#### IOWA STATE UNIVERSITY Department of Civil, Construction, and Environmental Engineering

## fall 2015 ccee Student organization newsletter

#### Dear Reader,

The CCEE Student Organization Newsletter provides the latest on Iowa State University civil engineering and construction engineering students, their activities, and other associated stories. Student leaders provide updates contained in every issue, every semester. Since spring 2012, we have been thrilled to share what students do best — embark on adventures. Hope this inspires your next adventure.

Kind Regards,

### IOWA STATE UNIVERSITY

Department of Civil, Construction, and Environmental Engineering

#### what's inside

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### have a story?

Email it to us at cceeweb@iastate.edu.

### do the social media thing

Facebook: www.facebook.com/lowaStateCCEE Twitter: @isuccee LinkedIn: Civil, Construction and Environmental Engineering at Iowa State University

### explore online

www.ccee.iastate.edu

#### civil construction software club (ccsc)

C C C

The Civil Construction Software Club (CCSC) is a student organization that gives CCEE students up-to-date knowledge about the computer software and technology they'll need to succeed in the industry.

This year we bring the Autodesk Certified Professional Exam to CCEE students, which will give students the chance to receive more formal training to improve their modeling skills in AutoCAD, Civil 3D, and Revit as well as demonstrating proficiency to employers with industry-recognized testing. We also have industry presenters covering everything from quadcopters and photogrammetry to BIM and laser scanning.



» To get involved, contact CCSC President Kyle Younkin at kyounkin@iastate.edu.

#### associated general contractors of america (agc)

The Associated General Contractors of America (AGC) Student Chapter at Iowa State has hosted some exciting events this semester. On Oct. 8, 2015, AGC hosted the first-ever Heavy Highway Career Fair, featuring more than a dozen companies in need of interns and new construction engineering graduates. AGC also hosted the annual Tech Fair with more than 10 companies attending. This fall AGC has arranged an overnight tour where members visited three jobsites in the Kansas City area.

One of the most significant events this semester is the Thanksgiving Break Service Trip. AGC takes more than 40 members each semester to a location



within driving distance to assist a community that had a natural disaster. Past trips include Johnson City, Tenn., Washington, Ill., Joplin, Mo., Moore, Okla., and several Iowa cities.

Accompanying these headlining events throughout the semester are several socials and community service events. AGC holds meetings on the first Wednesday of each month and plans to feature presentations from Burns & McDonnell, The Beck Group, and Master Builders of Iowa. AGC provides great opportunities for students interested in the construction industry, regardless of experience. It is a dynamic student organization that intertwines friendships, construction education, and industry interaction.

» To get involved, contact AGC Student Chapter President Amy Salcedo at asalcedo@iastate.edu.

### mechanical contractors association of america (mca)





The outlook is excellent for ISU Mechanical Contractors Association (MCA) Student Chapter as active membership looks to be its largest in the last couple of years. The first monthly meeting in September had an above-average attendance. MCA hosted its 15th Annual ISU MCA Golf Outing on Sept. 18, 2015, at Tournament Club of Iowa in Polk City. More than a dozen foursomes, which integrated industry and student members, enjoyed a round of golf.

MCA partnered with the NECA Iowa State Student Chapter to host the MEP Career Fair on Oct. 13, 2015, in the Howe Hall Atrium. At this fair,

mechanical/electrical contractors and design firms from across the Midwest presented to students. This has been a huge success, and MCA looks to continue its 100 percent summer internship placement for active members. This past year we also won a national Chapter of Excellence Grant, which gives us \$7,500 in scholarships and chapter operations funds.

Future events on the MCA agenda include the MCAA Student Summit in Columbus, Ohio, where students will receive the MCA Student Competition Project. MCA will send four students to this event, where they will tour the Rock and Roll Hall of Fame and attend the convention while meeting with industry professionals. MCA encourages anyone interested to attend a monthly meeting or any social events. Like us on Facebook!

