

# IOWA ENGINEER



THE UNIVERSITY OF IOWA COLLEGE OF ENGINEERING

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Where robots rule,  
Iowa takes the flag

## Enhancing the Future: K-12 Outreach and Creative Engineers

At the University of Iowa College of Engineering we are continuously striving to find ways to better serve Iowa, the nation, and the world. In this issue of *Iowa Engineer* we highlight two developments that have arisen from this focus on enhancing the future: K-12 outreach, and collaborations with the arts. The goal of our K-12 outreach program is to inspire our youth to consider their possible future as engineers by showing them that the creative design process is fun, engaging, and rewarding. The FIRST Tech Challenge program described in this issue is one great example of an effective outreach program that contains all of these elements. Thanks to a partnership including the UI College of Engineering, Rockwell Collins, and the Iowa Governor's STEM Initiative, the program has exploded in the state of Iowa, growing from 2 teams in 2009 to more than 200 teams this year. The national exposure that we have received for



this impressive growth has convinced people across the country that something special is happening in Iowa. The focus on the arts has arisen from our continuous effort to be the best at educating engineers who will thrive in the 21st century. In addition to the rigorous technical content in our very challenging curriculum, we emphasize the 21st century skills of communication, teamwork, leadership, entrepreneurship, global awareness, and creativity. Our recognition that engineers can benefit from understanding and exploring creativity in the arts has inspired our creation of the Virginia A. Myers Nexus of Engineering and Art. The director of the Nexus, Deanne Wortman, is an artist with a BFA and two MFAs, and her interactions and engagement with our students have already borne fruit, as described in the article in this issue. The Nexus would not have been possible without the generosity of the alumni and friends who were inspired by this vision for the importance of creativity for future engineers, and I am sure that in the coming decades the Nexus will lead to creative collaborations that we can only begin to imagine.

Alec Scranton  
Dean of Engineering

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# FIRST

*FTC encourages students to work with adult mentors. Carl Gloe (left) is a Rockwell Collins employee who has mentored and volunteered with FIRST for over a decade.*



# ST to the future

TEXT BY SUSAN SHULLAW

*Building self-confidence, knowledge, life skills ... and robots.*

Looking like weird mash-ups of Erector sets and cell phone parts, the little robots spin and whirl furiously across the 12- by 12-foot mat, advancing, colliding, reversing and charging forward as their ungainly arms grasp at whiffle balls that keep rolling out of reach.

Around the perimeter of the mat, the robots' creators – girls and boys in their mid to late teens – control the robots' movements while shouting directions and encouragement. Just beyond the competition floor, hundreds of friends, family members, coaches and sponsors leap and cheer for their teams. The excitement is intense and the noise is deafening.

But listen carefully, and you can hear futures being born.

Welcome to FIRST Tech Challenge.

Founded in 1989 by inventor Dean Kamen, FIRST – For Inspiration and Recognition of Science and Technology – has launched a variety of programs, including the FIRST LEGO League competition and FIRST Tech Challenge (FTC). All are designed to motivate young people to pursue education and career opportunities in STEM fields (science, technology, engineering, mathematics) while building self-confidence, knowledge and life skills.

One of FIRST's most distinctive features is its embrace "Gracious Professionalism®," coined by Dr. Woodie Flowers, FIRST Distinguished Advisor and Pappalardo Professor Emeritus of Mechanical Engineering at MIT. Gracious professionals learn and compete like crazy, Flowers has said, but treat one another with respect and kindness in the process, achieving a comfortable blend of knowledge, competition and empathy.



*FTC brings students together and encourages them to strategize. A team from Linn-Mar High School, "Lost in Time," works with "Oriental Pearl," a team from China.*

In other words, FIRST attracts young participants whose talents and training are well suited for the UI College of Engineering and for companies eager to hire its graduates. One of those companies, Rockwell Collins, is among FIRST's national sponsors. Rockwell Collins also happens to be a major corporate partner of the UI College of Engineering. Rebecca Whitaker, who directs the college's FIRST Tech Challenge program, connects the dots.

"In 2009, Rockwell Collins approached the college about becoming the state's first official FTC affiliate organization," she explains. "Back then there were

only two FTC teams in Iowa – in Solon and Sioux City – and they had to travel to nearby states to participate in competition. I was directing the college's K-12 outreach programs at the time, and FTC seemed like a perfect fit for the work we were already doing with elementary and secondary schools around the state."

## COMPETITION AND COORDINATION

With the help of generous grant funding from Rockwell Collins, as well as corporate partners including John Deere and MidAmerican Energy Company, the College of Engineering became an FTC affiliate – and quickly emerged as one of the top



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programs in the nation. From two teams in 2009, Iowa today is fielding 210 teams involving more than 2,100 young people from across the state.

For the third year in a row – beating out contenders like Chicago, Detroit, St. Louis and Minneapolis – Iowa will be hosting FTC’s North Super Regional Competition, which will bring 72 teams from 13 states to the U.S. Cellular Center in Cedar Rapids in March 2016. Iowa’s performance so impressed FIRST founder Dean Kamen that he sent a congratulatory video message in 2012, declaring “Iowa, you’re first!”

