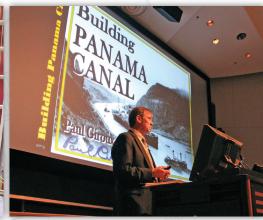
BUILDING PARTNERSHIPS









IOWA STATE UNIVERSITY

Department of Civil, Construction and Environmental Engineering

2013-2014 ANNUAL UPDATE

I invite you to explore CCEE's 2013-2014 partnerships.



Terry Wipf has been a faculty member with the lowa State University Department of Civil, Construction and Environmental Engineering since 1983. He has served as the department chair since August 2011.

owa State University's Department of Civil, Construction and Environmental Engineering (CCEE) builds impactful partnerships. As the 2013-2014 Annual Update describes, alumni, students, faculty and staff thrive on teamwork that leads to impactful outcomes. This rich network helps Iowa State and its partners identify and solve problems that positively influence our nation and the world.

In September 2013, The U.S. Department of Transportation recognized Iowa State as a regional leader in research and education by establishing a Midwest Transportation Center (MTC). Iowa State and its five MTC partner institutions (see page 9) support research, education, leadership development, diversity, outreach and data-driven performance measures related to the Midwest's transportation infrastructure. In addition to establishing the MTC, Iowa State was one of a few universities to receive a Tier 1, national center grant from the U.S. Department of Transportation, partnering with Florida International University (lead university) and the University of Nevada-Reno to establish a center focused on accelerated bridge construction.

CCEE is proud to recognize Assistant Professor Jeramy Ashlock, who received the National Science Foundation's Faculty Early Career Development Program (NSF CAREER) Award (see page 7). CCEE looks forward to the national impact he and his students will make on soil-pile interaction research, education and K-12 activities, inspiring current and future geotechnical engineers.

U.S. airport pavements will soon become safer through Associate Professor Halil Ceylan's Federal Aviation Administration project. Ceylan leads an interdisciplinary research team (see page 10) that aims to develop ice- and snow-free pavement solutions for America's airports. This work is part of Iowa State's role in the FAA Center of Excellence Partnership to Enhance General Aviation Safety, Accessibility, and Sustainability (PEGASAS).

CCEE also has developed creative classroom solutions. Construction engineering Professor Charles Jahren has partnered engineering students with an alumnus and multimedia experts to produce hybrid learning courses (see page 12). Most lecture time is converted to online modules, which creates more time for open-ended, in-depth class discussions. The hybrid learning course model will be implemented in six CCEE courses this fall.

Two faculty members have mentored nationally acclaimed high school students (see page 13). Professor Sri Sritharan, along with doctoral student Brad Fleming, guided a New York high school student on her award-winning, structural engineering research. Peter Taylor, associate director of the National Concrete Pavement Technology Center (part of the Institute for Transportation, or InTrans), advised Wheeling High School (Illinois) students in their state-of-the-art nanotechnology lab that U.S. Secretary of Education Arne Duncan dedicated last fall.

Our partnerships exist on all levels and honor the cornerstone of Iowa State's land-grant mission. We expand our reach beyond the classroom and the lab to invite diverse perspectives. One new program CCEE launched is Civil, Construction and Environmental Engineering Graduates of the Last Decade (CCEE GOLD, see page 6). We look forward to re-connecting with recent alumni as they build their own connections.

With each passing day, our students, faculty, staff, alumni and friends pursue endeavors that instill pride in Iowa State University and CCEE. Feel free to contact me by email, phone or letter to share your story.

Warm Regards,

Terry J. Wipf, PhD, P.E.

Pitt-Des Moines Professor in Civil Engineering Chair, Department of Civil, Construction and Environmental Engineering (CCEE)

Iowa State University





Inside the **2013-2014 CCEE ANNUAL UPDATE**

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What is the new

CCEE GOLD

all about?

p.6

This is how IOWA STATE UNIVERSITY works.







Thank you for your support!





Partnerships with **CCEE** advisory councils



Tammy Nicholson, ChairDirector, Office of Rail Transportation
lowa Department of Transportation
(BSCE'89)

Civil Engineering External Advisory Council

The Civil Engineering External Advisory Council continued to build on the theme of partnerships at its April 2014 meeting. We held a joint meeting in Ames with the University of Iowa's civil engineering council. The group discussed the shared challenges of ABET accreditation, increases in student population, funding, department staffing, and resource limitations and collaboration. Both programs strive to deliver a quality education and address the issues in different ways. Iowa State has several high quality lecturer positions that help and has also dedicated four academic advisers to assist students. A key part of the discussion centered around research of both universities and explored areas where there is potential for collaboration. In the afternoon, the Iowa State group met with several recent graduates who created the Civil, Construction and Environmental Engineering Graduates of the Last Decade (CCEE GOLD). Their mentoring and enthusiasm is inspiring. This group will hold a kickoff in October 2014 (see page 6).

Other members of council

William Anderson, The Council of Engineering & Scientific Specialty Boards Ben Biller, Burns & McDonnell Robert Crandall, Black & Veatch Corp. Craig Denny, Terracon Consultants, Inc. Matt Garber, Clapsaddle-Garber Associates

Paul Giroux, Kiewit Infrastructure West Co. Mike Helms, Stanley Consultants, Inc. Les Kempers, Rocky Mountain Prestress Sandra Larson, Iowa Dept. of Transportation Jack McGuire, The Boeing Co.
Bob Paulsen, AE Guidance, LLC
Michelle Scherer, University of Iowa
Ron Tekippe, HGM Associates, Inc.
Rick Tollakson, Hubbell Realty
Mike Vander Wert, Calhoun-Burns and
Associates, Inc.

Denton 'Red' Voss, Black and Veatch Corp.

Scott Werner, EFCO Corp.



Kent Meyn, Chair Project Manager ACI Mechanical, Inc. (BSConE'85)

Construction Engineering Industry Advisory Council

It was a proud year for the Iowa State University Construction Engineering Industry Advisory Council. We celebrate ACG Student Chapter's 2013 National Outstanding Student Chapter of the Year Award, their ninth, for its volunteer work in Jonesborough, Tenn. The construction engineering teams finished first in the commercial and residential divisions at the Associated Schools of Construction Regional IV Student Competition. Forty-five students spent their Thanksgiving break rebuilding homes and changing lives in tornado-devastated Moore. Okla. At our AGC-Construction Engineering Spring Awards Banquet, Glenn DeStigter (BSConE'66), of the Weitz Company, was inducted into the Construction Engineering Hall of Fame. We give many thanks to Glenn for his years of service on the Industry Advisory Council and for his financial support of the construction engineering program.

Other members of council

John Adam, Iowa Dept. of Transportation
Timothy Becker, Kiewit Power
Ken Bonus, Bonus Homes, LLC
Sean Brummer, Turner Construction Co.
Douglas Clark, Peterson Contractors, Inc.
Robert Cramer, Cramer & Associates, Inc.
Steve Daxon, Estes Construction
Beth Duyvejonck, Opus Design Build, LLC
Mike Espeset, Story Construction Co.
Paul Francois, Pepper Construction Co. of Ohio
Michael Gawley, Oakview dck, LLC
Richard Greenlee, Engineering Partners
Int'l, LLC

Mark Guetzko, Seedorff Masonry, Inc. Paul Higgins, The Beck Group Larry Hopp, Kiewit Construction Co.

Stephen Jackson, Cedar Valley Corp.
Michael King, Black & Veatch
Chad Layland, Baker Electric
Chris Lindhart, The Beck Group
Dean McCormick, Iowa State University
T. J. Meiners, Nelson Electric Company
Josh Miltenberger, Ryan Companies US, Inc.
Cork Peterson, Peterson Contractors, Inc.
Gene Postma, Western States Fire
Protection Co.

Matt Ralston, Burns & McDonnell
Dirk Schafer, J. E. Dunn Construction
Rick Schultze, ARCO Design Build
Ken Sorenson, M. A. Mortenson Co.
Mike Tousley, The Weitz Co.
Brian Wessels, Greiner Construction Co.
Stacy Zerr, The Waldinger Corp.

SANDRA LARSON

CIOWADOT **Building a career of collaboration**



Sandra Larson

Sandra (Albertson) Larson (BSCE '88, BSBiology'75) has played an integral role in building partnerships between Iowa State University (ISU) and the Iowa Department of Transportation (Iowa DOT).

Born in Kirksville, Mo., Larson has spent most of her life in Iowa. She grew up in Ames, and then

enrolled at ISU in 1971 — in biology and general science education. "At that point, I hadn't even considered engineering." With her teaching degree she taught ninth grade physical science in Cedar Rapids, Iowa, and Riyadh, Saudi Arabia. She and her husband, Gene, had always wanted to live and work overseas.

