# CIVIL ENGINEERING SUMMER 2018 COLLEGE OF ENGINEERING



## KANSAS STATE

## FROM THE DEPARTMENT HEAD

Last year we had a record number of undergraduates receiving degrees, enrolled the largest number of doctoral students in our history and experienced several turnovers in our faculty ranks. This issue of Civil Matters summarizes departmental activities and accomplishments over that time period.

We are guite proud of our students who have won very prestigious and competitive scholarships and fellowships to help them pursue higher studies at K-State. Thanks largely to the support of our alumni and friends, we were able to disburse scholarships to 53 undergraduate students totaling more than \$184,000. We are also pleased to introduce our first teaching faculty member as well as new staff who have recently joined our CE family.

To give you an idea of the depth and breadth of the research being conducted in our department, we've featured short stories on various research projects.

Our creative inquiry teams have showcased our educational and professional service activities on numerous occasions. The department has continued to add excellent teaching and research capabilities in various laboratories in Fiedler and Engineering halls to emphasize our "hands-on" approach to civil engineering education. We're also active in continuing education and technology transfer programs through K-State's Global Campus.

It is a distinct honor and privilege to serve as head of a department with such a storied history and supportive alumni.



I would like to extend my sincere appreciation and thanks to all who have supported us over the years. The future of our profession looks very promising and bright.

Our faculty, staff and students extend an open invitation to you for a visit. We'd love to have a conversation with you about new educational and research opportunities we offer, and show you our excellent facilities.

Mustague Hossain Department head, Munger Professor and Civil Engineering Alumni Professorship Honoring Dr. Robert Snell







## **SUMMER 2018 COLLEGE OF ENGINEERING**

6

8

IN THIS ISSUE







EXCELLENCE



STUDENTS SUPPORT FEE INCREASE 10 STUDENT ORGANIZATIONS 14 **CREATIVE INQUIRY TEAMS** 16 DEPARTMENT NEWS 18 NEW FACULTY AND STAFF 20

RESEARCH GRANT AWARDED

**CE GRADUATES** 22

RESEARCH

ALUMNI CORNER

SCHOLARSHIPS

#### ON THE COVER

GARRETT PIEPER, LEFT, CE SENIOR, ASSISTS JEONGDAE IM, CE ASSISTANT PROFESSOR, WITH A LAB PROJECT.

#### LEFT

KENTIN BRUMMETT, LEFT, CE SENIOR, AND DESIREE MILLENTREE, CE JUNIOR, DISCUSS HPLC RESULTS IN THE ENVIRONMENTAL LAB.

#### **CIVIL MATTERS**

is published by the department of civil engineering in the Kansas State University College of Engineering, 2118 Fiedler Hall, 1701C Platt St., Manhattan, KS 66506. It is available on the web at ce.k-state.edu

Summer 2018 Editing and design. . Engineering Communications . K-State Communications and Marketing Photography .

### RESEARCH

## **CE LOOKS AT BIOREMEDIATION TO REMOVE POLLUTANTS**

Bioremediation is the use of microorganism metabolism to remove pollutants. Work is underway at K-State to investigate diverse microbial processes controlling the fate of contaminants under different redox conditions. Specifically, the focus has been on non-traditional, novel approaches called biologically mediated abiotic degradation, or BMAD, processes.

One major research thrust has concerned the BMAD processes acting on emerging contaminants such as bisphenol A, or BPA, a mass-produced chemical used in the manufacture of polycarbonate plastic and epoxy resins. It has been of concern in environmental systems due to weak estrogenic activity. BPA had been considered recalcitrant under anoxic conditions, but recent studies at K-State demonstrated that biologically produced manganese oxides mediated BPA transformation and mineralization.

In a research project funded by the American Chemistry Council, CE master's student, Nusrat Shobnam, under supervision of Jeongdae Im, CE assistant professor, is trying to demonstrate the relevance of this BMAD process for the turnover of recalcitrant BPA in natural settings, and to generate some level of predictive understanding about the fate and longevity of BPA in the environment. Read more at bit.ly/bmad-ce.



LEFT, NUSRAT SHOBNAM WITH JEONGDAE IM IN THE ENVIRONMENTAL LAB

### HIGH-EARLY-STRENGTH CONCRETE FOR RAPID REPAIR OF PAVEMENT

Of the 140,654 miles of public roads in Kansas, 13 percent are in poor condition. Kansas motorists annually incur \$500 in extra operating costs from driving on roads in need of repair. Usually concrete slab patching and/or slab replacements are done with high-early-strength Portland cement concrete, or PCC. The Kansas Department of Transportation, or KDOT, had noticed these PCC patches were deteriorating quickly, needing to be replaced in less than 10 years. While the patches were considered temporary, replacing/repairing them was common in the past. Now as funding has become limited, the need for a more permanent or longer lasting patch was desirable. In a research project funded by KDOT, CE master's student, Yadira Porras, under the supervision of Mustaque Hossain, Munger professor, and Christopher Jones, associate professor, successfully came up with a long-life patching mix for use in the KDOT District V/Wichita area.

The mixture, with local aggregates and incorporating ASTM Type III cement (564 Ib/yd<sup>3</sup>), a calcium chloride admixture (2 percent), an air-entraining agent and a water-reducer, met the minimum compressive strength of 1,800 psi in six hours as required by KDOT, as well as freeze-thaw durability requirements for 20 years. Read more at bit.ly/porras-ce.

## FORMULATING CLOSED-FORM ANALYTICAL SOLUTIONS FOR BUCKLING OF LAMINATED ANISOTROPIC COMPOSITE PLATES

Fiber-reinforced polymer composites are replacing conventional materials in various engineering applications due to their superior characteristics such as high strength-to-weight ratio, high stiffness-to weight ratio, fatigue, corrosion resistance, etc. However, such composite lamination lends itself to more complicated anisotropic material behavior. Thus analytical solutions for such materials are highly challenging but essential to accurately benchmark numerical (finite element) results.