The FTC season begins in May with the start of team registration, and concludes the following April with the FTC World Championship. FTC kickoff events are held in September, when the game itself is revealed to teams worldwide. This year, the game is called “Res-Q,” requiring the robots to pick up various forms of debris (small balls and blocks), drop them in baskets, climb a ramp and hang from a bar at the top of the ramp. Following the kickoff, teams get busy designing, building, programming and testing their robots. Tournament season runs from November through February.

“We use a league competition system, where a dozen or so local teams compete several times before moving up to the next level, which in this case is the FTC league championship,” Whitaker says. “That’s where we learn which teams will advance. We have 85 meets across the state, followed by nine league championships, and all will feed into the Iowa championship held in Coralville in March.

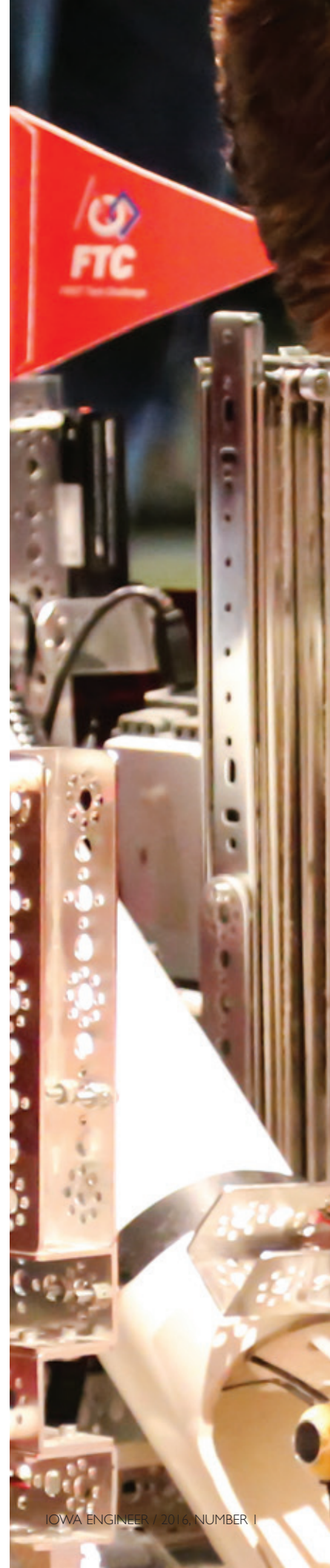
“Teams average about 12 members from grades 7-12,” she continues. “The competitions are really fun and I get a little crazy, dye my hair green, that sort of thing. The students always remember me!”

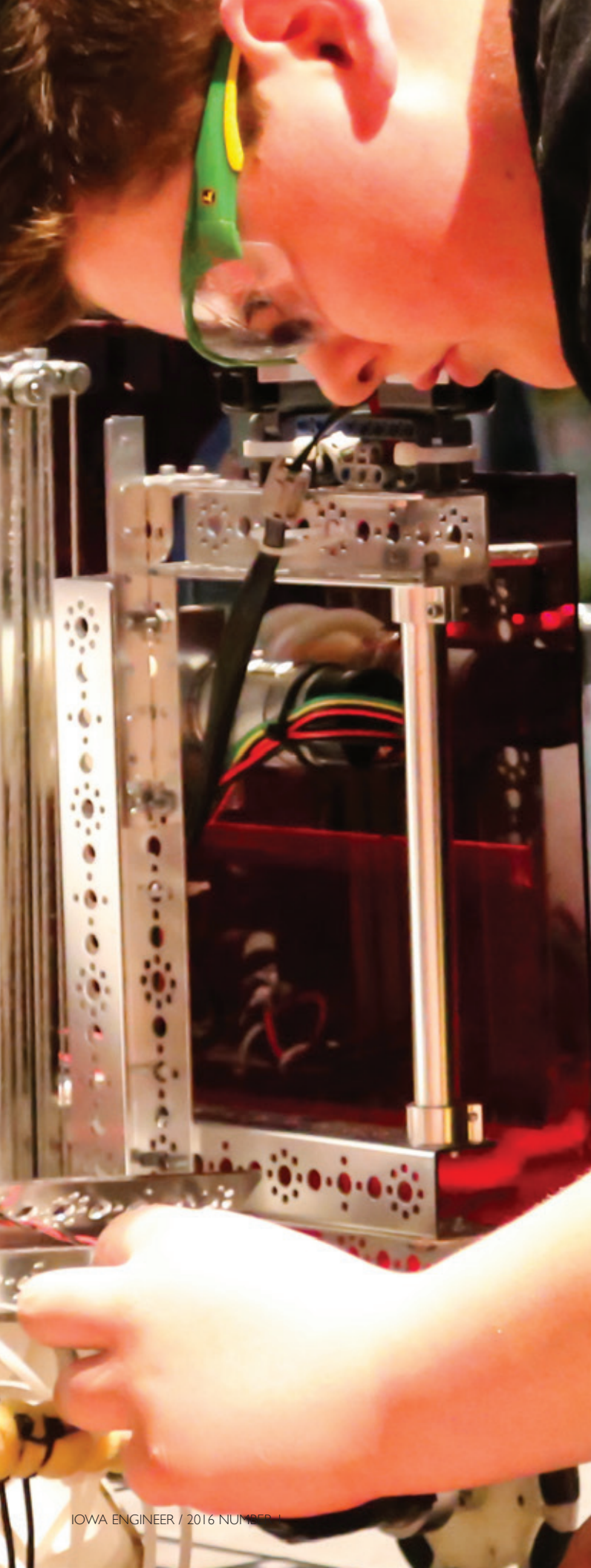
Green hair aside, the students likely remember Whitaker and the College of Engineering for the wide-ranging support they provide to FTC participants, including coordination of some 250 volunteers, from referees and judges to robot instructors. The college also helps facilitate corporate grants and hosts professional development sessions for team coaches.