» To get involved, contact MCA Chapter President Pete Christiansen at petec@iastate.edu.

### sigma lambda chi (slc) \, 🕻

Sigma Lambda Chi (SLC) is an international honor society for construction engineering. SLC's fundamental purpose is to provide recognition to outstanding students in the construction curricula. Here at Iowa State the Rho Chapter of SLC is open to students in the top 20 percent of the junior and senior construction engineering class. This past May we welcomed four new members at the initiation ceremony: Andrew Brown, Jacob Lane, Nicholas Mendez and Rick Smith.

As an honor society, our goal is to assist the community, university and department in any way we can. This semester, we have already held our mainstay event Hotel Lego with high school



students in Science Bound (see picture). In October, we held three more Hotel Lego events as part of the Women in Science and Engineering's The Road Less Traveled.

Over this next year SLC plans to continue with initiations, service, and social events as we look to grow our organization. » To get involved, contact SLC Chapter President Andrew Lemus at aelemus@iastate.edu.

## national electrical contractors association (neca)

The National Electrical Contractors Association is a national trade association, with smaller chapters — Iowa NECA — running their own geographical areas. Iowa State University partners with Iowa NECA to offer monthly meetings with industry speakers, job fairs, outreach events, and participation in the ELECTRI International Green Energy Challenge.

Green Energy Challenge Team

The NECA Iowa State chapter won the 2015 ELECTRI International Green Energy Challenge — a repeat accolade as Iowa State defended its 2014 national title. They also won NECA Student



Chapter of the Year. Both honors were recognized at the NECA Convention held Oct. 2-6, 2015, in San Francisco.

ELECTRI International and NECA challenged students to develop a back-up power system and resiliency plan for a facility with demonstrated critical power needs. Iowa State civil engineering and construction engineering students, who call themselves Team Cyclone Energy, chose the university's Administrative Services Building, where they developed a 50-page proposal to improve the building's energy consumption, light levels, and energy costs. Students proposed a solar-energy microgrid and lighting retrofit as well as offered three alternate scenarios: 1) improve indoor air quality, improve thermal comfort, and reduce light intensity for building occupants; 2) increase energy production capacity of solar array; or 3) a combination of increasing comfort for building occupants and increasing solar energy production capacity.

Iowa State's winning report and oral presentation came with a \$4,000 cash prize, \$2,000 in travel support to the NECA Convention, and free NECA Convention registration.

This year ten exceptional students devoted hundreds of combined hours of practice and talent to excel in competition. Team members include spring 2015 construction engineering graduates Lucas Baxter, Joe Hahn and Bryan Marroquin; construction engineering seniors Caleb Bonderer, Dylan Busby, Maggie Holt, Joe Kern and Rick Smith; construction engineering junior Regan Smiley; and civil engineering senior Britta Sortland.

Iowa State NECA faculty advisers are Beth Hartmann and Jenny Baker, both senior lecturers in civil, construction and environmental engineering. "This competition exposes students to a real-life scenario," Hartmann said. "They work through how to perform technical analyses, develop a conceptual estimate and schedule, identify an appropriate financing plan, and develop a clear and professional proposal."

Iowa State also received the NECA Student Chapter of the Year Award, which came with a \$1000 cash prize. This honor recognizes and rewards those students, faculty and NECA staff working hard year-round to run successful student chapters. Thirty-three chapters from the U.S. and Canada were eligible for this award.

At the NECA Convention, Hartmann presented to the ELECTRI International Council about how the Green Energy Challenge impacts students. The national electrical contracting industry has taken notice, considering Iowa State has been a Green Energy Challenge top-3 finalist each year since 2012. "The guidance of faculty, staff and industry partners, mixed with the admirable dedication our students have to this project, is what continues to make this team successful," Hartmann said. "They become part of something bigger than they could have imagined."

To apply for the 2016 Iowa State Green Energy Challenge team, contact Hartmann at bethlin@iastate.edu.

