Childs—Ralph and Dora Rogers Memorial Scholarship

Christopher Christensen—Engineering Scholarship, Loyal and Jill Huddleston Civil Engineering Scholarship, Orville "Butch" and Doris Spray Family Civil Engineering Scholarship

Austin Conrady—Ralph and Dora Rogers Memorial Scholarship

Dillon Cowing—Bartlett & West Inc. Civil Engineering Scholarship

Brady Crites—Ralph and Dora Rogers Memorial Scholarship

Jacob Cronenwett—Chas Turnipseed Memorial Fund

David Ecklund—Coonrod Memorial Civil Engineering Scholarship, Dr. Thomas G. Swaney Memorial Scholarship

Matthew Emerson—Ralph and Dora Rogers Memorial Scholarship

Eric Fletcher-Alan and Sharon Sylvester Civil Engineering Scholarship, Engineering Scholarship, Walter M. and Alice K. Bellairs Scholarship

Allison Franken — Justus O'Reilly Family Engineering Scholarship

Christopher Gaston—Jeanne M. and Edward J. Mulcahy Scholarship, Jim and Pat Guthrie Civil Engineering Scholarship, Rathbone Scholarship Fund

Joshua Ginther—Ralph and Dora Rogers Memorial Scholarship

Claudia Gonzalez—Ralph and Dora Rogers Memorial Scholarship

Matthew Gotobed—Ralph and Dora Rogers Memorial Scholarship

Ashley Green—Mick and Nancy McAuliffe Civil Engineering Scholarship

Neil Haas—Ralph and Dora Rogers Memorial Scholarship

Jeremy Harter—Alfred Walton Johnson Memorial Scholarship, Dwight Raymond Lee Memorial Scholarship, Rathbone Scholarship Fund

Samantha Hinrichs—Edmond E. Young Scholarship, Engineering Scholarship, Laree Mugler Scholarship

Brady Hoffman—Ralph and Dora Rogers Memorial Scholarship

Jerald Hulsing—Foundation for Engineering

Austin Jueneman—Engineering Scholarship, Kevin and Diane Honomichl Civil Engineering Scholarship

**Caleb Jurey**—The Paulson Civil Engineering Student Excellence Scholarship Corey Kingsland—Charles Freund Memorial

Scholarship, Rathbone Scholarship Fund

Weston Koehn-Brungardt Honomichl & Company, P.A. Civil Engineering Scholarship; Engineering Scholarship

Cash Kramer—Engineering Scholarship, Karl J. Svaty Memorial Engineering Scholarship

Weston Loehr-G.E. Johnson Engineering Scholarship, L.W. Newcomer Scholarship, 'Red' Web Sproul Memorial Scholarship

Jared Loomis—Duane and Pauline Murphy Scholarship, G.E. Johnson Engineering Scholarship, Herb and Mary Sue Whitney Scholarship

**Boaz Love**—Francis D. Wagner Memorial Scholarship, G.E. Johnson Engineering Scholarship

Darren Meyer—G.E. Johnson Engineering Scholarship

Keithen Meyer—G.E. Johnson Engineering Scholarship

Caleb Mitchell—Chas Turnipseed Memorial Fund, G.E. Johnson Engineering Scholarship

Kevin Moluf—Civil Engineering Excellence Scholarship, Clair A. Mauch Memorial Scholarship in Civil Engineering, G. E. Johnson Engineering Scholarship

Sarah Mountcastle—Ralph and Dora Rogers Memorial Scholarship

Austin Muckenthaler—G.E. Johnson Engineering Scholarship

Benjamin Nye-E.C. Lindly Scholarship for **Engineering Students** 

Abigail Ortiz—Ralph and Dora Rogers Memorial Scholarship

Jacob Paperi—Ralph and Dora Rogers Memorial Scholarship

Carl Peterson-Warren and Mary Lynn Staley Engineering Excellence Scholarship, College of Engineering Student Leadership Scholarship

Yadira Porras—Engineering Scholarship, Everett J. and Marilyn J. Cupps Civil Engineering Scholarship, Vicki Scharnhorst Civil Engineering Scholarship

Donald Powers—Warren & Mary Lynn Staley Engineering Excellence Scholarship Robert Reilly—Warren and Mary Lynn

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Memorial Scholarship

Dalton Savage—Bruce E. Roberts Scholarship, Douglas L. Gfeller Memorial Scholarship Fund, Kenneth and Maria Rector Scholarship, The Howard C. Eberline Memorial Scholarship

Gage Scheer—Ralph and Dora Rogers Memorial Scholarship

Barrett Schmidt-Ralph and Dora Rogers Memorial Scholarship

James Scott—Engineering Scholarship, S.H. Brockway Memorial Scholarship, The Howard C. Eberline Memorial Scholarship

Robert Sherwood—Ralph and Dora Rogers Memorial Scholarship

Lisa Shofstall—Engineering Scholarship, Robert Callen King Award in Engineering

Jashuna Shrestha—Ralph and Dora Rogers Memorial Scholarship

Christopher Shultz—Engineering Scholarship, Forrest Faye & John Warren Frazier Scholarship

Jennifer Sommerfeld—Donald G. Dressler Memorial Scholarship, Engineering Scholarship, The Edward L. Wilson Civil Engineering Scholarship, College of Engineering Student Leadership Scholarship

Michael Stancic—The Tim and Sharon Taylor Family Scholarship

Vincent Studer—Paul Bartak Family Scholarship, Warren and Mary Lynn Staley Engineering Excellence Scholarship, College of Engineering Student Leadership Scholarship

Braden Taylor—Warren and Mary Lynn Staley Engineering Excellence Scholarship

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Adam Wilkerson—Engineering Scholarship Daithin Wycoff—Foundation for Engineering Scholarship

Kurt Yoder—Ralph and Dora Rogers Memorial Scholarship

Jared Yost-Robert Callen King Award in Engineering



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Vice President – Engineering EvapTech, Inc. Lenexa, Kan.

#### Greg Allison

VP Civil Engineering MKEC Engineering Consultants, Inc. Wichita, Kan.

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