## **STEM STEPS FORWARD**

Equally impressive, the college’s FTC efforts have received significant funding for the past four years through the Iowa Governor’s STEM Initiative – \$45,000 this year alone, reports Whitaker. “To my knowledge no other state supports FTC programs at this level,” she says, “and in our case, John Deere, Rockwell Collins and MidAmerican will match those funds. With help from the state and our corporate partners, no team should have to face financial obstacles.”

Given the college’s deep involvement in FTC competition, many FTC participants look toward the UI as they begin their college search. Although precise numbers aren’t available, Whitaker is certain that FTC is having a positive impact on the college’s admissions numbers. She hosts a welcome-to-school gathering for FTC alumni at the start of the fall semester, and reports that 35 students attended this year’s event.





Devon Zimmerman of Sioux City is one of those FTC alumni and a member of what you might call a FIRST family. His older sister was part of a 4H FIRST LEGO League team for several years, his parents were league coaches and Devon joined an FTC team during his sophomore year in high school. Now, as a College of Engineering freshman, he's serving as a team mentor. "I really enjoyed FTC competition and just wanted to stay involved," he says. "It definitely helps instill better thinking and communication skills."

For Rebecca Whitaker, FTC offers obvious benefits for the state, the college and individual students, and the program is professionally rewarding as well. But there's a more personal side to her involvement. "My son is 8 and my daughter is 10, and both are on FIRST LEGO League teams," she says. "Their exposure to FIRST competition is a great way to underscore what I tell them all the time: Just go for it. You can do anything you want to do."



*Top: FIRST is more than robots — it's giving back to the community and reaching out to young people*

*Left and above: Students dedicate a lot of time and effort for their robots.*

TEXT BY JEAN FLORMAN

# Crescendo

BUILDING TO A

When the new Voxman Music Building opens in fall 2017, it's a good bet that guests at the inaugural concert will spot Robert Campbell (BSEE '86): He will be the one staring at the Concert Hall ceiling.



The image shows a large, modern concert hall. The ceiling is a prominent feature, with a complex, angular, perforated design that allows light to filter through, creating a starburst pattern. The walls are made of light-colored wood panels. In the foreground, the audience is seated in dark chairs, looking towards the stage. On the stage, an orchestra is performing, with various instruments visible. The overall atmosphere is one of a high-quality, contemporary performing arts center.

# Concerto

As the theatre planner for the \$152 million, 189,289 square-foot building—new home to the UI School of Music performance, teaching, and studio spaces—Campbell has spent the last three years studying proposals, programs, renderings, blueprints, 3D-CAD drawings, surfaces, materials, spans, angles, and joints. But he says when the building is complete, it is the ceiling of the 750-seat Concert Hall that will capture his eye because it will epitomize the whole of the project and the people who have made it happen.

“The ceiling in any performing arts center is complicated,” says Campbell, Associate Principal of the theatre planning design firm Fisher Dachs Associates (FDA) and theatre designer for the new University of Iowa music building. “But the ceiling in the main Concert Hall posed some special challenges because the acoustics require sound to reflect back to the stage—the musicians—as well as to the audience.”

While guests may notice the interesting design of the ceiling, with its angular open-



“Those triangle openings aren’t simply empty space; they accommodate airflow, stage equipment, concert lighting, and, of course, acoustics.”

ROBERT CAMPBELL (BSEE '86)

ings scattered across the expansive space, Campbell will see a functional but visually striking element that represents years of teamwork by the designers and builders who have worked to create an architectural feature that supports the acoustical, lighting, mechanical, and structural systems so critically important to the overall success of the concert hall and the building.

“It will be a lot more than just a ceiling, and even more than a ceiling in a typical concert hall,” says Campbell, who earned a BSE degree in electrical engineering from the University of Iowa in 1986. “Those triangular openings aren’t simply empty space; they are there for a reason—to seamlessly accommodate airflow, stage equipment, concert lighting, and, of course, acoustics, and to still look great.”