» To get involved in NECA, contact NECA Iowa State Chapter President Maggie Holt at mholt@iastate.edu.

#### water environment federation (wef)



The Water Environment Federation (WEF) Iowa State University Student Chapter aims to provide additional hands-on experience and networking opportunities for students. The mission of the WEF student chapter is to share knowledge of available water resources, pollution prevention practices, and design, construction and maintenance of water treatment facilities. The WEF student chapter encourages graduate and undergraduate students to get involved in activities.

Last year, the WEF student chapter arranged two field trips. One was the Des Moines Water Reclamation Facility, and the other was the JBS Swift plant in Marshalltown, Iowa. These trips

allowed our members to see both the municipal and industrial wastewater treatment processes. This semester, we attended the WEF's Annual Technical Exhibition and Conference (WEFTEC) in Chicago. We visited the exhibition and several technical presentations at the conference. Also, we networked at social events with industry professionals and other WEF student chapters during the conference.

» To get involved, contact WEF Student Chapter President Shengyang Wang at wangsy49@iastate.edu.

#### transportation student **----**association (tsa)



The Transportation Student Association (TSA) promotes the advancement of transportation through association with academia, industry, and fellow students. The organization introduces students to transportation topics from various perspectives through TSA sponsored meetings, nurtures the development of professional spirit, and encourages fellowship among association members. It is part of the Missouri Valley Section of the Institute of Transportation Engineers (MOVITE).

TSA students attended the Midwestern District ITE Meeting in Branson, Mo., and won the Traffic Bowl Competition. Three students also participated in the Student Poster Competition and Student

Design Competition. Iowa State graduate students Micah Makaiwi and Raha Hamzeie were two of five Student Design Competition winners.

TSA students also participated in ITE International Annual Meeting and Exhibit in Hollywood, Fla. As the winning ITE Midwestern District Traffic Bowl Competition team, Iowa State competed with eight other teams at the International Collegiate Traffic Bowl. Students also attended technical sessions and a students panel. This past August the Iowa State University Institute for Transportation and the Iowa Department of Transportation hosted the Mid-Continent Transportation Symposium. Students presented their research at panel sessions and poster sessions.

» To get involved, contact TSA Student Chapter President Georges Bou-Saab at gbousaab@iastate.edu.

#### american society of civil engineers (asce)



The American Society of Civil Engineers (ASCE) is a student organization that aims to encourage interest in the study of civil engineering. ASCE promotes the civil engineering profession by facilitating interaction of students, faculty and professionals. The purpose of ASCE is to expose students to a variety of events that will expand their educational and career opportunities.

Members of ASCE are given many opportunities to be involved with worthwhile activities outside of the classroom. ASCE hosts one or two speaker meetings per month, where members are able to learn more about different civil engineering projects and companies. These speaker meetings



also serve as a networking opportunity to build professional relationships with practicing engineers. Alongside these professional relationships, student members are able to create personal relationships with their peers at the many ASCE social events, such as tailgates and tournaments. The ASCE outreach events are chances to serve the environment and give back to people of our community. ASCE also offers jobsite tours to students that are aiming to gain real-world knowledge about the practice of civil engineering.



Technical skills and understandings can be gained from the ever-growing competition groups, including the nationally acclaimed and highly competitive Steel Bridge and Concrete Canoe Teams.

Each year the Steel Bridge Team designs, fabricates, and constructs a new bridge to enter in competition. Students get to work hands-on and learn new skills such as how to weld, cut, and grind steel; as well as the design process itself. They also communicate with companies and professional organizations that provide materials and sponsor the team. In 2015 the Steel Bridge Team placed second at the ASCE Midwest Region Student Steel Bridge Competition, which led them

to the ASCE-American Institute of Steel Construction National Student Steel Bridge Competition.

The Concrete Canoe Team designs, builds, and races a canoe made completely out of concrete. Students gain practical experience with concrete mix design, mold construction, pouring concrete, canoe paddling, and project management. They also reach out to organizations that provide materials and sponsor the team. Iowa State will host the 2016 Midwest Regional Concrete Canoe Competition, so stay tuned for announcements on that event.