In a research study supported by K-State civil engineering, doctoral graduate, Rund Al-Masri, under the supervision of Hayder Rasheed, CE professor, successfully developed analytical solutions for buckling of anisotropic laminated plates subjected to in-plane compressive stresses. This was done through creative implementation of constitutive dimensional reduction by static condensation, which resulted in closed-form buckling-load formulas. These formulas were generalizations for the Euler buckling formulas for isotropic columns and plates. Analytical results obtained were successfully compared with finite element analysis and experimental testing. This work resulted in several publications in prestigious journals. Plans are underway

to seek funding to extend this work in collaboration with the NASA Johnson Space Center in Houston Texas. Read more at bit.ly/buckling-ce.



BUCKLING OF FIBER-REINFORCED POLYMER COMPOSITES

### 

EXCELLENCE

2019 will mark the 20th year of my professional career in civil engineering. Reflecting on that fact led me to write and share the following memories and observations.

I grew up in Haysville, Kansas, where my family operated a farming operation started by my grandparents that centered on growing peaches. About my junior or senior year in high school, after several years of freeze-out (no crop), my grandfather approached my brother and me, and asked if we wanted to continue to farm or do something else. We both chose "something else." I remember my grandmother telling me that a lot of things "grow better than peaches."

At the time, my dad was a county commissioner in Sedgwick County and introduced me to the director of public works there. Around the same time, my grandfather took me to a planning board meeting for a rezoning related to converting one of our orchards to a rural housing development next to an established development. There I heard all about traffic, drainage, noise, etc. Between these encounters, I'm not sure I was sold on civil engineering then, but I was interested. I liked the idea of solving problems for others. I began my education at Wichita State University in its general engineering program and transferred to K-State my second semester to enroll in the civil engineering program.

College was hard. I was at best an average student. But I encountered a Calculus I

instructor who helped me take my grades from Fs to a B. I learned to work my tail off and that was it for me. No matter how hard the challenge, I could work harder and overcome it. I am appreciative of many instructors in college who pushed me to overcome.



I accepted my first job offer six months prior to graduation. And although it was a great job that I enjoyed, about a year later a former professor asked if I'd be interested in graduate school, and my new plan became working toward the required credits, completing KDOT-funded research, and tackling my thesis.

After graduate school, I went back to consulting for a short time and then on to the city of Manhattan as a design engineer. Here I met many people involved in public works that shaped who I wanted to be as a professional in both public works and engineering. With the city of Manhattan, I went on to serve in the capacity of city engineer and director of public works.

From those posts with the city, I joined SMH Consultants, where I have been ever since. I continue to meet great people that pave the path for my personal career, whether it be a small-town city administrator in Western Kansas or a big time public works director in the Kansas City metro area. It doesn't matter who they are or what their position, if you listen carefully, relate and respond, much can be gained in personal development from a simple short conversation. It also doesn't matter how old they are. I always believed that influence comes from those older than us. But as I talk to younger people starting careers in civil engineering, I find they are no less influential.

Many of us serve in leadership capacities, but influence is not limited to leaders...nor is leadership. Leadership is influencing the right people at the right time in a positive manner. Each day, I try to remember that what I do, how I react, the words I choose and the importance I convey all exert influence on those around me.

My grandmother was certainly right...lots of things grow better than peaches.

Jeffrey Hancock is a principal owner of SMH Consultants, P.A., with offices in Manhattan, Dodge City, and Overland Park, Kansas. He is a member of the civil engineering advisory council.

## **CE ALUMNI HONORED FOR CAREER SUCCESS**



### ALUMNUS HONORED WITH LIFETIME ACHIEVEMENT AWARD

Thomas Gates (B.S. '79, M.S. '81) is a 2017-18 recipient of Albert Nelson Marquis Lifetime Achievement Award and was recently featured in the Wall Street Journal. The award is given based on career longevity, philanthropic endeavors and lasting contributions to society. Out of 1.5 million biographies, only a handful are selected for this honor.

Gates will also be honored by the International Association of Top Professionals as Top Civil Engineer of the Year for 2018. A fellow of ASCE, Gates is currently a practicing attorney in the environmental and waste management fields based out of Tukwila, Washington. He received his Juris Doctor degree from Seattle University in 2001. Additionally, he is a judge pro tem for Federal Way, Washington. Previously he served as chair of the state of Washington's solid waste advisory committee. He is a registered professional engineer in Alaska, Kansas and Washington.

The Kansas State University College of Engineering honored 10 alumni for professional career accomplishment during the first 20 years following their graduation at ceremonies April 21.

Recipients of the college's Professional Progress Award were nominated by their respective department heads and confirmed by Darren Dawson, dean of engineering.

Below is the 2018 Professional Progress Award honoree from CE.

Steven Lillehaug, CE '98, received the 2018 Professional Progress Award from the College of Engineering. A Minnesota native, he is the public works director/city engineer for the city of Shakopee, Minnesota. His prior experience includes serving as the public works director/city engineer for the city of Brooklyn Center from 2008-17; assistant city engineer for the city of Minnetonka from 2006-08; traffic engineer/ assistant city engineer for the city of Edina from 2004-06; and project engineer/ manager with a private consulting firm from 1998-2004. Lillehaug is also a seven-year U.S. Army Veteran and was a Chanhassen planning commissioner from 2002-04.

Lillehaug has been married to his wife, Cammie, for more than 27 years. They have two sons and a granddaughter. His hobbies include hunting, fishing (muskie), snowmobiling, motorcycling, Texas Hold 'Em poker and sports in general.