After three years in Saudi Arabia, they returned home to Iowa. Larson thought about changing careers then, and she considered engineering because she had always loved math and science. "I saw a display case in Marston Hall that had all the kinds of engineering degrees posted. I had thought about architecture, but noticed civil engineering included structural design. I chose civil engineering because of that display case, plus my brother was a civil engineer and he provided more information about the program," she said. She graduated with her civil engineering degree in 1988.

Soon after graduating, Larson accepted a bridge design engineer position at the Iowa DOT in Ames. She has held several positions and is now the Systems Operations Bureau Director. Throughout her career, she has had the opportunity to help build innovative partnerships within the Iowa DOT and with other agencies and institutions, including Iowa State University.

When the Iowa Highway Research Board was created in 1950, the partnership between the Iowa DOT and Iowa's universities was formalized. Since then the partnerships have grown between the Iowa DOT and ISU to ones of national signifigance and impact. Many state DOTs and

national organizations collaborate with the Iowa DOT and ISU to improve our nation's transportation system. This productive partnership has resulted in many improvements to the bridges and pavements across Iowa and beyond. InTrans, comprising many CCEE faculty researchers, was and is an integral partner in this effort.

A key partner is her former professor, Terry Wipf, chair of ISU's Department of Civil, Construction and Environmental Engineering (CCEE). She took his introductory structural analysis course in 1987. Many years later she reconnected with Wipf when she was the state bridge engineer for the Iowa DOT. As a result of their collaboration he started as the director of the Bridge Engineering Center at ISU's Institute for Transportation (InTrans). InTrans has formally partnered with the Iowa DOT since 1997. (At that time, InTrans was known as the Center for Transportation Research and Education. It expanded to become the Institute for Transportation in 2009.)



▲ Iowa State researchers team with Iowa DOT personnel to monitor a U.S. Highway 30 bridge's structural health in 2009. From left (titles as of 2009): Iowa DOT Chief Structural Engineer Ahmad Abu-Hawash, CCEE Professor Terry Wipf, Iowa DOT Operations Research Engineer Mark Dunn, Iowa DOT Bridges and Structures Office Director Norm McDonald, Iowa DOT Research and Technology Bureau Director Sandra Larson, and Iowa DOT Bridge Designer Ping Lu.

As the Systems Operations Bureau Director, Larson works with the Offices of Maintenance, Traffic and Safety, and Traffic Operations. These offices are focused on providing the safe and efficient flow of people and goods on our state's transportation system. Improving mobility year round across the system is a major emphasis area for the Iowa DOT and the Systems Operations Bureau. ISU has continued to partner with the Iowa DOT to meet the expectations for an improved transportation system; this was done through establishment of a new InTrans center focused on Traffic Operations, under the direction of Neal Hawkins

Larson's influence also has gone national. She has served the American Association of State Highway and Transportation Officials (AASHTO) in several leadership capacities: chair of the Research Advisory Committee, vice chair of the Standing Committee on Research, and vice chair of the Highway Subcommittee on Bridges and Structures. "I am appreciative of the national perspective the Iowa DOT demonstrates. In these national roles, I always look at what I can bring back for Iowa," she said.

The real strength in working with the ISU researchers is that they understand the business and perspective of the Iowa DOT, Larson said. "It's all about impact. This partnership shows that applied research can be implemented to make a difference for the public as they travel throughout our transportation system."

In April 2014, advisory councils of both the ISU and University of Iowa civil engineering programs met to share ISU-University of Iowa-Iowa DOT best practices in research and education. Larson is a member of the ISU Civil Engineering External Advisory Council.

Partnerships have reinforced Larson's decision to pursue civil engineering. "The field of civil, construction and environmental engineering is my home," she said. "I knew civil engineering was the right step for me; I just didn't know how right it was so long ago at that Marston Hall display case."

2014 Construction Engineering Hall of Fame GLENN H. DESTIGTER

n April 25, 2014, Glenn DeStigter (BSConE'66) was inducted into the Construction Engineering Hall of Fame.

Construction has been a lifelong passion for DeStigter. A native of Sioux Center, Iowa, he grew up with both his father and grandfather as general building contractors. He loved the building process and learned that every project requires leadership, planning, teamwork and respect for fellow workers.

As CEO of The Weitz Company, DeStigter led the company to exponential growth — from \$225 million in revenue in 1993 to \$1.6 billion in revenue in 2008. The company achieved its strong position in the industry as a full-service general contractor and later, under employee ownership, branched into profitable joint ventures, such as Hy-Vee Weitz Construction. For several consecutive years, the company outpaced the industry in growth and was ranked 25th among domestic building contractors in 2002, according to Engineering News-Record.

DeStigter's contributions have been recognized at the highest levels. In 2002, he received the Ernst & Young Construction Entrepreneur of the Year for both Iowa and Nebraska. Iowa Gov. Chet Culver inducted him into the 2008 Iowa Business Hall of Fame.

DeStigter and his wife, Vi, have made significant contributions to Iowa State University and its construction engineering program. He served as chair of the Construction Engineering Industry Advisory Council and

started a tradition of donor support among members that continues to benefit the program. DeStigters have supported endowments, faculty professional development, building projects and Cyclone Athletics as well as provided in-kind support by lecturing and developing a construction-site learning lab, where students completed special projects.

Our alumni news and achievements (by e

Academia

Gouranga Banik (PhDCE'98) became the head of Tennessee State University's civil and architectural engineering department Aug. 15, 2013. Banik previously was president and CEO of Bencons, LLC, and professor of construction management at Southern Polytechnic State University. In 1998, Banik completed his dissertation on the high-rate anaerobic treatment of dilute wastewater at psychrophilic temperature.

Brett Gunnink (BSConE'81, MSCE'83, PhDCE'87) was named dean of engineering at Montana State University, effective Jan. 1, 2014. Gunnink's previous experience includes head of civil engineering at Montana State and professor at University of Missouri-Columbia. In 1987, Gunnink completed his Iowa State dissertation on determining the pore structure of porous materials using electrical conductance.

David Sanders (BSCE'84) was named a 2014
Foundation Professor at University of Nevada-Reno
in recognition of outstanding research and teaching
achievements. Sanders has been a faculty member at
University of Nevada-Reno since 1990. He received a
master's degree and doctorate at University of Texas at
Austin. His father, Professor Emeritus Wallace Sanders,
taught structural engineering at Iowa State from 1964-1998.

Civil Service

Thanapong "Jack" Duangmanee (MSCE'02, PhDCE'09) engineers biogas digesters for rural Myanmar villages. The biogas digester provides clean burning fuel, using manure from cattle, for cooking. This helps villagers reduce deforestation and improve their environmental health.

Justin Nickel (BSCE'03) was appointed public works director of Marshalltown, Iowa, effective June 9, 2014.

Nickel was previously the public works director of Overland Park, Kan.

Industry

Travis Konda (PhDCE'04), a senior technical advisor with HNTB Corporation's Kansas City Bridge Design office, was selected by Civil Engineering News as one of its "Rising Stars" for 2014. The award recognizes 30 professionals, 40 years old or younger working in the U.S., who have shown exceptional technical capability, leadership ability,



Travis Konda

effective teaching or research, or public service benefiting the civil and structural engineering professions and their employers.

Craig Denny (BSCE'71, MSCE'73) and his wife, Terry (BSElemEd'72), donated \$100,000 to the Shawnee Mission School District (Shawnee Mission, Kan.) and \$100,000 to the Department of Civil, Construction and Environmental Engineering at Iowa State University to improve science,



Craig and Terry Denny

technology, engineering and math career opportunities for K-12 students and female college students.

The Craig Kenton Denny Endowed Scholarship supports female Iowa State civil engineering students who have an interest in pursuing a career or advanced degree in geotechnical engineering. Inaugural 2014 Craig Kenton Denny Endowed Scholarship recipients were Catalina Parada and Lauren Ruchti.

employment sector)

Industry (cont'd)



Rich and Carm Greenlee

Rich Greenlee (BSConE'66) and his wife, Carm, purchased strengths-building books for Construction Engineering Learning Community Students. The Greenlees also sponsored the 2nd annual Greenlee Leadership Lecture, featuring Karmyn Babcock's (BSConE'98, MSCE'00) on April 10, 2014. Babcock, the information technology director at

The Weitz Company, spoke about the different kinds of leadership one can emulate during the early stages of a career.