» To get involved in ASCE, contact ASCE Iowa State Chapter President Erica Mack at erica@iastate.edu.

# Photo by Iowa Department of Natural Resources/ Volunteer Iowa

#### **CCEE Student News!**

Read all CCEE department news at **news.engineering.iastate.edu/category/department-news/** civil-construction-and-environmental-engineering.

View a list of all CCEE student organizations at www.ccee.iastate.edu/current-students/currentundergrads/student-organizations.

## Governor, Iowa DOT honor construction engineering students

Iowa Gov. Terry Branstad and the Iowa Department of Transportation selected students of the Iowa State University Associated General Contractors (AGC) Chapter to receive the Group Governor's Volunteer Award. They were honored at a recognition ceremony June 8 at Southeast Polk High School in Pleasant Hill.

Andy Reynolds, a spring 2015 construction engineering graduate, was president of AGC Iowa State Chapter and facilitated AGC community service projects in the 2013-2014 academic year. "It is an honor to receive this award not only for the acknowledgement of our service efforts, but also for the advancement of the people and organizations we serve," Reynolds said.



Since 2012, the AGC Iowa State Chapter has partnered with Appalachian Service Project to rebuild houses in flooddamaged Johnson City, Tenn. In the last several years, AGC Iowa State Chapter also rebuilt homes in Joplin, Mo., Moore, Okla., Mississippi Gulf Coast, and Cedar Rapids, Iowa. Throughout the years, hundreds of students have spent Spring Break and Thanksgiving Break applying teamwork and construction engineering solutions to rebuilding some of America's devastated communities.

When they don't road-trip to building sites, the AGC Iowa State students contribute to more local community organizations, such as the Mary Greeley Medical Center, Boys & Girls Club of Story County, and Ames Community School District, to name a few. "We have been fortunate to have, year after year, generous, committed, and energetic students involved with this organization," Reynolds said. "Service is at the core of ISU-AGC."

The Governor's Volunteer Awards program was created in 1982, with inaugural awards presented in 1983. The program has grown from a small program only available to state agencies to its present function of providing all Iowa nonprofit, charitable, and government organizations with a non-competitive, easy, and low-cost way to honor local volunteers with a prestigious state-level recognition award. The program is coordinated by the Iowa Commission on Volunteer Service, which is responsible for planning, development, and improvement of the awards nomination process, guidelines, and procedures.

ICMYI: Watch the video of why AGC students are some of the most volunteer-driven at ISU at https://youtu.be/\_CMFQZ1R4Rk.





#### Iowa governor approves multidisciplinary Student Innovation Center

This article was originally published on June 9, 2015, in the Iowa State Daily.

On July 1, 2015, Iowa Gov. Terry Branstad approved construction of the Student Innovation Center, a proposed new ISU facility born from a collaboration between the College of Design and the College of Engineering.

Luis Rico-Gutierrez, dean of the College of Design, describes the center as a "hub for hands-on creativity" with an emphasis on "making stuff." It will serve as a space where students can work on projects with tangible and physical outcomes. The 175,000-square-foot center will be located near the Marston Water Tower, where the Nuclear Engineering Laboratory and the parking lot east of the lab currently stand. The budget is estimated to be \$80 million. Half of the money will come from the state, while the other half will be raised with private donations. An anonymous gift of \$20 million has already been pledged for the project.

"There's a lot of good work going around at the university trying to foster creativity and innovation in many different disciplines," Rico-Gutierrez said. "This will allow us to move all that good work to the next level."

Gary Mirka, associate dean for the College of Engineering, provided more details on the ways the facility could help students. "I like to think about this facility in terms of three levels. There's the curricular, co-curricular and extracurricular," Mirka said. "Curricular has to do with building and designing as part of classes. Co-curricular deals with student organizations like the solar cars, the society of automotive engineers or the steel bridge team."