## 

### **2017-18 SCHOLARSHIP RECIPIENTS**

Meyer, Ethan

Miller, George

Mitchell, Angie

Mitts, Riley

Moris, Blake

Neilsen, Laura

Olnev, Chad

Rogers, Lucie

Stewart, Kirk

Studer, Jacob

Swartz, Brock

Waters, Bailey

Watson, Elena

Wilson, Alexis

Andrus, Rebecca	Alfred Walton Johnson Memorial Scholarship
	Kevin and Dianne Honomichl Civil Engineering Scholarship
Bernal, Absalom	Tointon Family Scholarship
Bevins, Auston	Joseph F. and Kathryn Y. Allison Scholarship
Bitendelo, Swedi	Donald G. and Alta Lou Dressler Memorial Scholarship
	Foundation for Engineering - Dolese
Brown, Samuel	Edmond E. Young Scholarship
	Tointon Family Scholarship
Busenitz, Aubrev	Justin A. Miller Memorial Scholarship
	Karl J. Svaty and Karl J. Svaty Jr. Engineering Scholarship
	Stephen and Deloris Berland Civil Engineering Scholarship
	Vicki Scharnhorst Civil Engineering Scholarship
	Walter M. and Alice K. Bellairs Scholarshin
Crady William	Foundation for Engineering - Dolese
Davis John	Foundation for Engineering - Dolese
Domol Kylo	Rartlett & West Inc. Civil Engineering Scholarshin
Demer, Ryre	Orville "Rutch" and Doris Spray Family Civil Engineering Scholarship
Eccobar Kovin	Engineering Leadership and Innovation
Estobal, Revin	Foundation for Engineering - Dolese
Fangman Jarod	Tointon Family Scholarchin
Fohr Will	Clair A Mauch Momorial Scholarshin in Civil Engineering
Flacnoblor Brandon	Alok Bhandari Civil Enginoaring Scholarshin
Flasponier, Brandon	Rive Dilandari Civil Engineering Scholarship Brungardt Honomichl & Company, DA Civil Engineering Scholarship
Flasponier, Stephen	Tointon Family Scholarshin
Frankal Icahalla	Partlett & West Inc. Civil Engineering Scholarchin
ridlikel, isabelle	Dal lielt & West, IIIC. Civil Engineering Scholarship
	Orville "Putch" and Davic Spray Family Civil Engineering Scholarchin
	Tointon Family Scholarshin
Fugit Amu	Tomiton Faining Scholarship Hal and Mary Giogale Scholars Fund
Fugit, Any Herenemus, Even	Find allu Mary Slegele Scholars Fullu
neronemus, evan	Engineering Leadership and Innovation Tointon Family Scholarchin
Hinchaw Kara	IUIIIUII Fallilly Scholarship Brungardt Hanamicht & Company, DA Civil Engineering Scholarship
Hillslidw, Nard	Brungardt Henemichl & Company, PA Civil Engineering Scholarship
Horner, Matthew	Brungardt Honomichi & Company, PA Civil Engineering Scholarship
Huitgren, Kyle	Hal and Mary Slegele Scholars Fund
Hutchison, Daniel	E. C. Lindiy Scholarship for Engineering Students
	Jeanne M. and Edward J. Mulcany Scholarship Dev Theodine Givil Foreigneric education
	Kex Eberline Civil Engineering Scholdrsnip
lanas Vuistan	Tomicon Faining Scholarship
Jones, Kristen	Forrest raye and John Warren Frazier Scholarship
	Jedinie M. dnu cuwaru J. Mulcany Scholarship
	Jim & Pal Gulnne Civil Engineering Scholarship
Kallan Caran	Walter M. and Alice K. Bellars Scholarship
Keller, Casey	Foundation for Engineering - Dolese
Kelly, Kyan Klovek, Jacob	Tomton Family Scholarship Civil Family and Fusellan as Cabalanship
kiugn, isaac	Civil Engineering Excellence Scholarship
Lage, Madison	Coen Family Civil Engineering ScholarShip
Lanier, Hunter	Hal and Mary Siegele Scholars Fund
Lowe, Steven	nai anu mary Siegele Scholars Fund
Lowery, Jacob	Coonrod Memorial Civil Engineering Scholarship

Alan and Sharon Sylvester Civil Engineering Scholarship Charles Freund Memorial Scholarship L. W. Newcomer Scholarship Robert W. and Becca Reichenberger Engineering Scholarship Tointon Family Scholarship Brungardt Honomichl & Company, PA Civil Engineering Scholarship Everett J. and Marilyn J. Cupps Civil Engineering Scholarship Foundation for Engineering - Dolese **Tointon Family Scholarship** John and Diane Ahern Family Scholarship 'Red' Web Sproul Memorial Scholarship Stuart E. Swartz Civil Engineering Scholarship Tointon Family Scholarship Tointon Family Scholarship Nachtigall, John Coonrod Memorial Civil Engineering Scholarship Broberg-Hurley Family Civil Engineering Scholarship Foundation for Engineering - Dolese Kansas Asphalt Pavement Association, Inc. Civil Engineering Scholarship Walter M. and Alice K. Bellairs Scholarship Warren and Mary Lynn Staley Engineering Excellence Scholarship Chas Turnipseed Memorial Fund Pieper, Garrett Shelby K. Willis Civil Engineering Scholarship Radnor, William Hal and Mary Siegele Scholars Fund Tointon Family Scholarship Robertson, Michael Roemer, Macee Coonrod Memorial Civil Engineering Scholarship Coonrod Memorial Civil Engineering Scholarship Francis D. Wagner Memorial Scholarship Mick and Nancy McAuliffe Civil Engineering Scholarship Stephen and Karen Clegg Engineering Scholarship Rostampour, Ramin Foundation for Engineering - Dolese Shipp, Brennen Max E. Foote Scholarship Coonrod Memorial Civil Engineering Scholarship Coonrod Memorial Civil Engineering Scholarship Engineering Leadership and Innovation Edwin F. and Eunice F. Wambsganss Engineering Scholars Foundation for Engineering - Dolese Vandevord, Codv Hal and Mary Siegele Scholars Fund Ben A. Sellers Scholarship in Civil Engineering Bruce E. Roberts Scholarship Chas Turnipseed Memorial Fund Coonrod Memorial Civil Engineering Scholarship Engineering Leadership and Innovation Kenneth and Maria Rector Scholarship in Civil Engineering Loyal and Jill Huddleston Civil Engineering Scholarship Wallis Lage Family Engineering Study Abroad Scholarship Foundation for Engineering - Dolese Walter M. and Alice K. Bellairs Scholarship Foundation for Engineering - Dolese Weninger, Alec Tointon Family Scholarship Paulson Civil Engineering Student Excellence Award R. D. and Mary C. Andersen Scholarship Tointon Family Scholarship

## **ENVIRONMENTAL ENGINEERING GRADUATE STUDENT LANDS RESEARCH GRANTS**

Robert Weil, civil engineering graduate student in Prathap Parameswaran's Advanced Wastewater Treatment and Resource Recovery Laboratory, recently received two sustainability grants from Kansas State University.