Military

Krista Morris Bix (BSCE'12) serves in the U.S. Navy as a Civil Engineer Corps Officer, stationed in Mississippi after previous stints in Rhode Island and California. She works directly with about 50 Seabees (U.S. Naval Construction Force) as part of the Naval Mobile Construction Battalion 133. As of January 2014, she was preparing for upcoming deployment in Europe and Africa. She says she wakes up every morning excited to go to work and see how the day unfolds. Every day brings new challenges and experiences.

(Story is based on ISU Alumni Association Jan. 10, 2014, blog entry.)



VISIONS ACROSS AMERICA

Throughout 2012 and 2013, the ISU Alumni Association interviewed four civil engineering alumni as part of its VISIONS Across America project. Here are their stories.

Photos are by Jim Heemstra. Stories are summarized from articles written by Carole Gieseke.

Justin Ahmann, Montana

The 2005 civil engineering alumnus is the director of engineering at APEC Engineering, Inc., based in Kalispell, Mont. His career has led him from Nebraska to Virginia to Montana. Ahmann now works with water rights issues, utilities, dams, and municipal districts' sewer and water systems.



Greg Clites, Michigan

The 1981 civil engineering/water resources alumnus led successive careers in water resources management, computer programming, and secondary education. Clites teaches math at Tecumseh High School, about 30 miles from his hometown of Ann Arbor, Mich. "Teaching was a calling," Clites said.



Shawn Foutch, Missouri

The 1987 civil engineering alumnus and his brothers, Steve and Scott, co-own Foutch Brothers, a property renovation company based in Kansas City, Mo. They combine skills in civil engineering, architecture, and business to restore historic buildings to apartment-style living spaces and other modern uses. One major project was repurposing the 455,000 square-foot Big Chief Tablet factory in St. Joseph, Mo., to Mitchell Park Plaza.



Matthew Hake, Vermont

The 1984 civil engineering alumnus is the division administrator of Federal Highway Administration's Vermont office. He helped repair massive flood damage from Hurricane Irene in 2011 — just two and a half weeks into the job. "Vermonters came together to make sure everyone was OK. The National Guard, volunteers from other states and contractors dropped what they were doing to help," Hake said.



CCEE GOLD

Civil, Construction and Environmental **Engineering Graduates Of the Last Decade**

The Civil, Construction and Environmental Engineering Graduates of the Last Decade (CCEE GOLD) was established in 2014 to reach out to our recent alumni. CCEE GOLD's mission is to create a network of alumni who foster relationships with students and faculty through professional development, mentoring, and collaboration.

Objectives

Create opportunities for recent alumni to develop relationships with peers, current students, and faculty.

Support the mutual interests of recent alumni and the ISU CCEE community.

Encourage alumni to contribute their time, talent, and resources toward the enhancement of the ISU CCEE community.

Enhance the personal and professional skills of recent alumni through networking, community involvement. and professional development.

Develop and maintain a database of recent alumni from which the department can draw upon to improve the student experience.

CCEE GOLD Executive Council



Andrew Barone

Andrew "AJ" Barone received his Bachelor of Science in civil engineering in May 2012. He works for Raker Rhodes Engineering, based in Des Moines, Iowa, as a full-time structural engineer with a focus on building design. He lives in Coralville, Iowa, working in the new Iowa City office.



Owen Berg

A 2008 and 2010 CE alumnus, Owen is a Professional Engineer for Kiewit Engineering Company in Omaha, Neb. He specializes in engineering support for construction as well as heavy lift planning and analysis. He has spent the majority of his career "onsite" at various projects across North America and is licensed as a Professional Engineer in both the U.S. and Canada.



Jen (Morud) Jefferson

A 2007 and 2013 CE alumna, Jen pursues a doctorate at Colorado School of Mines in Denver. From 2007 to 2009, Jen oversaw the building and remodeling of Target retail stores. She briefly worked for Strand Associates in Milwaukee before returning to Ames to pursue a master's degree in water resources.



John Puls

A 2007 and 2008 CE alumnus, John is a geotechnical engineer for Kiewit Engineering Company in Omaha, Neb. He oversees a team of engineers performing design work for Kiewit projects across North America. His career has included opportunities spanning from remote northen Canada to the U.S.-Mexico border.



Nicole (Bell) Schmidt

A 2009 ConE and 2013 CE alumna, Nicole (Bell) Schmidt is a project engineer/ superintendent at Turner Construction in Kansas City, Mo. She also is active with the Iowa State University Alumni Association (ISUAA), both in the Kansas City Alumni Club and as a member of the ISUAA Board of Directors.

CCEE GOLD Kickoff Weekend! October 10-11, 2014

Friday — Network with Students and Faculty, 4-6 p.m.

Want to know the latest on your professors and student orgs? Visit with CCEE student organization leaders, faculty and staff on the north lawn of the Town Engineering Building. Enjoy some refreshments. Rain location: Town Engineering Building lobby.

Saturday — Homecoming Tailgate, 2 hours prior to kickoff Reunite with old friends at the CCEE GOLD tailgate. Spin the wheel, built by our own AGCers, and win great Cyclone prizes. Enjoy food and beverages, provided by HyVee catering. Enter a raffle for a Paul Rhoadsautographed football and Fred Hoiberg-autographed basketball. Purchase tickets separately for the Cyclones vs. Toledo Rockets football game.

Sign up by Sept. 15 at bitly.com/isucceegoldkickoffform.

Top photo by Chris Neary Bottom photo courtesy of AGC



Photo courtesy of Jeramy Ashlock

eramy Ashlock, assistant professor of civil, construction and environmental engineering, received the National Science Foundation's Faculty Early Career Development Program (NSF CAREER) Award in March 2014.

This award, one of the nation's top research awards for early career faculty, focuses on Ashlock's research program for integrated computational and physical simulation of dynamic soil-pile interaction. He will develop an integrated research and education program: multi-modal and random-vibration experimental testing techniques, 3-D computational modeling of multi-layered soil domains, undergraduate teaching, graduate teaching and research, and K-12 outreach events that introduce geotechnical engineering as a career path. NSF will fund a total of \$400,000 through February 2019.

Since March, Ashlock and his graduate students have prepared procedures for soil field tests. Mohammad

▲ Assistant Professor Jeramy Ashlock demonstrates the bridging of research, education and outreach of geotechnical engineering through his NSF CAREER Award.

Fotouhi Ardakani, a doctoral student in geotechnical engineering, has developed computer programming and will conduct field testing in Ames, Iowa. Programming includes modifying boundary element code for testing pile-soil vibrations and supercomputer cluster testing. The immediate goal is to expand research staff to a postdoctoral research associate and more doctoral students to conduct laboratory and in situ, or field, procedures.

In addition to research, Ashlock will develop teaching modules for use on NSF's TeachEngineering website, outreach lectures on geotechnical and earthquake engineering for an annual science festival and K-12 classrooms, NSF student field days, and summer research for middle school students.

Sritharan partners internationally on NSF-NEES project



Sri Sritharan

Sri Sritharan, Wilson Engineering Professor of civil, construction and environmental engineering, leads National Science Foundation (NSF) project with international collaboration in earthquake engineering.

The concept for the project began in early 2000, when former graduate student Sriram Aaleti pursued research

in rocking structural wall systems. Through the next few years, Sritharan and Aaleti developed a Precast Wall with End Columns (known as PreWEC). This innovative new posttensioned precast wall system experiences rocking motions at the wall and column bases and is more economical than previously developed systems. O-connecters made of mild steel placed between the wall and the end columns serve as replaceable sacrificial elements and dissipate the seismic energy. This minimizes structural and non-structural damage of a building subject to earthquakes. With further analytical investigations by Fulbright scholar Rick Henry, the NSF's George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) funded the rocking wall project in 2010.

Since then, a team of graduate students, undergraduate students, and international collaborators worked with Sritharan and his research partners that include University of Minnesota Professor Catherine French and Villanova University Professor Eric Musselman. The project also has attracted additional funding to Iowa State University from BS Italia, Precast/Prestressed Concrete Institute (PCI), and in-kind contributions from more than a dozen companies. In this project, structural engineering master's student Dimitrios Kalliontzis, holder of a 2014 PCI fellowship researches damping and energy dissipation mechanisms associated with structural rocking. Structural engineering doctoral student Maryam Nazari has performed shake table testing of single rocking walls and PreWEC systems — she presented her findings at the 10th National Conference on Earthquake Engineering in Anchorage, Alaska, in August 2013. The project also provided opportunities for three freshman hourly students to expose to research experience, including Elizabeth

Continued at "NEES" on page 9

Williams partners with chemical engineering, industry to commercialize biopolymers



Chris Williams

Iowa State University's Departments of Civil, Construction and Environmental Engineering (CCEE) and Chemical and Biological Engineering (CBE) have worked together to foster research partnerships with industry over the past several years.