Campbell’s educational background and life experience have engendered a special appreciation for the importance of both good design in theatre and the theatricality of good design. During his high school years in Wilmette, IL, he discovered a passion not only for designing theatre sets and lighting but also for tearing apart—and, he adds, putting back together—radios, TVs, and electronics. When he learned that Iowa offered excellent educational opportunities in both engineering and theatre, he jumped at the chance to attend college in Iowa City.

“I knew before I came to the UI that I wanted to pursue electrical engineering,” Campbell says. “And the College of Engineering also gave me the opportunity to take elective classes in the Theatre Department, which had recently completed construction of the new Theatre Building and offered an excellent theatre design program directed by David Thayer.”

In addition, Jon Kuhl had just begun a new computer engineering program within the electrical engineering department, so Campbell says “Iowa offered the best of everything for me—an excellent program in engineering with an emphasis on computer science and excellent theatre arts.”

After finishing his undergraduate degree, Campbell remained in Iowa City to take additional graduate courses in theatre design and to work on sound and lighting for productions in the old Voxman Music Building, University Theatres, and Hancher Auditorium.

In 1987 he left Iowa City to earn a Master of Fine Arts degree in theatre design and planning from the Yale School of Drama (1990); he then joined the international theatre design firm, Fisher Dachs Associates, Theatre Planning and Design in New York City.



*A prototype of a ceiling panel.*



*Renderings of the outside and inside of the new building. Renderings and ceiling element photo courtesy of LMN Architects.*

For more than three decades, he has served as designer and project manager for some of the most renowned performing arts centers in the world, including the Montreal Symphony Center, New York City Center, and Washington D.C.'s iconic Arena Stage, whose dramatic \$125 million design transformation Campbell directed.

He also has been instrumental in making FDA become the go-to firm for the design and renovation of major university performing arts centers. His early years working in the classroom, rehearsal, and performance spaces of the old Voxman Music Building, Hancher, and University Theatres have proven to be particularly important for his understanding of how to optimize the planning, design, and construction of teaching, rehearsal, and performance spaces in academic institutions around the world, including the University of Iowa's new Voxman Music Building in Iowa City.

"I learned a lot about what doesn't work in performing arts buildings during the years I worked as a student and recent alum in the old building," Campbell says. While acknowledging the loss felt by School of Music and community members when the old building and much of its contents were destroyed by the 2008 flood, he notes that "the old building had no passenger elevator, and instruments had to be brought to the second floor via the freight elevator at the Hancher loading dock."

As it rises on the Iowa City bluff east of the Iowa River, the stunning new Voxman Building attests to the fact that Campbell has applied the lessons he learned as a young UI engineer and theatre technician. He has been particularly keen on getting input from UI music school faculty, staff, and students. As a result, unlike the previous building, the new Voxman will provide a student commons, plenty of places for students to "plug in," and what Campbell calls "found spaces"—areas that students and others can spontaneously "make their own" to read, work, and perform, individually or together.

Campbell has managed the Voxman project through three stages, starting with facilitating conversations with School of Music students, faculty, and staff, UI administrators, community members, stage agencies, architects, and building engineers. As those wide-ranging discussions about the building location and user needs continued, the concept and design stages began. The new facility project design includes four major performance spaces: a 700-seat Concert Hall, a 220-seat Recital Hall, an Organ Recital Room, and Opera and Chamber Music Rehearsal Rooms. With members of the lead architectural firm LMN Architects from Seattle and Neumann Monson Architects

of Iowa City, Campbell has particularly attended to traffic flow into and through the building, prominently situating the main entrance at the corner of Burlington and Clinton Streets, planning wide corridors that will facilitate easy movement of people and instruments, and distinguishing public performance spaces and behind-the-scenes rehearsal, teaching, and office spaces.

"It's critical, for instance, to situate the percussion studio close to and on the same level as the concert hall stage and large rehearsal rooms in the building," he says.

Although to the untrained eye certain aspects of the project may appear obvious, building a performing arts structure is anything but simple. In fact, Campbell says that with the exception of hospitals, no other type of building presents such complex design and construction challenges as academic performing arts structures.

"In Voxman the concert hall itself is 128' long, 75' wide and over 45' tall with no internal structural support," he says. "The area above the stage must support tons of stage equipment and quiet air supply ducting, and the auditorium must have the capacity for catwalks and concert lighting anywhere over the space—all without impediments to sight-lines and with superb acoustics. And in a venue like Voxman, there can be as many as 600 dimmed lighting circuits."

To add to the complexity of this kind of work, some FDA performing arts centers are built to do more than serve traditional functions. Among Campbell's recent projects are venues whose main level seating systems are designed to be mechanically removed from the auditoriums quickly so the rooms can transform from performance spaces into large flat-floor event spaces in a matter of minutes.

Campbell says that while each project presents its own special challenges, the Voxman effort has been unusually problem-free.

"It's also been an awful lot of fun," he says, not only because of the "complex features of the design" but also because the architects, engineers, builders, technicians, University faculty, staff, and students, and community members have worked so well together as a team.