The first, from the Green Action Fund, is being used to take initial steps toward recovery of resources from K-State's wastewater flow. Potential resources include water for landscape irrigation, biogas in the form of renewable natural gas and nitrogen/phosphorus nutrients.



The idea for the grant grew out of a team project in the CE 565 Water/Wastewater Treatment class, and members of that team — Matthew Peterson, Trevor Splichal and Sam Brown — participated in the grant project, along with Amber Kelly, junior in agricultural communications and journalism.

The second grant is from the Center for Engagement and Community Development, and will be used to engage students, stakeholders, and policy makers regarding the potential to recover

resources from agro-industry wastes in Kansas. Agro-industry wastewater flows have a high level of digestible organic matter, which can place a large load on municipal wastewater plants receiving those flows. Anaerobic digestion technology presents an opportunity to generate biogas while significantly reducing organic loads. Weil will present the results of his research at the 10th Annual KWEA/KsAWWA Joint Conference in Topeka, Kansas, Aug. 28, 2018.



LEFT, ROBERT WEIL EXPLAINS HIS RESEARCH TO CE SOPHOMORE, ALEXIS WILSON. ABOVE, CE STUDENTS, MEGAN LEHMAN AND EVAN HERONEMUS, COLLECT WASTEWATER SAMPLES FOR THE CECD PROJECT.



Last fall, civil engineering students voted two to one in support of a proposal to add a \$15 percredit-hour fee for CE courses to fund a new faculty position, with the overall goal to enhance the excellence of CE programs at K-State.

Benefits of the fee presented to the students included the addition of one new faculty member next year, enhanced reputation of the CE program, further opportunities for undergraduate research, reduced class sizes and a reduced student-tofaculty ratio.

The fee has been approved by the Kansas Board of Regents and will be effective beginning fall 2018.

#### **Engineering degree cost comparison**

- Average total cost for an engineering degree at K-State's 2025 peer institutions (64 engineering credit + 64 arts and sciences credit) is \$56,596.
- Average cost at K-State with approved fee increase is \$50,166.

#### **Current ranking**

US News & World Report, out of 198 programs:

K-State engineering programs Undergraduate: 75 Graduate: 100

#### Research is an essential component in the college and CE department budgets.



Institution	Degree Cost
K-State	\$49,206
KU	\$48,921
Auburn University*	\$57,480
Clemson University*	\$74,635
Colorado State University*	\$65,593
Iowa State University*	\$46,803
Louisiana State University*	\$53,858
North Carolina State University*	\$49,402
Oklahoma State University*	\$45,862
Oregon State University*	\$36,525
University of Massachusetts – Amherst*	\$79,600
Washington State University*	\$56,197

\*K-State 2025 peer institutions

In recent years, analytical capabilities in the environmental engineering labs have dramatically improved through installation of a new ion chromatography Dionex ICS-5000+ Dual-Pump IC System coupled with an AS-AP Autosampler; two gas chromatography systems, Agilent 7890A FID-ECD GC System coupled with 7697A Headspace Sampler and Shimadzu 2010 Plus GC-TCD; and two high-performance liquid chromatography systems, Shimadzu 20A HPLC with multiple-wavelength detector and refractiveindex detector, and Agilent 1200 Series HPLC with diode array detector and fluorescence detector coupled with an automatic fraction collector.

Chromatography instruments are generally used to detect and quantify chemical and biochemical components, and now we are capable of analyzing a wide variety of environmental samples — gas, liquid and solid phases. These new additions will not only promote exciting new areas of research in environmental engineering, but also strengthen our curriculum and learning resources.



BRUKER TI PREMIER NANOINDENTATION SYSTEM



## **NEW RESEARCH AND TEACHING CAPABILITIES**

*The CE department has recently added state-of the art equipment* to facilitate teaching and research in various areas.



DIONEX ION CHROMATOGRAPHY SETUP

The concrete laboratory has added a new nanomechanical characterization apparatus. This device can measure elastic and viscoelastic mechanical properties for a wide range of materials from very hard ceramics to very soft biological tissues. The system also functions as a surface-probe microscope with the ability to measure surface topography with a resolution floor of approximately 40 nm. The device will be used to characterize the early-age aging viscoelastic properties of cementitious materials as the cement matrix transitions from plastic to hardened. The evolution of these mechanical properties is closely related to shrinkage stress gradients and subsequently shrinkage cracking damage.

The surveying lab now has eight, two-second Go Win and Topcon total station kits — total station, prism, rod and tripod; eight automatic levels; one complete TopCon RTK GNSS system — two HiPer II BNSS receivers, base and rover; one Tesla Geo3G data collector with TopSurv field software; and three copies of Magnet Office tools and processing software.



CE DOCTORAL STUDENT, JACK CUNNINGHAM, PROVIDES INSTRUCTION DURING **CE 212: ELEMENTARY SURVEYING CLASS** 

## CE STUDENTS PARTICIPATE IN ELI PROGRAM

LEADERSHIP

The Engineering Leadership and Innovation Program, or ELI, prepares exceptional engineering students at Kansas State University for potential leadership roles in organizations that will flourish in a dynamic business environment, operating under complex social, ethical, political, economic, business and engineering factors. The program operates in association with the Staley School of Leadership Studies and the College of Business Administration. It teaches participants business and leadership theory through coursework, and defines a personal leadership development path for each through engagement with mentors. Participants

will then create and implement innovative solutions on creative inquiry teams. They will document their leadership journey using standard measurement tools interpreted in collaboration with professional industry mentors.

Primary program elements are coursework in leadership and business; leadership practice; engagement with an industry mentor; corporate partner interactions via on-site facility tours as well as on-campus corporate events; leadership portfolio development through a leadership development plan and essay (senior year); reflections, photos; and evaluation of skills development. Participants receive an annual scholarship of \$3,000. In 2017-18, there were 17 corporate sponsors including BHC-Rhodes, Black & Veach, ConocoPhillips, Dolese, Exxon-Mobil, Koch Industries and Westar that have employed CE graduates. CE participants in the ELI program follow:

Cohort 1 (just completed): Evan Heronemus, senior Jacob Studer, senior

Cohort 2 (current/continuing): Kevin Escobar, senior Bailey Waters, senior

Cohort 3 (incoming): William Radnor, senior

### TRAFFIC SAFETY AND DRUMS – JOINT INTERESTS OF CE DOCTORAL STUDENT

CE doctoral student, Reza Shirazinejad, sang and played a native Iranian instrument called a tombak last fall during UPC's Lunchtime Lounge Festival at the K-State Union.