CCEE Professor Chris Williams,

CBE Associate Professor Eric Cochran and their research groups have led efforts to develop a family of new biobased polymers derived from vegetable oils. Their work will culminate in the construction and operation of an industrial scale pilot plant that will be located at the BioCentury Research Farm just east of Boone, Iowa.

Williams and Cochran have collaborated with Argo Genesis Chemical, LLC, an affiliated company of Seneca Petroleum in Crestwood, Ill., on the construction of the plant and associated research. "The 500-kilogram-per-day pilot plant will allow us to produce sufficient quantities of biopolymers," Williams said. "These biopolymers will be used for evaluation in several different industries, including the asphalt paving, adhesive, and packaging

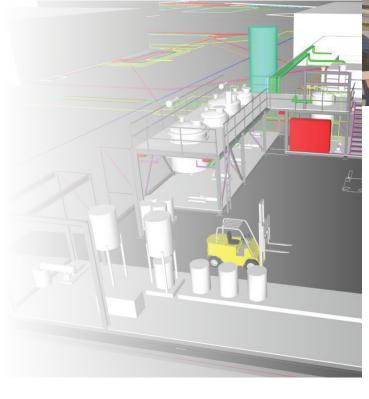
materials industries through demonstration scale projects."

The biopolymers are derived from domestically sourced vegetable oils and are bio-advantaged materials over butadiene (a material that must be imported from Europe and Asia), that has traditionally been used for making thermoplastic elastomers. "It is gratifying to see that our biopolymer technologies are cleaner, safer, and more cost-effective than the crude-petroleum-derived butadiene," Cochran said.

The pilot plant will be operational in spring 2015. Demonstration asphalt paving projects are planned for summer 2015, followed by projects on adhesives and packaging material. "It has been, and will continue to be, exciting to bring together numerous companies, governmental agencies and trade associations to collaboratively develop and commercialize our research products," Williams said.

Illustration courtesy of Chris Williams

► CCEE Professor Chris Williams and research partner Eric Cochran, associate professor of chemical and biological engineering, will build an industrial-scale pilot biopolymers plant. An architectural illustration, at right, provides a glimpse of what this Boone, lowa, plant will look like.



Rehmann partners with geology faculty on community sustainable water management plan



Chris Rehmann

Chris Rehmann, associate professor of civil, construction and environmental engineering, partners with geological and atmospheric sciences Professor William Gutowski and other researchers to develop a model for planning sustainable water resources.

The interdisciplinary research team will develop a model involving physical and social aspects of water resources in Squaw Creek, a tributary of South Skunk River that flows one block east of Iowa State University's campus. Their goal is to study water and climate change while reaching out to the community to build consensus for a sustainable water management

plan. The study will focus on the Squaw Creek watershed in and around Ames, with the idea of making it a prototype that can be applied to other watersheds across Iowa and the world.

Rehmann's focus is on the environmental fluid mechanics and water resources engineering components of the project. He said he will model the hydrologic aspects such as precipitation, runoff to the creek and groundwater movement, as well as helping with the physical system modeling, which includes water resources and engineering issues of the creek.

He will also help identify stakeholders such as water users, environmental groups, business interests and political leaders.

Members of the research team include Kristie Franz, associate professor of geological and atmospheric sciences; Jean Goodwin, professor of English; William Simpkins, professor of geological and atmospheric sciences; Leigh Tesfatsion, professor of economics; and Alan Wanamaker, assistant professor of geological and atmospheric sciences.

"In particular, we try to get students to consider — along with engineering — the social, political, cultural, economic, environmental and ethical aspects of a problem. The project with the folks from the College of Liberal Arts and Sciences will be a practical application of that type of thinking," Rehmann said.





IOWA STATE UNIVERSITY

Institute for Transportation



Shauna Hallmark

The U.S. Department of Transportation supports the establishment of a Midwest Transportation Center (MTC) based at Iowa State University with a two-year grant of \$2,592,500.

The center focuses its research on data-driven performance measures of transportation infrastructure, traffic

safety and project construction, said Professor Shauna Hallmark, the principal investigator and director of Iowa State's Institute for Transportation.

"One example is studying the life-cycle performance of pavement," Hallmark said. "We want to develop performance measurements that tell us how well the system is doing."

In addition to research, the grant from the U.S. DOT's Research and Innovative Technology Administration will also support education programs, leadership development, diversity promotion and outreach efforts.

"University transportation centers are key to helping us address today's transportation needs, from environmental sustainability to safety," said U.S. Transportation Secretary Anthony Foxx in a statement. "The participating universities are a critical part of our national transportation strategy and to developing a professional workforce with the expertise and knowledge to tackle the challenges of the future."

The Midwest Transportation Center will include researchers and students from six universities: Iowa State, Creighton University in Omaha, Neb., Harris-Stowe State University in St. Louis, the University of Missouri-

Columbia, the University of Missouri-St. Louis and Wichita State University in Kansas.

Hallmark estimates that 40 students and 18 researchers will be involved in Midwest Transportation Center projects.

"This is a gigantic deal," she said. "It will allow us to do all kinds of projects — everything from basic transportation research to K-12 outreach programs."

This article summarizes an Oct. 10, 2013, news release from the lowa State University News Service.

ISU partners in nat'l accelerated bridge construction center

Brent Phares, the director of Iowa State's Bridge Engineering Center and an adjunct assistant professor of civil, construction and environmental engineering, leads Iowa State in its partner role in a U.S. Department of Transportation (U.S. DOT) University Transportation Center (UTC).



Brent Phares

U.S. DOT recently awarded a twoyear, \$2.8 million grant to establish an Accelerated Bridge Construction University Transportation Center (ABC-UTC) based at Florida International University in Miami. Iowa State and the University of Nevada-Reno are partners in the center.

Phares said the grant will provide approximately \$800,000 to Iowa State over the next two years. Researchers seek another \$400,000 in matching grants, totaling of \$1.2 million in bridge research over the next two years.

NEES, continued from page 7

Lynch who continued her work with Dr. French on the interaction between PreWEC and floor diaphragm as part of an NSF Research Experiences for Undergraduates (REU) program. Jonathan Watkins, a Fulbright scholar and doctoral student at The University of Auckland (New Zealand), also has researched in Iowa State facilities and his work focused establishing suitable connections between rocking walls and floor diaphragms so that floor damage can be eliminated in earthquake-resilient buildings.

Further testing has been conducted at NEES facilities at University Minnesota and Villanova University. Suzanne Dow Nakaki, a California-based structural engineer on the American Concrete Institute's Building Concrete Codes Committee on seismic provisions, works with Sritharan and his team to transfer the research to design options.

The NEES rocking wall project targets earthquakeresilient structures for the nation, including the Midwest where infrequent earthquakes exceeding magnitude 8 are possible. While the team works to find a structural solution for earthquake hazards, results of this study can be used for designing structures to withstand other hazards such as tornadoes, hurricanes, and blasts.

"We work to find the best researchers, regardless of where they reside, to reinforce our structures in the face of increased strength and frequency of natural disasters," Sritharan said.



▲ Members of Professor Sri Sritharan's research team prepare a rocking wall test on a University of Nevada-Reno NEES shake table.

FAA invests in ice-free pavement



Halil Ceylan

Halil Ceylan, associate professor in civil, construction and environmental engineering (CCEE) and founding director of the Program for Sustainable Pavement Engineering and Research at Iowa State University's Institute for Transportation, works with the Federal Aviation Administration

(FAA) to research methods for ice- and snow-free pavement systems on airfield surfaces. The FAA awarded Ceylan and his team funds in August 2013 for this research project.

Ceylan is the principal investigator for this project, entitled "Heated Airport Pavements." A team of researchers joins Ceylan: Peter Taylor (associate director of the National Concrete Pavement Technology Center at Iowa State), Sriram Sundararajan (associate professor in Department of Mechanical Engineering), Kasthurirangan (Rangan) Gopalakrishnan (research assistant professor in CCEE), Sunghwan Kim (research assistant professor in CCEE), Jason Weiss (professor at Purdue University) and Konstantina (Nadia) Gkritza (associate professor at Purdue University). In addition, five graduate students and one undergraduate student work on this project.