"It's been a fantastic experience to work on a project that has everything to do with the school, especially the students," Campbell says. "We expect to make this building work well for faculty, visitors, and especially for students a hundred years from now.

"And not only that, it's my alma mater. For me, that's the icing on the cake."



THE  
NEXUS  
OF

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*Artineers study structure  
using origami.*

# Engineering

# ART

**E**ngineer, artist, sculptor and more—that was Leonardo da Vinci, Renaissance genius.

Engineer, artist, furniture designer and more—that is Alex Zeppieri, 2015 University of Iowa graduate who is currently employed by a Chicago engineering firm. Having graduated with a civil engineering major and art minor, Zeppieri could be viewed as something of a modern-day “Renaissance engineer.”

And thanks to a new curriculum requirement, virtually all UI College of Engineering students soon will graduate as “Renaissance engineers.”

Beginning with the fall 2015 semester, all entering first-year undergraduate students have begun meeting a new faculty-endorsed requirement to take at least three semester hours in the arts. The range of courses available to students includes painting, dance, theater and many other activities not usually associated with engineering.

Why combine engineering and the arts?

“There is great interest from the arts faculty and students to engage with our college,” says Professor and Associate Dean for Academic Programs Keri Hornbuckle.

“And there has never been a time when our approach, ‘Educating the Engineer and Something More,’ has had more potential for impact,” says Hornbuckle, noting that engineers are increasingly viewed as cultural leaders, as well as technological leaders.

Although several universities have initiated collaborations between engineering and the arts—such as the University of Michigan’s “ArtsEngine”—at least one new UI program is

ground-breaking in visualizing how the two disciplines are related.

The new UI program, called “The Virginia A. Myers Nexus of Engineering and Art,” is an idea, as well as a place for ideas, says Nexus Director Deanne Wortman, who also serves as Adjunct Assistant Professor in Printmaking-Foil Imaging in the UI School of Art and Art History.

She says the word “nexus” is Greek for bridge and adds, “I’m the ‘x’—I’m at the center—of the Nexus.”

She notes that the program is named for Myers—Professor Emeritus of Printmaking in Art and Art History, famed printmaker and inventor of the Iowa Foil Printer that enables artists to blend gold leaf and foil into their compositions. Wortman, who studied under Myers, says she has followed a long and circuitous path to become the director of something she calls “a really interesting experiment.”

She grew up in Minnesota. But only after her father—a returning GI on the GI bill who graduated from Iowa with an MFA (master of fine arts) degree in painting and printmaking—had moved the family to Northfield, Minnesota and started the print department at Carlton College.

Wortman attended the UI as a freshman in 1961, met her husband, Jack, and got married. After her husband passed the required federal exam, he went to work for NASA in League City, Texas, where they spent three years rubbing shoulders with astronauts.

The family returned to Iowa to continue their educations and enjoy the experience of having their children grow up in Iowa. She says that her husband completed his master’s



*Artineer Bailey Banach uses a 3D scanner to create prosthetic fingers.*

*Right: Banach and Nexus Director Deanne Wortman.*

*“I tell my students:  
‘Tell me you’re  
curious—ask how,  
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because curiosity is  
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What if Leonardo da  
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*NEXUS DIRECTOR  
DEANNE WORTMAN*

degree in history and she—finally in 1998—completed a master’s degree in drawing and an MFA in intermedia arts, all while driving a city bus and working in the Iowa City Public Library in the Children’s Room.

She says: “They finally said ‘You have to graduate,’ and I said ‘Why?’”

Wortman describes her new position as an opportunity to bring art students and engineers together in a place where engineering students can participate in art classes as they earn their degrees. But she also views the nexus of engineering and art as more than a chance to broaden the engineering curriculum.

“The director of the NEA (National Endowment for the Arts) told me that about four percent of the U.S. GDP (gross domestic product) comes from the arts,” she says.

In order to promote the Nexus, she has invited engineering and art students to visit her second-floor office in the Seamans Center for the Engineering Arts and Sciences. Once there, the students are invited to join something she calls the Nexus Club.

Wortman says the new Nexus Club is for “Artineers”—a term she says she invented to describe engineers interested in art, artists interested in engineering and other folks involved in engineering and the arts.

“Participants design and create new products, processes or devices that solve problems in society,” she says. “If the door is open the Nexus is open.”

Wortman says that activities will include musical jam sessions, hot-stamped foil workshops, a “Global Crochet Coral Reef reefer’s group,” an art events information board and field trips to such locations as the UI Studio Arts Building, UI Museum Of Art, UI Center For The Book and the UI Woodworkers Workshop.

Her proposed group creations include: a year-end Artineer’s Journal of writings, pictures, interviews and projects; a designer and engineer collaboration in a logo contest; a giant marble machine; hot-stamped holiday card workshops; paper engineering pop-up book workshops; and “anything else the Artineers think up.”

“When the College of Engineering asked me to be a bridge between engineering and art, I said, ‘That’s curious.’ I like to take meandering paths in life. Usually when we go on a family trip, we take the longest route possible.”