A tombak is a single-headed goblet drum and principal percussion instrument of Persian music. Its shell is carved from a single block of wood, usually walnut, with the bottom somewhat thicker than the top for strength. An animal skin, sheep or goat, is stretched and secured at the top of tombak, allowing a full bass tone as well as various treble tones.

## **EWB CONTINUES WORK IN GUATEMALA**

The K-State student chapter of Engineers Without Borders, or EWB, organizes and leads international, domestic and local humanitarian projects. Its current international project involves a five-year commitment to the Guatemalan community of El Amate.

In January 2018, the EWB-KSU team flew to Guatemala for its fourth trip. Goals this time included beginning a latrine structure and septic system, assessing for a future retaining wall and monitoring the success of the primary school built in 2016. Throughout the chapter's multiple visits to El Amate, a deeper relationship has been formed with the community, which has helped the chapter better assess its needs.

Construction of the latrine and septic system began on the third day of the trip, with the team overseeing construction of the leach field, septic tanks and structural footings.



KRISTEN JONES, EWB-KSU MEMBER AND CIVIL ENGINEERING JUNIOR, AT A SERVICE PROJECT SITE IN GUATEMALA

Goals for the next trip, scheduled for January 2019, include construction of a retaining wall and fence to keep stray dogs and other intruders away from the property. Future plans are also to construct a kitchen on site so students can have access to healthy school lunches.

## CE RESEARCHES OGALLALA AQUIFER

Agriculture and livestock operations in Western Kansas depend largely on groundwater from the Ogallala Aguifer to maintain and increase production levels. Due to extensive use over the last few decades, groundwater levels are being depleted. This, however, has implications for current and future economies of the region and to a large extent, the nation. CE doctoral candidate, Weston Koehn, under supervision of David Steward, professor emeritus of civil engineering, and Stacey Kulesza, assistant professor of civil engineering, is developing the hydrogeologic understanding necessary to quantify focused recharge from the Arkansas River to the Ogallala Aquifer. Results have the potential to improve the modelling of groundwater-surface-water interactions and to inform Ogallala groundwater management decisions. Koehn's research combines the expertise of Steward — groundwater/vadose zone modeling, and Kulesza — near-surface geophysics, to address this grand challenge. This research is funded by the USDA-Agricultural Research Service Ogallala Aguifer Program.





When not playing tombak, Reza is at work on a project sponsored by the Kansas Department of Transportation, "Safety evaluation of raised speed limits on the Kansas freeway," under supervision of Sunanda Dissanayake, professor of civil engineering. The study was conducted to see if the speedlimit change has caused an increase in fatal and injury crashes in Kansas. It has identified various factors contributing to total crashes in Kansas after the change. Read more at bit.ly/reza-ce.



WESTON KOEHN CONDUCTS AN UNDERWATER ELECTRICAL RESISTIVITY SURVEY WITHIN THE ARKANSAS RIVER CHANNEL TO GAIN INSIGHT ON THE RIVER-AQUIFER INTERACTIONS.

### STUDENT ORGANIZATIONS **ASCE STUDENT CHAPTER UPDATE**

The 2017-18 academic year was exciting and engaging for K-State's ASCE student chapter. The group welcomed Scott Schiff, who joins Mustague Hossain, as a new chapter faculty adviser. Both professors have been active in attending officer meetings and assemblies, answering students' questions, and providing leadership guidance to officers.

The chapter was represented at ASCE's 2018 Multi-Regional Leadership Conference in Omaha. This event included the Workshop for Student Chapter Leadership where participants had the opportunity to network with other chapters and professionals, sharing ideas on how to make the most out of their ASCE chapters.

In the fall, the group hosted the annual joint banguet with the ASCE student chapters from the University of Kansas and Benedictine College, and the Kansas Section of ASCE. K-State civil engineering students enjoyed each other's company at a bowling event in the fall in the Student Union, hosted jointly with the Engineers Without Borders student chapter. A second social bowling event was also hosted independently in the fall



ASCE STUDENTS ENJOY BOWI ING EVENT AT THE K-STATE UNION



### **CHI EPSILON UPDATE**

K-State's Chi Epsilon Civil Engineering Honor Society inducted 18 new members this past school year, seven in the fall semester and 11 in the spring semester. The chapter continued its Adopt-a-Highway commitment along Highway 24, performing a service project there each semester. Splitting coverage of the section between two Sundays, at both locations, chapter members and new initiates worked to clean up trash along the road. The officers also participated in CE recruiting events on scholarship, senior and transfer days.

The society's new president, Aaron Korff, along with chapter officers William Radnor, Cody Vandevord, Elizabeth Motter, Garrett Pieper and Kentin Brummett, and faculty adviser, Hani Melhem, hope to increase name recognition of the organization and create more outreach opportunities to help mentor CE underclassmen.

> MIDDLE SCHOOL GIRLS PARTICIPATE IN THE **GROW PROGRAM**

SPRING INITIATES OF **CE CHI EPSILON** 

### WOMEN IN CIVIL **ENGINEERING**

Members of Women in Civil Engineering, or WICE, strive to encourage female students in CE. They facilitate academic success by promoting mentoring and social events. Stacey Kulesza, assistant professor, resurrected this group last fall as the newly appointed adviser. Members elected new committees, met several times throughout the academic year for events such as an ice cream social, lunch, etc., and also coordinated the Girls Researching Our World (GROW) program last spring. GROW is a K-State outreach program for middle school girls.



## **SENIOR DESIGN CLASS**



### **OUTREACH WORKSHOPS**

#### **ANNUAL BRIDGE DESIGN** WORKSHOP

This workshop reviews the latest developments in bridge design and LRFD (particularly as it pertains to foundations and geotechnical considerations), and provides information about available resources from the American Association of Highway and Transportation Officials (AASHTO)/Federal Highway Administration (FHWA) and Kansas Department of Transportation (KDOT). The workshop will hold its 25th session in October 2018. Hani Melhem, professor, is the conference director.