Ceylan and his team employ a two-pronged approach to investigate the efficacy and cost effectiveness of new heated pavement technologies. They investigate the relative energy and monetary needs to remove snow and ice from paved surfaces by conducting energy and financial viability analyses. A cost-benefit analysis is performed here; not necessarily to prove that heated pavements are cost effective, but rather to provide a realistic assessment of the true cost, benefit, and return on investment. Since the award was announced in 2013, Ceylan and his team have collected information on current deicing and snow removal costs at nine U.S.

airports. They also have estimated airport costs for implementing an automated heated pavement system. Through fall 2014, the team will compare and contrast these costs.

Researchers will develop a hybrid heated airport pavement system that can keep the runway surface temperature above freezing during winter weather by combining electrically conductive concrete with nanostructured, super-hydrophobic surfaces.

Jason Weiss, the Jack and Kay Hockema Professor of Civil Engineering at Purdue University, simultaneously leads a research effort on using phase-change materials to store heat in concrete pavement, which reduces the need for pavement deicing. Weiss is a Purdue partner on this Iowa State-led FAA grant.

The research findings will result in increased safety to ground crews, increased safety to passengers, and shortened processing time. With a decrease in snow and ice removal, the benefits may also be seen economically, timely and environmentally due to the elimination of harmful deicing agents.

The grant promotes Iowa State as a member of FAA Center of Excellence Partnership to Enhance General Aviation Safety, Accessibility, and Sustainability (PEGASAS). PEGASAS concentrates research and development efforts on general aviation safety issues, including airport technology; propulsion and structures; airworthiness; flight safety; fire safety; human factors; system safety management; and weather. Iowa State joins five universities as core PEGASAS members: Purdue University, Ohio State University, Georgia Institute of Technology, Florida Institute of Technology and Texas A&M University. Richard Wlezien, professor and Vance and Arlene Coffman Endowed Department Chair in Aerospace Engineering, is the Iowa State University principal investigator for FAA PEGASAS.

■ The FAA has invested in an lowa State ice- and snow-free pavement solution to increase airport crew safety, increase passenger safety, and decrease air traffic processing time. Here two students record ice and pavement temperature on a heated pavement sample at lowa State's Portland Cement Concrete Laboratory.

White, team partner with 11 states to revolutionize soil compaction technology



David White

Richard L. Handy Professor David White implements a technology that revolutionizes more than 80 years of soil compaction testing.

On a typical road and building construction site, soil is compacted to properly support the structure built above it. Manual quality assurance tests, which are traditionally done

with handheld instruments, test soil density, thickness and uniformity in isolated areas. In recent years, state transportation departments have experienced low numbers of personnel to conduct the already scattered tests.

White and his research team identified a technological need to conduct more accurate soil compaction testing. They developed intelligent soil compaction technology. It uses new technology on a compactor, along with global positioning system (GPS) technology, to give the operator

a real-time view of roller pass coverage. Three methods of machine-ground interaction aid in measurements:

1) frequency-domain analysis of accelerometer data, 2) force displacement analysis using dynamic models, and

force displacement analysis using dynamic models, and 3) monitor machine power through roller drum sinkage. Data are collected on a machine-integrated computer. They also can be transferred to a computer off site for analysis. Visual output portrays a color spectrum of soil stiffness: red means low stiffness; yellow means intermediate stiffness; and green means high stiffness. Soil stiffness correlates to soil strength.

The difference in accuracy between manual testing and roller testing is astronomical. "By instrumenting rollers with integrated measurement technology, we can go from less than a tenth percent (coverage) to nearly 100 percent (coverage)," White said. "Everywhere the roller goes, we get the information."

Intelligent compaction exposes weak soil areas easier, allowing the roller operator to eliminate weak soil before

further site construction. This increases project reliability and decreases life cycle costs.

Under White's lead, this technological advancement attracted 11 state transportation agencies to form the Technology Transfer for Intelligent Compaction Consortium (TTICC). These states include California, Georgia, Iowa, Kentucky, Mississippi, Missouri, Ohio, Pennsylvania, Utah, Virginia, and Wisconsin. Watch a video on TTICC at www.ceer.iastate.edu/tticc.

"The TTICC program in Ames, Iowa, is a great tool for education," said Daniel Clark, chief of the Evaluations and Research Unit at Pennsylvania Department of Transportation. "I see it as a train-the-trainer type of development. As I interact with my counterparts in other states, we share experiences and stories of what works and what doesn't work."

Caterpillar, JB Holland Construction (Decorah, Iowa), and McAninch are key partners in implementing soil compaction technology on site.

Laflamme, team build international partnership around novel sensing skin



Simon Laflamme

Assistant Professor Simon Laflamme leads an international partnership of students, faculty, nonprofit organizations, and government agencies around a recently patented, cost-effective sensing skin for monitoring of civil infrastructure.

A soft elastomeric capacitor advances applicable sensing technology for

structural damage. It is inexpensive to fabricate, uses low power to operate, can be customized to different shape and size, and is highly robust to tampering. Electrical signals detected from an array of capacitors produce 2-D strain maps, which detect local deformations over a large area. Recent findings show that the sensing skin can detect small fatigue cracks in steel, monitor deflection shapes, and capture vibration signatures along multiple axes due to the skin's bi-directional measurement capability. This technology advances conventional strain gauges, which does not easily scale up due to their

very small sizes. It is an improvement to fiber optic measurement systems by providing an inexpensive method to measure strain over large areas.

The research group currently tests this technology for condition assessment of wind turbine blades, distributed weigh-in-motion sensing, and detection and localization of fatigue cracks.

Laflamme's interdisciplinary research group comprises of 20 researchers, including eight Iowa State engineering faculty members, a University of Perugia (Italy) faculty member, and 11 graduate student researchers based in various Iowa State engineering departments.

Five organizations sponsor Laflamme's structural sensing skin research: Iowa Alliance for Wind Innovation and Novel Development (IAWIND), Iowa Energy Center (IEC), Iowa Department of Transportation (IaDOT), U.S. Department of Agriculture (USDA), and American Society for Nondestructive Testing (ASNT).



Photo by Chris Neary

▲ Structural engineering master's student Sari Kharroub demonstrates fatigue crack testing on a metal specimen using an MTS 810 Material Testing System. A soft elastomeric capacitor, based on a structural sensing method Laflamme invented in 2011, detects cracks at the microlevel and strain over large areas.



otos by Chris Neary



Charles Jahren

Iowa State University's construction engineering program has partnered engineering students, multimedia experts, and an alumus to develop hybrid learning courses.

From 2012 to 2014, W. A. Klinger Teaching Professor Charles Jahren and his team of engineering students and multimedia experts developed a

hybrid learning model that efficiently combines online and in-classroom course content. The College of Engineering supported this endeavor through a dean's educational initiative that funded engineering departments and their projects to support continuous improvement in undergraduate education.

A key driver of the hybrid learning model is a multimedia expert. Natalya Koehler served in this role from 2012-2013. Koehler developed a research-based framework for one hybrid course — CON E 322 (Construction Equipment and Heavy Construction Methods). She used a three-prong approach to this framework: 1) educational design research, 2) teaching hybrid courses in civil and construction engineering, and 3) web-based interactive multimedia design and evaluation. Koehler moved to Ohio in September 2013, where she became an instructional developer for online courses at Franklin University.

In September 2013, Aliye Karabulut Ilgu took over the postdoctoral research position. She received her doctorate in curriculum and instructional technology at Iowa State in May 2013. Karabulut Ilgu coordinated development of online course materials using software like Camtasia Studio, Lectora Inspire, and Snagit. She also revised inclass activities so students could utilize face-to-face time more efficiently.

John Mallen (MSCE'13), lecturer and former graduate student who helped develop the model, contributed his expertise to course content. He helped produce a hybrid model for CON E 322; however, he recognized the importance of hybrid learning in other courses. "We were able to shorten the lecture videos and reduce the seat time for students," Mallen said. "This allows the instructor to introduce more open-ended problem discussions when students meet face-to-face."

Spring 2014 construction engineering graduate Zhenhua Jia compiled video, audio, and PowerPoint files in Camtasia Studio software to produce the online portion of the hybrid classroom. He also created discussion questions within these modules. "I created short videos for students to watch," Jia said. "If we keep videos short and interesting, with animations, I think students will take the time to watch them."

Gransberg co-develops tri-national course module



Douglas Gransberg

Iowa State University's College of Engineering Continuous Improvement Initiative for Undergraduate Education has benefited international instruction in the construction engineering program.