She suggests that learning how to incorporate foil-printing in a work of art is just such a circuitous skill.

“You must understand a multitude of things, including chemistry, metals, printing processes, paper composition and more.” she says.





*Right: Virginia Anne Myers,  
May 8, 1927 - December 7, 2015*

*Below: Toy vehicles are dipped in  
paint, and their wheels used to  
create images.*



Other Nexus-related activities include:

- Associate Professor of Chemical and Biochemical Engineering Julie Jessop will assist students in creating entries in the 2016 RadTech International poster competition. (RadTech is a non-profit organization promoting the use of ultraviolet and electron beam technologies in industry to save energy and reduce pollution.) UI students won first place and second place awards in the 2012 RadTech poster competition.
- Professor of Metal Arts and 3D Design in the School of Art and Art History Steve McGuire will continue to offer his five-year-old handmade bicycle course to both engineering and art students. He says that many of the more than 70 students who have taken the course have gone on to become engineers and craftsmen in the bicycle industry. He also notes that the UI was the first academic institution selected to exhibit student work at the prestigious North American Hand Built Bicycle Show.
- Associate Professor of Art and Art History Monica Correia will continue to teach a course she has taught for about six years in which students design and construct furniture, some of it award-winning. She notes that she always has students design a chair first because every office has a chair. Because the project calls for students to accommodate the shape of the body to a physical design, the project calls for a blend of ergonomics and aesthetics, she says.
- Assistant Professor of Art and Art History Daniel Miller will teach a course called Introduction to Robotic Art Studio in which students investigate elements involved in integrating robotic systems with art. Robotics will be paired with such elements as light, sound, wearable technology and many other things.

Artineer Bailey Banach of Ames, Iowa, a senior majoring in biomedical engineering, says that her experience in the Nexus program has enhanced her engineering skills. Her engineering senior design project—involving the use of a 3D scanner to scan the hands of a man who is missing portions of his fingers—is an attempt to create prosthetic fingers.

As a Nexus student, she also uses the 3D scanner in concert with Marta Nagy, Professor at University of Pécs, Hungary and Fulbright Scholar, to scan and help design ceramics.



“Working with Marta has made me understand the bridge between art and engineering. It took me years to understand the link; you can’t have one without the other,” says Banach, whose father is Hawkeye Athletic Hall of Fame Wrestler Ed Banach.

Marta says her work in the Nexus has advanced her personal project, “The Future of Ceramics.”

“The art of ceramics has long followed traditional ways, but this is the start of a new era,” she says. “The technology of 3D scanning has not really been used to its best advantage in ceramics. I want to research the limits of 3D scanning and use the machine to create new partners in design.”

How does Virginia A. Myers react to the program that bears her name? She says, proudly, “First of all, it was an immense shock to learn of it. This, out of the clear, blue sky! I have such enormous respect for Dean Alec Scranton and the College of Engineering.”

In summary and from an engineering perspective, the UI blending of engineering and the arts is a logical, “hands-on” part of the UI engineering curriculum.

Dean Scranton says the three-semester-hour requirement is an extension of many activities already in place that help to make UI engineers well-rounded engineers.

“In addition to providing a rigorous undergraduate engineering education, the college has long focused on key non-technical areas to help enhance a student’s academic experience. This includes leadership, global awareness, teamwork, communications, entrepreneurship, and creativity,” Scranton says.

“The engineering profession is an inherently creative endeavor in which engineers design and create new products, processes, or devices that solve problems in society and enhance the quality of life for humankind. When engineers and artists work together they can achieve especially impressive outcomes,” he says.

As for Wortman: “I tell my students: ‘Tell me you’re curious—ask how, why and why not—because curiosity is a valuable concept,’” she says. “What if Leonardo da Vinci had not been curious? Leonardo was both an artist and engineer, and people like that should be our models.”



## Engineering Faculty Members Help Drive Informatics Initiative

Seventeen members of the College of Engineering faculty have become associated with the University of Iowa's Informatics Initiative.

Directing the initiative is Greg Carmichael, Karl Kammermeyer Professor of Chemical and Biochemical Engineering.

Engineering faculty members who are now associated with the initiative include Joe Assouline, Er-Wei Bai, Terry Braun, Tom Casavant, Hans Johnson, Dave Kristensen, Andrew Kusiak, Amaury Lendasse, Tim Mattes, Priya Pennathur, Joe Reinhardt, Mike Schnieders, Milan Sonka, Charles Stanier, Fatima Toor, and Gabriele Villarini.

"The Iowa Informatics Initiative is a bold, campus-wide initiative designed to foster new collaborations to open new research and scholarship opportunities across campus from health care to digital arts and humanities, and to educate and train the next generation workforce with the skills to transform information into knowledge and actions," according to Carmichael.

"The Informatics Initiative is designed to strengthen the research and training capacities of these centers and clusters by adding new faculty with foundational and domain expertise, and to enhance the professional staff infrastructure to better support informatics activities and maximize the effective use of campus wide informatics resources," he added.