#### **KANSAS TRANSPORTATION ENGINEERING CONFERENCE**

The Kansas Highway Engineering Conference began in 1918 and was

RENDERING OF THE KSU FOUNDATION OFFICE PARK NORTHERN DEVELOPMENT

The senior design class for AY 2017-18 had 57 participants. In the fall, 24 participants worked in five teams on the Manhattan Business Park Development. In the spring, 33 students worked in six teams on the KSU Foundation Office Park Northern Development. Two design classrooms have been dedicated to this class — Fiedler 2116 and Fiedler 2121. Fiedler 2116 is equipped with six Dell Precision T3420 workstations and a Dell 2155cdn multifunction printer. Fiedler 2121 has 13 Dell Precision T3420 workstations (most with dual monitors), one HP DesignJet 500 plotter, a Dell 2155cdn multifunction printer and a Mitsubishi LCD projector. The workstations are outfitted with engineering and documentation software including Microsoft Office Suite, AutoCAD, Creo, Solidworks, Revit, Mathematica, MATLAB, Minitab, GIS, Pipe2000, RISA 3-D, WinPond, HCS2000, Visual Studio and Eclipse. All workstations are networked to access universitywide computing resources. This capstone design class has received praise from graduating seniors.

identified by this name until about 1972 when it was renamed the Highway and Transportation Engineering Conference, following renaming of the Kansas Highway Commission as the Kansas Department of Transportation. This conference is an important part of CE's education, research and outreach mission. It is held each year in April.

#### TRAFFIC ASSISTANCE SERVICES FOR KANSAS (TASK)

K-State and the University of Kansas, in cooperation with the National Highway Traffic Safety Administration, FHWA and KDOT, are offering courses in Traffic Assistance Services for Kansas, or TASK. Classes are available statewide on various dates. Eric Fitzsimmons, assistant professor, is the TASK coordinator from K-State.

#### SUPERPAVE FIELD LAB TECHNICIAN **CERTIFICATION TRAINING**

Superpave Field Laboratory Technician Certification Training is a four-day course offered jointly by K-State and KDOT. It is intended to certify engineers, technicians and other personnel involved in the construction of Superpave hot-mix asphalt pavements using quality control and quality assurance (QC/QA) specifications in the state of Kansas. The training has been offered since 1996. Instruction will be provided by a select group of instructors from KDOT, industry and K-State. Multiple sessions are held every January and February. Mustaque Hossain, Munger professor, is the coordinator.

Learn more about CE Outreach/Teach Transfer Programs at bit.ly/workshops-ce.

### CREATIVE INQUIRY TEAMS \_\_\_\_\_

## **STEEL BRIDGE DESIGN TEAM**

AY 2017-18 STEEL BRIDGE TEAM

Each year students on the steel bridge team manufacture a 1/10th-scale steel bridge according to unique rules modeled after real-world scenarios. The entire project is managed by students who do not receive any school class credit or scholarships in return; however, a great deal of knowledge and experience is gained by everyone involved.

The team is comprised of determined and eager students who want to become involved in a competitive design-build project. From concept to competition, all tasks are performed by members of the team, including designing, optimizing, drawing, detailing, locating and ordering material, fabricating, painting, assembling and competing. Students gain experience with programs such as RISA-3D, AutoCAD and Solidworks during the design process — all of which are commonly used by professionals.

The team competes first at a regional competition against approximately 12 teams. If the bridge performs well enough, it will be tested again at the National Student Steel Bridge Competition sponsored by the American Institute of Steel Construction and the American Society of Civil Engineers. The competition has several categories including construction speed, material weight, structural stiffness and display.

The 2017-18 bridge was built with a higher-strength steel and was modeled after an arched-over-truss design to increase stiffness and decrease weight while sacrificing construction speed. The team placed fifth overall at regionals, taking 2nd place in stiffness, 3rd place in efficiency and 2nd place in display. Three team members attended the national competition as guests to learn for the future and network with other schools. Hayder Rasheed, professor, served as adviser to this team.



## **CONCRETE CANOE TEAM**

This year the concrete canoe team started early to design and fabricate its project. Christopher Jones, associate professor, took over as faculty adviser.

Team members met twice weekly during the school year to refine the concrete-mix design and work on structural analysis/ hull design. Next was construction of the form, with the goal of

## **GEOWALL TEAM**

The K-State GeoWall Team participated in a regional competition at Southern Illinois University, Carbondale. CE students Jacob Studer, captain, and teammates Rachel Eisenbarth, Jared Fangman and Marshall Ruetti, were tasked with building a wrap-faced retaining wall from construction paper that was able to withstand a vertical and horizontal load with limited deformation.

THE 2017-18 GEOWALL TEAM COMPETES DURING A REGIONAL MEET.

finishing the mix design in the fall in order to have "pour day" at the beginning of the spring semester. Maintaining this schedule allowed ample time to sand and stain the canoe, and to have paddle practices.

The team participated in regional competition at Southern Illinois University, Carbondale.



## FACULTY AWARDS AND ACCOLADES



**Eric Fitzsimmons**, assistant professor and his co-inventors have been awarded *U.S. Patent No. 9,851,086*: Heated Lens Lighting Arrangement.



Mustaque Hossain, Munger professor, received the Myers-Alford Teaching Award from the College of Engineering.



**Stacey Kulesza**, assistant professor, was appointed a Steve Hsu Keystone Research Faculty Scholar; received the Outstanding Assistant Professor Award, and MEP Faculty Engagement Award; and was recognized as ASCE Region 7 Outstanding Engineering Volunteer and KSPE Tri-Valley Chapter Young Engineer of the Year.



Landon Marston, assistant professor, won first-place in the Universities Council on Water Resources 2018 Ph.D. Dissertation Award in the water policy and socio-economics category.



Hani Melhem, professor, received the Faculty Engagement Award from the Multicultural Engineering Program of the College of Engineering.



Hayder Rasheed, professor, received the Charles H. Scholer Faculty Award from the College of Engineering.

## RETIREMENTS AND TRANSITIONS



BOBB STOKES ADDRESSES ATTENDEES AT HIS RETIREMENT RECEPTION AT THE K-STATE UNION.