Doug Gransberg, the Donald F. and Sharon A. Greenwood Endowed

Chair in Construction Engineering and professor of civil, construction and environmental engineering at Iowa State, coordinated a tri-national course module in total asset management. Total asset management is prioritizing funding to a given jurisdiction's infrastructure asset preservation/replacement projects i.e. bridges, roadways, and buildings. Gransberg and Iowa State students partnered with Susan Tighe, professor of civil and environmental engineering at University of Waterloo (Canada), and Eric Scheepbouwer, assistant professor of civil and natural resources engineering at University of Canterbury (New Zealand), and their students.

All students benefited from each instructor's section of the three-week module. The lectures were recorded for the student teams to watch live online. In the first week, Tighe taught the theory behind asset management and the Canadian approach to pavement assets. In week two Gransberg applied theory to asset valuation, probabilistic life cycle costing, and the U.S. approach to bridge assets. In the final week, Scheepbouwer discussed procurement of asset management projects.

In addition to online lectures, multinational student teams developed a comprehensive asset management plan for the mythical state of New Candamerica.

"The module promotes international nuances in a classroom context, including culture, economy and difference of practices," Gransberg said. "It has proven to be a huge success."

Iowa State mentors award-winning NY high school researcher

aria Walsh-Regotti, a senior at Ossining High School in Ossining, N.Y., partnered with Sri Sritharan, Wilson Engineering Professor and professor of civil, construction and environmental engineering at Iowa State. As a high school sophomore, she reached out to Sritharan for help on a two-year research project. Sritharan then connected his doctoral student, Brad Fleming, to Walsh-Regotti on a soil-foundation-structure interaction project. This created a dynamic research team.

In 2012 she began an engineering project that led to an Iowa State partnership to engage in a multi-university National Science Foundation-Network for Earthquake Engineering Simulation (NSF-NEES) project. She admits that it was "a hard thing for a high school sophomore to get into," especially with not yet experiencing difficult math classes. But, she found a research article on earthquakes and testing scaled models of structures and foundations, written by Sritharan. "I was really interested in earthquake research and everything he was doing," she said.

With this research project, she applied her love of engineering to foundations and structures and developed her own small-scale experimental models. "I dug deeper into this civil engineering study and realized how much every part of a structure is dependent on one another. It's not just the design of the bridge, or the beams that connect to the trusses and everything else; it's also the foundation," Walsh-Regotti said.

She called it "an eye-opening experience," where so many things that have an impact on the integrity of structures could be studied.

Fleming mentored Walsh-Regotti on technical aspects of her project. He made sure soil experiments were set up correctly and the variables were calibrated. Fleming also encouraged Walsh-Regotti to explore some of her own research questions.

"I read many, many research papers on soil compaction and soil improvement," Walsh-Regotti said. "I definitely learned so much more being at the university and from all the contact we had in between"



▲ Maria Walsh-Regotti, a student at Ossining (N.Y.) High School, placed first and second in 2013 and 2014, respectively, at the Westchester (Sleepy Hollow, N.Y.) Science and Engineering Fair. CCEE Professor Sri Sritharan and doctoral student Brad Fleming mentored her award-winning research.

Fleming also gained valuable lessons while working with Walsh-Regotti: "It made me a better teacher in terms of guiding a high school student from step A to B to C," Fleming said.

Their work has reaped Walsh-Regotti several accolades: Winner of the 2013 Westchester Science and Engineering Fair (WESEF — a local science fair affiliated with the Intel International Science Fair) and 2013 ASM International Foundation Award — both in the Earth Science category; second place at the 2014 Winchester Rockland Subregional Junior Science and Humanities Symposium (University of Albany); and fourth place in the Engineering Section at the 2014 WESEF.

"I got to meet different researchers and learn more about what I want do. It was a really fruitful experience," Walsh-Regotti said.

Taylor teaches students at leading US high school nanotech lab

Peter Taylor, associate director of the National Concrete Pavement Technology Center at the Iowa State University Institute for Transportation, recently partnered with a nationally recognized high school for nanotechnology research and practice.

Wheeling High School (Chicago, Ill.) invited Taylor to speak with high school students and demonstrate nanotechnology laboratory practices with concrete. Wheeling High School is home to a nanotechnology laboratory — the only one if its kind in a U.S. public high school. Taylor lent his expertise on the effects of deicing salts as well as micro- and nano-silica effects on concrete. He also mentored groups of students on their science fair research projects.

Students were skilled in electron microscope scanning and atomic force microscope scanning — technology conventionally learned at the postsecondary and graduate school levels. "It was apparent that Wheeling High School leads the nation in preparing future nanotechnology researchers," Taylor said.

U.S. Secretary of Education Arne Duncan dedicated the nanotechnology lab last fall. It was developed by the Illinois Science and Technology Coalition through the Illinois Department of Commerce and Economic Opportunity.



 \blacktriangle Peter Taylor mentors students at Chicago area's Wheeling High School nanotechnology lab, the only one of its kind in the U.S.

[FACULTY AND STAFF AWARDS]



James Alleman

Professor James Alleman received the **U.S. Department of State Jefferson Science Fellowship**. The Jefferson Science Fellows Program was founded in 2003 to establish a model of engaging the American academic science, technology, engineering and medical communities in the formulation and implementation of U.S. foreign policy. National Academies (encompasses National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council) administers the program in partnership with the U.S. Department of State and the U.S. Agency for International Development (USAID).

Alleman will spend one year as a science adviser on foreign policy issues. This includes the opportunity to travel to U.S. embassies and missions overseas. After one year, Alleman will continue to be a resource to the State Department and USAID for five more years. "This opportunity will surely provide a unique opportunity to broaden and deepen my awareness of global policy issues related to science and engineering," Alleman said.



Timothy Ellis

Associate Professor Tim Ellis received the Outstanding Government Civil Engineer Award from the American Society of Civil Engineers (ASCE) Iowa Section.

ASCE Iowa Section Past President Gary Reed presented the award to Ellis on Sept. 12, 2013. The award recognized Ellis' sustained outstanding civil engineering performance in the public sector, his evidence of high character and professional integrity, and his exceptional civic and humanitarian activities and community service. Ellis has lent his expertise to projects in the Democratic Republic of Congo, Hungary, Taiwan, China, Malta, and locations throughout Iowa and the U.S.



Douglas Gransberg

Douglas Gransberg, professor and Donald F. and Sharon A. Greenwood Chair in Construction Engineering, won the American Society of Civil Engineers (ASCE) 2014 Journal of Management in Engineering (JME) Best Peer-Reviewed Paper for "Project Complexity Mapping in Five Dimensions for Complex Transportation Projects." The article was published in ASCE JME's October 2013 edition.

The award-winning paper reports that a "complexity footprint" helps the complex transportation project manager identify appropriate resources to be allocated before a crisis occurs. A five-dimensional complex project management model is applied, which includes 1) technical aspects, 2) project schedule, 3) project costs, 4) project context, and 5) sources of project's funding. The model was successfully implemented in 18 projects in four countries.

The paper's co-authors are CCEE Associate Professor Jennifer Shane, Colorado State University Associate Professor Kelly Strong, and Carla Lopez del Puerto, assistant professor at University of Puerto Rico-Mayaguez.



Chris Neary

Communications Specialist II Chris Neary received the **Iowa State University Outstanding Marketing Practice Award**. The award recognizes his exemplary marketing efforts with the Department of Chemical and Biological Engineering Centennial Celebration, which occurred throughout the 2013-2014 academic year. Iowa State University Chief of Staff Miles Lackey and University Marketing Director Carole Custer presented the award to Neary on April 22, 2014.

Tom Hayes, chair and professor of marketing at Xavier University and nationally respected higher education marketing speaker and consultant, said Neary's work demonstrated "strong use of brand, solid measurements for fundraising, (as well as) strong integration of materials and mediums."

The award came with a \$500 marketing services voucher. Neary presented a summary of the CBE Centennial Celebration marketing campaign at the Iowa State University Marketing Summit April 22, 2014.

Other awards: David White was promoted to professor (already tenured), effective July 1, 2014. His current title is Richard L. Handy Professor.

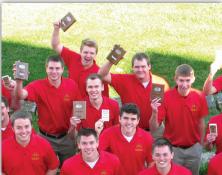
[UNDERGRADUATES]



Spring 2014 civil engineering graduate Rvan François received the Wallace E. Barron All-University Senior Award in March 2014. The award goes to five graduating seniors who display high character and outstanding achievement in academics and university/community activities.



▲ Students of the National Electrical Contractors Association Iowa State Chapter repeated their top-3 success at the 2013 ELECTRI International Green Energy Challenge. They won the written proposal component of the challenge and placed



▲ Construction engineering students placed first in two of the four categories at the Associated Schools of Construction (ASC) Region IV Competition in October 2013. Iowa State has won 37 times at the ASC competition since 1994.