An Informatics Task Force was organized in the spring of 2013 with the charge of developing a comprehensive and cohesive action plan that strengthens informatics education, training, research and collaborative support at the University of Iowa. The task force found existing strengths in informatics-related educational and research in a number of areas distributed across campus. In addition, institutional strengths in the underlying infrastructure necessary to support informatics teaching and research were identified including a state-of-the-art data center and recent investments in the Helium/Neon computer systems.

## Student Recognition

**Meeshanthini Dogan**, PhD student in biomedical engineering, received the outstanding graduate student achievement award in biomedical engineering - second place. She has two papers accepted for publication in *Child Development* and *Frontiers in Psychology*.

**Alzuebeir Elsheikh**, undergraduate student in biomedical engineering, received the Alliant Energy/Erroll B. Davis Jr. Achievement Award. The award recognizes academic achievement in engineering or business administration, leadership in campus and community organizations, and potential for future career success.

**Megan Helms**, sophomore majoring in biomedical engineering, received a research fellowship from the Iowa Center for Research by Undergraduates to work in Dr. Arlene Drack's ophthalmology lab on a project related to albinism.

**Gohar Manzar**, graduate student in biomedical engineering, received numerous awards including: Young Investigator Award for the American Transplant Congress, Most Outstanding Poster at the Institute for Clinical and Translational Science 2015 Research Week, 3rd place at Carver College of Medicine Health Sciences Research Week Scientific Humor Contest, Best Poster in BME at Research Open House, and a Graduate Student Senate Travel Fund Award.

**Greg Ongie**, graduate student in Professor Mathews Jacob's lab, received Best Paper Award at the 2015 International Symposium on Biomedical Imaging (ISBI). Ongie and Jacob are also associated with the Iowa Institute for Biomedical Imaging.

**Michelle Riedlinger**, senior majoring in civil engineering, received the 2015 American Society of Civil Engineering (ASCE) Student Leadership Award. She is an undergraduate research assistant at IIHR—Hydroscience & Engineering, a College of Engineering student ambassador, president of the UI student chapter of ASCE and captain of the ASCE concrete canoe project.

**Lauren Schutz**, junior, is double majoring in biomedical engineering and dance. She interned in summer 2015 at the Harkness Center for Dance Injury in New York.

**Negin Sobhani**, graduate student in chemical and biochemical engineering, received first prize for her research poster entitled "Performance Analysis, Profiling and Optimization of Weather Research and Forecasting (WRF) Model" at the 2015 Rocky Mountain Advanced Computing Consortium High Performance Computing Symposium held August 13-15 at the University of Colorado.

Six Engineering students have been named to the 2015 Big Ten Academic All-Conference Team: **Cole Fisher** (football) senior, civil engineering; **Aubree Larson** (women's soccer), freshman, industrial engineering; **Sarah Mazur** (women's soccer), senior, electrical engineering; **Katharine Woodruff** (women's soccer), sophomore, industrial engineering; **Anthony Gregorio** (men's cross country), senior, mechanical engineering; and **Taylor Soltys** (men's cross country), junior, chemical engineering.

**Molly Berringer, Alexis N. Miller,** and **Kazra Zarei**, all biomedical engineering majors, **Douglas Linder**, electrical and computer engineering major, and **Daniel Davies**, chemical engineering major, were named 2015-2016 Tau Beta Pi Scholars. Scholarships are given on the competitive basis of scholarship, campus leadership and service and promise of contributions to the engineering profession, with consideration given to economic need and academic commitment.

**Robert Hart**, graduate student in mechanical engineering, won first prize at the Student Simulation Challenge at the American Society for Composites 30th Annual Conference held at Michigan State University. Hart is a SMART fellow working in collaboration with the U.S. Army Tank and Automotive Research and Development Engineering Center.

**Yin Yu**, graduate student, received the 2015 International Cartilage Repair Society Scientific Presentation Prize - Magna Cum Laude, along with a scholarship. Yu received the Young Investigator Award at the 2015 World Congress on Osteoarthritis. His bioactive research has been featured in *Science Daily* and *EurekAlert*. Yu also won the John Pappajohn Entrepreneurial Center Business Model Competition with team members **Jaision Marks**, undergraduate majoring in biomedical engineering, and **Xutong Guo**. He also received the outstanding graduate student achievement award in biomedical engineering - first place.



The AIChE student chapter was recognized at the Annual Student conference held November 6-9 in Salt Lake City, UT. University of Iowa was recognized with the Jack Wehman SACHe Team Design Award. Team members were **Ian Armstrong**, **Catherine Suchanek**, and **Austin Hangartner**. Ian attended the meeting to accept the award. This is the top award given for safety in design. This is the 5th consecutive year that the University of Iowa has won at least one safety in design award.