David Steward, professor and Thomas and Connie Paulson Civil Engineering Outstanding Faculty, retired after 20 years of service. Steward will be moving to North Dakota where he will be the chair of the civil and environmental engineering department at North Dakota State University. He was accorded a retirement reception in May. More than 40 people attended.

> DAVID STEWARD, FAR RIGHT, DELIVERS HIS PARTING REMARKS DURING HIS RETIREMENT RECEPTION.

18

Sunanda Dissanayake, professor, accepted a full-time position as the associate dean of the Graduate School at K-State. She leaves after 16 years of service with CE.



Bobb Stokes, emeritus professor, retired after more than 26 years of service to K-State CE. He served as a faculty member, center director, interim department head and then department head. He has more than 40 years of outstanding service to the civil engineering field. He was accorded a retirement reception in December of last year. More than 90 people attended.



### CE WELCOMES NEW FACULTY MEMBER



Civil engineering is pleased to announce the addition of new faculty member Scott Schiff, who joined the department last fall as a teaching professor – the only person in the college to hold this position. Schiff received his B.S. from the University of Cincinnati, and M.S. and Ph.D. degrees from the University of Illinois at Urbana-Champaign. After graduation, he was appointed as a visiting assistant professor at the University of Illinois, where he taught classes and worked on three funded research projects. In August 1989, he joined the civil engineering faculty at Clemson University as an assistant professor of civil engineering, and was promoted through the ranks to professor in 2003 and retired in 2015.

In 1992, Schiff, along with his two coauthors, was awarded the ASCE Norman Medal for the best paper to be published in any ASCE journal in the prior year. In 1993, the Chi Epsilon Chapter of Clemson University awarded him the Outstanding Teacher Award. He was the faculty host of the 2001 National Student Steel Bridge Competition and also served as the faculty adviser to Clemson's 2001 National Champion Steel Bridge Team. In 2008, he was a member of a faculty team that was given the Helen Plants Award for the best non-traditional session — Enhancing Student Learning Using SCALE-UP Format — at the 2008 Frontiers in Education Conference.

Schiff 's primary research interests at Clemson were related to structural performance on highway and railway bridges, and performance of building and envelope systems in high winds hurricanes and tornadoes.

### IN MEMORIUM \_\_\_\_\_



### NEW STAFF MEMBERS JOIN CE

The department is pleased to announce the addition of two new staff members.

**Ben Thurlow**, a research technician, has an associate degree in electronic engineering technology from North Central Technical College in Beloit, Kansas. He previously worked for an aerospace company in Wichita.



Trisha Brown, office specialist II, has many years of experience in an office setting — bringing not only expertise in the inner working of daily business operations, but also skills in being a team player. A native of the Manhattan area, she previously lived in Germany for three years as well as upstate New York for four.



## PERIĆ MAKES INTERNATIONAL IMPACT DURING SABBATICAL

Dunja Perić, associate professor of civil engineering, spent AY 2017-18 on sabbatical leave. During this time she was active in teaching and research activities in Australia, Europe and the U.S. She taught and participated in research at the University of New South Wales in Australia. In the past, Perić had initiated research and teaching collaborations between K-State and University of Zagreb, Asad Esmaeily, professor of civil engineering, passed away peacefully at the KU Med Center on June 3, 2018, after a short battle with lung cancer. Esmaeily was born in Kerman, Iran. He received his B.S. and M.S. in civil engineering from the University of Tehran, and two other master's and a Ph.D. degree from the University of Southern California. After graduation he briefly worked for the California Department of Transportation before joining K-State in 2002. Esmaeily rose through the ranks and became a professor in 2014. A prolific teacher, he was a recipient of many teaching and advising awards. His research focused on smart bridge systems, and he had supervised five doctorate students and

more than 30 master's students. He had authored and/or co-authored a book and numerous publications. He served on ASCE and ACI committees and co-edited a number of journals. He leaves behind his wife, Shokouh Nassri; son Amir, a junior at K-State; son Daniel, 15; and a daughter, Shokoufa, 8.

A scholarship fund for the younger children has been established at the Kansas State Bank — account name:

Dr. Esmaeily Children Education Fund, bank routing number: 101101536, account no.: 1103350, email: amire@k-state.edu.

Croatia, where she also spoke recently. Her other presentation locations during the sabbatical include the University of Ljubljana, Slovenia; Josip Juraj Strossmayer University of Osijek, Croatia; and Technical University of Vienna, Austria. She has also been appointed as an adjunct associate professor at the University of Colorado at Boulder where she did research this spring.



### **B.S. GRADUATES** (AY 2017-2018)

Maryam A M A A Alhendi Shehab Ahmed Al-Mutawa Mohammad H A H A Algallaf Ibrahim Alsaman **Rebecca Michele Andrus** Luke Strand Augustine Lauren Katherine Braun Marcel J Braun Samuel P Brown **Yigit Firat Celebi Theresa Margaret Collins** William Paul Daniels Ian Michael Deggendorf John McArthur DeVault Katlvn Hall Dotson **Andrew Stephen Foerster** Yizhe Ge Seth Gotchey **Bryan James Harkrader Jacob Daniel Harms Justin Edward Harris Tanner Victor Higgins** Kara Olivia Hinshaw Zackarvah Lee Hughes **Daniel James Hutchison** Julia Renae Keiter **Casev John Keller** Omar Y M A A Khawari

Jacob Douglas Lowery **Bradley Austin Luebbert** Xin Luo **Ethan Paul Meyer** Jared R Mills Brett Morey Blake Nicholas Moris Laura Neilsen **Chad Allen Olney** Matthew Peterson **Rory Macphail Reichelt** Matthew James Rowe **Ryan Patrick Salliotte** Elliot Duane Schrag **Robert Rae Sherwood Brock Alan Swartz** Dylan Gregory Swoyer **Tianhe Tan** Karla Jazmin Torres Nava Andrew Michael Walberg William Walker Elena Watson **Andrew Wehner** Alec Michael Weninger Hunter James Wiles Seaver Lee Williams Joel Steven Woodward

### PH.D. GRADUATES AND DISSERTATIONS (AY 2017-2018)

Rund Al-Masri — major professor, Hayder Rasheed

Dissertation: Analytical and Finite Element Buckling Solutions of Anisotropic-Laminated Composite Columns/Plates under Axial Compression with Various Boundary Conditions