▲ The Associated General Contractors (AGC) of America Iowa State Chapter won its ninth national **Outstanding Student Chapter Contest. The contest** awards the student chapter that best undertakes a project that benefits a local community. This award honored AGC's rebuilding work in Jonesborough. Tenn., during Spreak Break 2013.



 More than a dozen engineering students, including many in civil engineering and construction engineering, built a 29-foot LEGO man made of cardboard in November 2013. The project raised \$6,500 for Iowa Homeless Youth Centers as part of Reggie's Sleepout in Des Moines. Watch how they built "Buster" in this video: vimeo.com/80046077.



Photo courtesy of Nicole Oneyear

third overall.



▲ The Design-Build Institute of America (DBIA) Iowa State Chapter will represent the Midwest at the Third Annual National Design-Build Student Competition in October 2014. Students submitted a request for qualification (RFQ) on a 120,000 square-foot university recreation center. Iowa State and nine other schools from around the U.S. will compete for national winner.



"Iowa State civil engineering student also a contractor"

Photo by Chris Neary

Hamza Janjua

Hamza Janjua pursues a head-start to his civil engineering career. While many earn the degree before working professionally, Janjua works to be one step ahead.

The civil engineering senior also is a licensed general contractor in the state of Iowa. His new business, SSB Construction, LLC, thrives in Ames with his first project — a Burger King being built just west of Interstate 35 on 13th Street. "SSB stands for 'scope, schedule and budget' - the three basic things of project management," Ianjua said

Born in Baltimore, Md., he grew up in Abbottabad, Pakistan, about 70 miles north of Islamabad. At age 18 he moved to New York City. In nearby Valhalla, N.Y., he earned core credits from Westchester Community College. From there, he transferred to Iowa State University to follow his family's legacy in civil and construction engineering — his great-grandfather, grandfather, father, and now Janjua, have owned construction companies.

"(Civil engineering) is in my blood. It's a family tradition; and besides that, it's very constructive," Janjua said.







Photo courtesy of Jace Christensen

▲ (From left) Construction engineering senior Jace Christensen, civil engineering senior Ryan Francois, and construction engineering senior Michael Donlin met with dozens of students from different majors throughout the U.S at the 2014 Alliance for the Arts in Research Universities Emerging Creatives Conference, held at Stanford University.

Student project 'Bloccupies' parking space in ISU art show

Ryan Francois, a civil engineering senior who minored in critical design studies, combined art and engineering concepts in many endeavors. His final College of Design project, Bloccupy, repurposed a metered parking space to "allow as many people to interact and take advantage of the space as possible," Francois said. "It became a true public space." The project was featured in Art Vacancy, a collaborative art exhibition that partnered College of Design faculty, design graduate students, and independent artists April 24-27, 2014, in downtown Ames. Francois was the only undergraduate student to participate.



We put the ART in engineering

People need to think

'interdisciplinary,'

because that's where

everything is.

Jace Christensen.

Spring 2014 construction

Iowa State University civil engineering senior Ryan Francois, as well as construction engineering seniors Jace Christensen and Michael Donlin, attended the Emerging Creatives Student Conference Jan. 30-Feb. 1, 2014. The conference was held at Stanford University and was sponsored by the Alliance for the Arts in Research Universities (a²ru).

About 110 students from 30 U.S. research universities were selected to attend. Twelve Iowa State students with backgrounds in human sciences, design and engineering attended. The event's goal was to allow interdisciplinary student collaboration with an interest in crossing creative boundaries.

When asked what the most challenging part of the conference was, Francois replied, "It was challenging working with other majors and backgrounds, because each major had its own method of approaching a problem much differently than ours as engineers."

engineering graduate world was challenging part of the conference was, Francois replied, "It was challenging working with other majors and backgrounds, because each major had its own method of approaching a problem much differently than ours as engineers."

They also participated in various team building exercises. Christensen participated in a group wallet building activity. He and teammates looked at current wallet designs then redesigned them with their own functions in mind. "It opened my eyes to the idea that as engineers,

we are very concerned with problem solving, but we tend to forget about finding the problem in the first place. Sometimes one needs to go against the grain to make things better," Christensen said.

Donlin said that his favorite experience was the "d. school." He explained that it was not an actual school

but "simply a place that focused on the collaboration of ideas." One could work with people from all backgrounds with the common goal of rapid prototyping of ideas. Donlin said that while working in this creative environment, "working with the right people can sometimes allow the problem to solve itself."

The three engineering seniors said that the experience was "a wonderful chance to network and engage in collaborative projects with students from different disciplines who are trying to make the

world a better place."

Francois added that collaboration with other majors "allows for communication breakdown to occur less often over various departmental disciplines."

Donlin adds that "sometimes you only see what you are looking at, not what you are looking for — collaboration can help that problem."

lowa State to host national conference, promote arts integration

Iowa State will host the 2014 Alliance for the Arts in Research Universities (a²ru) National Conference Nov. 5-8 at the Scheman Building and areas throughout the Iowa State campus and Ames.

The conference's theme will be "edge effects," which refers to changes in population and diversity of species where habitats meet, compete and overlap. The goal is to apply this idea to interdisciplinary collaboration between the arts and "hard" sciences, like engineering.

About 40 presentations, including panels, breakout sessions, performances and roundtable discussions will center around cross-disciplinary partnerships.

More information can be found at a2ru.org/ events/2014-a2ru-national-conference-iowa-state-university. Register today at goo.gl/ZmTcXa.

a2 I UALLIANCE FOR THE ARTS
IN RESEARCH UNIVERSITIES

Graduate students demonstrate research excellence.



Photo by Chris Neary

▲ Structural engineering doctoral student Hussam Saleem's work was published in the July 3, 2014, edition of The International Journal for the Science and Technology of Polymers (Polymer), one of the world's top journals for polymer science. He was lead author on article about interfacial treatment effects on behavior of soft nanocomposites for highly stretchable dielectrics, partcularly in novel structural health monitoring methods.



▲ Geotechnical engineering doctoral student Shibin Lin presented two papers at the 27th Symposium on the Application of Geophysics to Engineering and Environmental Problems, held in Boston, Mass., March

16-20, 2014. His first paper was on optimum geophone depths for capturing higher modes of soil media by minimally invasive surface wave testing. The second paper was about a computational and experimental study on seismic stiffness profiling of pavements using nondestructive surface wave methods.

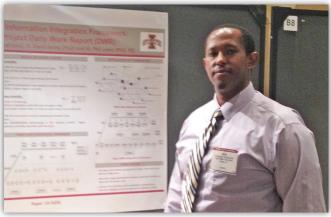


Photo courtesy of Asregedew Woldesenbet

▲ Construction engineering doctoral student Asregedew Woldesenbet presented at a Transportation Research Board 2014 Annual Meeting poster session. He discussed his research on a three-tiered data and information integration network that supports highway agency data and information management. In fall 2014, Woldesenbet will join the University of Nebraska civil engineering faculty as an assistant professor.



Photo courtesy of Jing Dong

▲ Transportation engineering master's student Yundi Huang (left) was honored twice during the 2013-2014 academic year. Her first accolade was receiving the Dana Hook Leadership Legacy Graduate Scholarship from the WTS International Greater Chicago Area Chapter. Huang's second honor came with second place in the 2014 Thomas J. Seburn Student Paper Competition from the Missouri Valley Section of the Institute of Transportation Engineers (MOVITE).

CCEE selected for ISU Presidential Scholars Program

The Iowa State University Provost's Office selected the Department of Civil, Construction and Environmental Engineering (CCEE) as one of 22 Iowa State graduate programs to receive university funding for an additional, exceptional doctoral student.

The CCEE student is Tuyen Thanh Le, a construction engineering and management master's degree graduate of Ho Chi Minh City University of Technology, one of Vietnam's top engineering schools. He began his doctoral program in August 2014. Le plans to pursue research on digital data utilization for highway project delivery and management, under the direction of Associate Professor David Jeong.

The goal of the initiative is to recruit top doctoral students in strategic program areas. It is part of President Steven Leath's broader plans to strengthen research and graduate programs campuswide.

Our students and faculty are internationally engaged.



Photo courtesy of Emily Knight

▲ Students from the Iowa State University Program for Women in Science and Engineering (WISE) toured Spain during their 2014 Spring Break. "Each place had its own architectural touch, which made everything we saw new and exciting. It was truly a civil engineer's dream," said Glenna Lovig, a civil engineering sophomore. Other CCEE students on the trip were Emily Knight, Jenny Kuenstling and Sasha Weir.