"Then we also have that third tier, and that's extracurricular. It doesn't have anything to do with the class or a student organization, but really just freeform design. I think that this space will allow for that kind of activity as well," he said.

The facility bridges the design and engineering disciplines, but will also provide a space to work for students of other majors. "The building is an open invitation for every major in the university to come and participate," Rico-Gutierrez said.

This emphasis on interdisciplinary cooperation can lead to students learning practical skills about teamwork in the real world. "That's the value. You get people from design and engineering working on the same problem but coming at it from a really different perspective, and bringing their skill sets and thought processes to bear on the project," Mirka said.

Rico-Gutierrez said big businesses like Boeing or Apple bring design, technology and science together to create a better quality of life for people. The colleges worked with Chicago-based company Cannon Design to flesh out the concept of the building.

## lowa State freshmen build multidisciplinary research, 3-D printing technology experience



Three freshman honors students used 3-D printing technology and more to conduct structural engineering research with Simon Laflamme, assistant professor of civil, construction and environmental engineering at Iowa State University.

Students involved in the project were mechanical engineering freshman Heather Murphy, preindustrial design freshman Derek Coulter, and industrial engineering freshman Connor Theisen. They participated in a project that the National Science Foundation awarded Laflamme in 2013. Students fabricated structural parts using a 3D printer, a process that would otherwise be very expensive and difficult using conventional

fabrication methods. In particular, structural parts, like the passive damping element pictured above, have been designed to reduce vibrations in buildings.

Each undergraduate student in Laflamme's group was involved with all of the components of research: from thinking to analysis of data and reporting. "This way, they got a good idea of what is expected in the world of research," Laflamme said. "Students learned to work in a group, how to communicate results, and to develop an intellectual curiosity."

Coulter said his expectations were "shattered" while conducting the research experience. "The experience to design something real so early is something that will give me an edge as I move on in college and into a career of designing products," he said.

Laflamme's students took advantage of the Iowa State University First-Year Honors Mentor Program. This program partners faculty mentors with Iowa State honors students to experience research first-hand. "We involve college freshmen to provide them with an opportunity to get a valuable research experience," Laflamme said. "They are also highly encouraged to bring creative solutions to the table, which empowers them with great problem management skills."

#### Meet our new faculty — who conduct research with students!



**Dr. Ashley Buss**, assistant professor in geotechnical/materials engineering

Dr. Buss is an Iowa native, Iowa State graduate, and passionate researcher of sustainable pavement practices. In 1999 she and her Volga, Iowa, community experienced major flooding. The engineering response to flood recovery and infrastructure rebuilding inspired her to pursue a civil engineering career. She was hired in August 2015 and is eager to work with students! Contact Dr. Buss today at abuss@iastate.edu.



#### Dr. Kaoru lkuma, assistant professor in environmental engineering

Dr. Ikuma was inspired by the 1995 Hanshin, Japan, earthquake to pursue a career in environmental engineering and water resources. She is a graduate of Duke University of Virginia Polytechnic and State University. At Iowa State she combines environmental biology and engineering to explore how to best use microbes to remove contaminants from water. Dr. Ikuma was hired in August 2015 and is eager to work with students! Contact Dr. Ikuma today at kikuma@iastate.edu.

## Federal Highway Administration awards top graduate fellowship to Iowa State students

Iowa State University's civil engineering program recently attracted two exceptional graduate students as Dwight David Eisenhower Graduate Fellows, a national graduate student award that the Federal Highway Administration (FHWA) sponsors.

Ellen Nightingale and Patricia Thompson, both master's students in civil engineering, bring a wealth of experience to Iowa State's transportation engineering research program. Each student pursues research under the direction of Peter Savolainen, associate professor of civil, construction and environmental engineering at Iowa State.