Ibrahim Alfalla — major professor, Sunanda Dissanayake Dissertation: Crash Analysis and Survey to Identify Young Drivers' Distractions in Kansas

- Uditha Galgamuwa major professor, Sunanda Dissanayake Dissertation: Estimating Crash Modification Factors for Lane-Departure Countermeasures in Kansas
- Reza Shirazinejad major professor, Sunanda Dissanayake Dissertation: Safety Evaluation of Raised Speed Limits on Kansas Freeway
- Jan Vosahlik co-major professors, Kyle Riding and Christopher Jones

Dissertation: Pumping of Concrete Mixtures: Rheology, Lubrication Layer Properties and Pumping Pressure Assessment

#### M.S. GRADUATES AND MAJOR PROFESSORS (AY 2017-2018)

Yousif Alharmoosh-Algena Asad Esmaeily Jack Cunningham Eric Fitzsimmons Koby Daily **Christopher Jones** Ya Gao Mustaque Hossain Hani Melhem Hanwen Liu Caleb Mitchell Havder Rasheed **Tyler Penfield** Prathap Parameswaran Yadira Porras Mustague Hossain Eric Fitzsimmons **Benjamin Nye** Mahdi Sahafnia Asad Esmaeily **Tracy Spade\*** Stacey Kulesza Kailey Younkin\* Hayder Rasheed Asad Esmaeily Nader Zad

\*Global Campus

## CE GLOBAL CAMPUS COURSES

K-State CE offers graduate-level courses leading to a Master of Science degree in civil engineering, and transportation engineering graduate certificate to off-campus students residing both in and out of the United States. Kansas State University's online engineering master's programs are the best in the nation according to Best College Reviews, which annually ranks the top academic degrees and programs. It puts Kansas State University's programs No. 1 on its list of the top 25 best online master's degree programs in engineering for 2018. All courses needed for the degree are offered online. More details can be found at: global.k-state.edu/engineering/civil.

The following classes are scheduled for the next academic year.

- Fall 2018 CE 654 Design of Groundwa
  - CE732 Advanced Structural
  - CE 742 Advanced Steel Des
  - CE 745 Structural Dynamics
  - CE 751 Hydraulics of Open (
  - CE 766 Wastewater Engineer
  - CE 773 Hot-Mix Asphalt Mix
  - CE 786 Land Development
  - CE 816I -Design of Deep Fou
  - CE 822 Shear Strength and

Here is my check or credit card authoriz						
<b></b> \$1,000	<b>\$250</b>	<b></b> \$50				
<b>\$</b> 500	<b>\$</b> 100	<b>\$</b> 25				

KANGAS STATE	Please make check payable to Kansas State University Foundation Credit card payment:	
MANSAS STATE		
UNIVERSITY	If this is a business credit card, business name:	
	CARD NUMBER EXP. DATE	
CIVIL ENGINEERING ENHANCEMENT FUND		
Here is my check or credit card authorization for a gift of:	SIGNATURE PHONE Required for credit card gifts	
\$500 \$100 \$25	Or make your gift online at give.evertrue.com/ksu/engineering	
Name (print)	<ul> <li>Contact me/us about creating a scholarship.</li> <li>Contact me/us about gifts that pay lifetime income.</li> <li>I/We have provided for K-State in my/our will.</li> </ul> Matching gift information If you or someone in your household works for a matching gift company, contact your human resources department to see if your gift qualifies for a company match. For more information, contact our matching gift coordinator by calling 800-432-1578 or visit <u>ksufoundation.org/match</u> .	
Address		
City State ZIP		
	Thank you for your generous support!	
Phone Email	Please return this card to: KSU Foundation, P.O. Box 9200, Shawnee Mission, KS 66201-1800.	
	150,00	

22

K-State Global Campus 1615 Anderson Ave. Manhattan, KS 66502

global@k-state.edu 1-800-622-2578 (toll free) global.k-state.edu

ater Flow Systems	Spring 2019	CE 680	<ul> <li>Economics of Design and Construction</li> </ul>
l Analysis I		CE 728	<ul> <li>Advanced Geotechnical Design</li> </ul>
ign		CE 741	<ul> <li>Civil Engineering Materials II</li> </ul>
:		CE 743	<ul> <li>Advanced Reinforced Concrete Theory</li> </ul>
Channels I		CE 762	<ul> <li>Water Treatment Processes</li> </ul>
ering/Biological Processes		CE 774	<ul> <li>Pavement Design</li> </ul>
ture Design and Construction		CE816B	<ul> <li>Environmental Biotech I</li> </ul>
for CE and Planners		CE 827	- Computational Applications in Geosystems
ndations		CE 837	<ul> <li>Structural Stability</li> </ul>
Slope Stability of Soils		CE 872	<ul> <li>Transportation Safety</li> </ul>



#### College of Engineering

Department of Civil Engineering

2118 Fiedler Hall 1701C Platt St. Manhattan, KS 66506-5200 705-001

Nonprofit Organization **U.S. POSTAGE** PAID Permit #525 Manhattan, Kan. 66502

#### NOTICE OF NONDISCRIMINATION

Kansas State University prohibits discrimination on the basis of race, color, ethnicity, national origin, sex (including sexual harassment and sexual violence), sexual orientation, gender identity, religion, age, ancestry, disability, genetic information, military status, or veteran status, in the university's programs and activities as required by applicable laws and regulations. The person designated with responsibility for coordination of compliance efforts and receipt of inquiries concerning the nondiscrimination policy is the university's Title IX Coordinator: the Director of the Office of Institutional Equity, equity@k-state.edu, 103 Edwards Hall, 1810 Kerr Drive, Kansas State University, Manhattan, Kansas 66506-4801. Telephone: 785-532-6220 | TTY or TRS: 711. The campus ADA Coordinator is the Director of Employee Relations and Engagement, who may be reached at charlott@k-state.edu or 103 Edwards Hall, 1810 Kerr Drive, Kansas State University, Manhattan, Kansas 66506-4801, 785-532-6277 and TTY or TRS 711. Revised Aug. 29, 2017.



Joey Blackwell - Engineer Class of 2013

Hallie Zacharczuk - Marketing Class of 2005

Keith Warta - CEO Class of 1984