▲ Civil engineering senior Chloe Ward pursued a summer research internship at **RWTH Aachen University, Germany. Her project** pertained to high temperature behavior of textile reinforced concrete.



Ghana

Malta

Germany



▲ Associate Professor Tim Ellis, pictured here with U.S. Ambassador to Malta Gina Abercrombie-Winstanley, was a Fulbright Teaching Scholar at the University of Malta.



Spring 2014 civil engineering graduate Zane Pennock traveled to Ghana with the Engineers Without Borders Iowa State Chapter, He applied his engineering skills to a water management project in Ullo, Ghana.





Photo courtesy of Say Kee Ong

▲ Professor Say Kee Ong is an international faculty member at Chulalongkorn University, Bangkok, Thailand.

Bureau of Labor Statistics: Civil, construction, environmental engineering job growth to surpass all-occupation average

The U.S. Bureau of Labor Statistics released its most recent Occupational Outlook Handbook, which says that construction management, civil engineering and environmental engineering job opportunities combined should increase by 140,000, or 17.3 percent, by 2022.

Employment for construction managers, the general occupation of construction engineering graduates, expects to rise 16 percent from by 2022. In 2012, 485,000 construction managers were employed in the U.S. About 78,200 more construction managers are expected to be employed in the U.S. by 2022. Iowa State construction engineering graduates also have the required academic qualifications for potential professional engineering licensure.

Employment for civil engineers expects to rise 20 percent by 2022. In 2012, 272,900 civil engineers were employed in the U.S. About 53,700 more civil engineers are expected to be employed in the U.S. by 2022.

Environmental engineers should see a 15 percent rise in job opportunities by 2022. In 2012, 53,200 environmental engineers were employed in the U.S. About 8,100 more environmental engineers are expected to be employed in the U.S. by 2022.

Rates are higher than the all-occupation rate, 11 percent growth by 2022. The job growth rates also are higher

than the all-engineering occupation rate, 9 percent growth from 2012 to 2022.

"Civil, construction and environmental engineers play a vital role in maintaining and developing public and private infrastructure," said Terry Wipf, Pitt-Des Moines Professor in Civil Engineering and chair of the Department of Civil, Construction and Environmental Engineering at Iowa State. "A rebounding economy adds to the demand for our graduates."

Job Growth: 2012-2022 - Civil Engineers, Construction **Managers/Engineers, Environmental Engineers**

Civil Engineers	20%
Construction Managers/Engineers	16%
Environmental Engineers	15%
All Occupation-Average 11%	

Bureau of Labor Statistics, U.S. Department of Labor. Occupational Outlook Handbook, 2014-2015 Edition, published January 8, 2014. Chart illustrates percentage growth relative to each occupation, not growth in numbers.

[IN MEMORIAM]



Paul Morgan

Paul Morgan, a CCEE professor emeritus and former College of Engineering associate dean, died peacefully at Mary Greeley Medical Center in Ames, Iowa, on Aug. 30, 2013. He was 90.

Morgan joined the Iowa State civil engineering faculty in 1953. He then moved to the Dean's Office in 1964 and was appointed associate

dean in 1969. Morgan retired in 1988, after serving as an administrator and educator at Iowa State for 35 years.



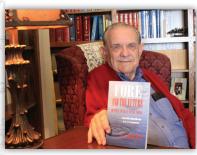
Mary Hurd

Mary Krumboltz Hurd, a female engineering pioneer and 1947 Iowa State civil engineering alumna, died Sept. 27, 2013. She was 87.

Hurd, a woman in an almost male-exclusive profession, authored a book, "Formwork for Concrete," in 1963 that was broadly used in the construction industry and at universities. She

received the following Iowa State University awards: Person of Distinction at the Iowa State University Sesquicentennial (2008), Anson Marston Medal (2005), and Professional Achievement Citation in Engineering (1982). In November 2013, she posthumously received the Iowa State University Alumni Merit Award.

Professor Emeritus Handy publishes 'FORE and the Future of Practically Everything'



Richard Handy, CCEE Professor Emeritus

Scientific explanation just got a whole lot funnier. Five years in the making, a book called "FORE and the Future of Practically Everything" was officially released by Moonshine Cove Publishing on Nov. 15, 2013. The author is Anson Marston Distinguished Professor Emeritus Richard Handy.

"FORE and the Future of Practically Everything" uses a

scientific theme, a first-order rate equation (FORE), and applies it to all manner of topics from the rise in sea level to heights achieved in the pole vault. The book targets both technical and non-technical readers. It goes from the future of petroleum production to life expectancy and where to look for the "lost continent" of Atlantis.

FORE applies to processes that are slowing down and approaching hypothetical end points. The first story in the book describes declining speeds of a pickup truck after it runs out of gas. A pickup truck was used because pickup trucks are more likely to be driven by men and therefore are more likely to run out of gas.

The rise in sea level is shown to be a continuation of a process that began 12,000 years ago when glaciers started melting. However, the rate now is about five times faster than it should be, an indication of climate change. The book has numerous graphs and photographs, including one of the ice-bound Arctic Ocean in the 1950s, and another showing open water 50 years later.

Handy shows how FORE can cut across a broad range of topics from life expectancy to home run hitting, from aspects of population growth to world food production. The author dislikes the name "futurist," and prefers to call the book "a guess with a college education."

Thank you to those who recently gave to CCEE.

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Six faculty members joined us this year.



Assistant Professor An Chen began his appointment in July 2014. His teaching and research focus on sustainable structural engineering, with specific areas in green buildings, including energy-efficient structures, recycled materials utilization, and sustainable rehabilitation system for deteriorated bridges. Chen received his Ph.D. in civil engineering from West Virginia University and his M.S. and B.E. in civil engineering from Dalian University of Technology, China. Prior to joining the department, he worked as an assistant professor at the University of Idaho. Chen is a registered Professional Engineer with the State of Connecticut, is a LEED Accredited Professional, and has extensive industrial design experience.



Assistant Professor In Ho Cho began his appointment in August 2014. He came to Iowa State after working as the Willis Research Fellow and lecturer at the University of Colorado's Department of Civil, Environmental and Architectural Engineering. Cho's research interests lie in information-based nonlinear structural analyses. Cho received his Ph.D. in civil engineering (minoring in computational science and engineering) at the California Institute of Technology. He also received an M.S. in civil, urban and geosystem engineering and a B.S. in engineering at Seoul National University, South Korea. Cho was selected as part of the Iowa State University Presidential High Impact Hires Initiative.



Associate Professor Peter Savolainen began his appointment in August 2014. He most recently worked as an associate professor of civil and environmental engineering at Wayne State University (Detroit, Mich.), where he developed an internationally recognized research program in traffic safety and operations. His teaching efforts have been recognized by the American Society of Civil Engineers (ASCE) through the ASCE Excellence in Civil Engineering Education (ExCEEd) and ExCEEd II programs. Savolainen received his Ph.D. and M.S. in civil engineering at Purdue University and his B.S. in civil engineering at Michigan Technological University. He is a registered Professional Engineer (P.E.) with the State of Michigan.



Associate Professor Anuj Sharma began his appointment in August 2014. Before coming to Iowa State, Sharma was as an assistant professor of civil engineering at the University of Nebraska-Lincoln. His research interests lie in developing a performance-based, comprehensive decision support methodology for multi-modal transportation infrastructure. Sharma received his Ph.D. in civil engineering at Purdue University, his M.S. in civil engineering at Texas A&M University, and his B.E. in civil engineering at Regional Engineering College, Rourkela, India.



Associate Professor J. Jay Shen began his appointment in August 2013. His most recent position before Iowa State was associate professor of civil, architectural and environmental engineering at Illinois Institute of Technology. Shen's research interests are in performance-based seismic design of steel structures, model-based simulations, and inelastic behavior of steel structures. He earned his B.S. in civil engineering at the Hefei University of Technology, China, M.S. in civil engineering at the Chinese Academy of Sciences, and Ph.D. in civil engineering at the University of California-Berkeley.



Associate Professor Omar Smadi began his CCEE appointment in July 2014. Smadi has been a research scientist and director of the Roadway Infrastructure Management and Operations Systems Program at Iowa State University's Institute for Transportation (InTrans) since 2010. He has been employed at Iowa State since 1994, working in various roles at the Center for Transportation Research and Education and InTrans. Smadi's research interests lie in asset management and performance measures for state highway agencies. He received his Ph.D. in civil engineering and M.S. in transportation engineering at Iowa State and his B.S. in civil engineering at Yarmouk University, Jordan.

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