The fellowship grants Nightingale \$31,500, which

goes toward tuition, a stipend and travel to the Transportation Research Board (TRB) Annual Meeting in Washington, D.C. At the national conference she will present research about high-tension cable barriers on Iowa's highways – a project that partners CCEE with the Iowa Department of Transportation (Iowa DOT). "Iowa State's strong faculty-student mentoring style really attracted me to this research opportunity," Nightingale said.

Thompson has received \$11,500 and also will travel to the TRB Annual Meeting. She will present research on the development of crash prediction models for urban road segments in a project sponsored by the Michigan Department of Transportation (MDOT). These models will be used by MDOT as part of its continuing safety planning process, allowing for the proactive identification of promising candidate locations for safety improvements. "This research will allow me to further explore the transportation engineering field that I've become acquainted with through practical experiences," Thompson said.

Both Nightingale and Thompson graduated from Michigan Technological University in May 2015. Each student excelled in academics, internships, and community service. Nightingale was active in Chi Epsilon (civil engineering honor society), Tau Beta Pi (engineering honor society), and the MDOT Transportation and Civil Engineering Program. Thompson also participated in Chi Epsilon and Tau Beta Pi while pursuing industry internships, math tutoring, and leadership in the Society of Women Engineers.

FHWA's Dwight David Eisenhower Transportation Fellowship Program advances the transportation workforce by attracting the brightest minds to the field through education, research, and workforce development. In addition to the Eisenhower Graduate Fellowship, the program offers seven fellowship programs to top transportation-related students in Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), and community colleges.

#### Discover what student researchers can do!

#### Lauren Schwab, master's student in environmental engineering

As a graduate student, Schwab enjoys roles as both student and teacher. During summer 2015, she mentored Hoover High School (Des Moines, Iowa) student Diana Rodriguez on environmental engineering research. Together they learned about how river flow velocity can be measured and how those measurements apply to the spread of river contaminants. "I enjoyed teaching Diana in ways she could comprehend at a graduate level," Schwab said.



### Interns help build Jack Trice Stadium South End Zone

A civil engineering and a construction engineering student gained valuable professional experience in building the Jack Trice Stadium South End Zone one of Iowa State's most prolific campus construction projects.

Kristen Larsen, a spring 2015 civil engineering graduate, interned for The Weitz Company. "I helped make changes to electronic plans online so all contractors had the most up-to-date information on site and in the office," Larsen said.

Lucas Baxter, a spring 2015 construction engineering graduate, interned for Baker Electric. In his role he utilized virtual design and construction programs to



visualize construction, in 3-D form, before it was built. "A lot of the scheduling and pull-planning concepts we learned in Larry Cormicle's class applied to coordinating with all the trades on this construction project," Baxter said.

Internships and co-ops are a crucial part of an Iowa State student's career. Most civil and construction engineering students pursue more than one internship during their Iowa State careers, which demonstrates commitment to learning beyond the classroom in different, real-world environments.

## lowa State construction engineering students apply theory to electrical boards

Thirty-nine students, divided into seven teams, compile power drills, load centers, pull wire, screws, circuit breakers, and light bulbs to assemble them onto 2-by-4-foot plywood boards. They build scaled-down building electrical systems an exciting project in CON E 353, the electrical systems for building course in Iowa State University's construction engineering program.

Jenny Baker, a senior lecturer in the civil, construction and environmental engineering department, introduced the electrical board project to her course this past spring. "Students have a blast installing components based on theory and drawn system plans that we discuss," Baker said.



In CON E 353, students learn about theory of building electrical systems and then apply that theory to hands-on electrical board demonstrations. "The underlying objective is to have a better understanding of different voltages and how they work, including when you need what wires to be connected to which phases," Baker said.

Joe Hahn, a spring 2015 construction engineering graduate, helped prepare each of the eight boards that students groups used. "You can only learn so much from a book," Hahn said. "This project helped me understand electrical systems from a field, non-lecture point-of-view." Electrical companies donated a total of \$7,500 in materials for the boards, including 3E, Baker Electric, Commonwealth Electric, and Square D by Schneider Electric.