The University of Iowa ChemE Jeopardy Team took second place in this year's competition. Members of the team were **Zach Behrendt**, **Matt Johnson**, **Daniel Davies** and Nathan **Schuchert**. This is the fourth consecutive year that the University of Iowa has been in the finals: 2nd place in 2012 and 1st place in both 2013 and 2014. **David Murhammer** serves as chair of the competition. The UI Student Chapter was recognized for the 11th straight year (and 22 out of the last 23 years) as an outstanding student chapter. The award is given to the top 10% of student chapters in the United States.

## Appointments

The UI Public Policy Center announced that **David Cwiertny**, associate professor of civil and environmental engineering and a core faculty member in the campus wide Water Sustainability Initiative, is the new director of the Environmental Policy Research Program.

**Gregory H. LeFevre** has been appointed assistant professor of civil and environmental engineering and assistant faculty research engineer at IIHR—Hydroscience & Engineering. His special fields of knowledge include fundamental mechanisms related to the microbial and vegetative biotransformation of emerging contaminants in aquatic environments. He received his PhD in environmental engineering from Stanford University in 2012, an MS degree in environmental engineering from the University of Minnesota in 2009 and a BS degree in environmental engineering from Michigan Technological University in 2006.

**Sarah Vigmostad**, associate professor of biomedical engineering, associate faculty research engineer at IIHR—Hydroscience & Engineering, and researcher at the Iowa Institute for Biomedical Imaging, and David Cwiertny, associate professor of civil and environmental engineering, were selected to attend the Frontiers of Engineering Education Symposium held October 25-28, 2015, at the National Academies' Beckman Center in Irvine, CA.

## Grants and Contracts

**Antonio Arenas Amado**, assistant research scientist, IIHR—Hydroscience & Engineering, received a \$60,000 grant from Iowa State University for "Quantification of nutrient reduction practices benefits from the hillslope to the watershed scale."

**James Buchholz**, associate professor of mechanical engineering and associate faculty research engineer at IIHR—Hydroscience & Engineering, received a \$198,373 grant from the US Department of Defense, Department of the Navy, for "Engaging undergraduates and high school students in Naval Science & Technology."

**Gregory Carmichael**, Karl Kammermeyer professor of chemical and biochemical engineering was awarded a \$118,289 grant from the US National Aeronautics & Space Administration for "Regional scale modeling in support of KORUS-AQ: Improving predictions of dynamic air quality using aircraft, ground networks, and satellite data."

**Pablo Carrica**, professor, and James Buchholz, associate professor, both of mechanical and industrial engineering and faculty research engineers at IIHR—Hydroscience & Engineering, received a grant from the Department of Defense, Department of the Navy for "Engaging Undergraduates and High School students in Naval Science & Technology." The Office of Naval Research will provide about \$600,000 over three years to establish a certificate program in the area of naval hydrodynamics.

**George Constantinescu**, associate professor of civil and environmental engineering and associate faculty research engineer, IIHR—Hydroscience & Engineering, received a \$49,448 subgrant from Iowa State University for “Improving traffic safety through better snow fences: Image based methods to measure snow volume and the snow relocation coefficient.”

**William Eichinger**, William D. Ashton Professor of Civil Engineering, professor of civil and environmental engineering, and faculty research engineer at IIHR—Hydroscience & Engineering received a \$194,000 grant from the US Department of Agriculture for “Implementation of Lidar Technology for Quantifying Emission and Dispersion from Agricultural Systems.”

**John Gaspar**, research associate, National Advanced Driving Simulator, received a \$176,621 contract from Westat, Inc., Rockville, MD, for researching in-vehicle drowsy driving detection and alerting. Westat is a research corporation consulting in statistical design, data collection and management, and research analysis work.

**Craig Just**, assistant professor of civil and environmental engineering and assistant faculty research engineer at IIHR—Hydroscience & Engineering, received a \$41,907 contract from American Ordnance LLC for “Waste water treatment system design pilot study.”

**Troy Lyons**, director of engineering services, IIHR—Hydroscience & Engineering, received a \$681,317 contract from the American Electric Power Service Corporation.

**Witold Krajewski**, Rose and Joseph Summers Chair in Water Resources Engineering, professor of civil and environmental engineering and director of the Iowa Flood Center received a \$106,597 federal grant from the US National Aeronautics & Space Administration for “The deployment of ground-based precipitation instrumentation for the 2015 soil moisture active/passive field experiment.”

**Corey Markfort**, assistant professor of civil and environmental engineering, and assistant faculty research engineer, IIHR—Hydroscience & Engineering, received a \$101,329 contract for “Optimizing bat carcass search areas using a CFD-Lagrangian modeling approach.”

**Michelle Scherer**, Donald E. Bently Professor of Engineering, professor and departmental executive officer of civil and environmental engineering, and faculty research engineer of IIHR—Hydroscience & Engineering received a \$203,592 grant from the National Science Foundation for “Collaborate research: influence of Fe<sup>2+</sup>- catalyzed recrystallization on Fe oxide reactivity and C stabilization.”

**Charles Stanier**, associate professor of chemical and biochemical engineering and associate faculty researcher at IIHR—Hydroscience & Engineering, received a \$68,952 grant from the US Environmental Protection Agency for “CLEan Air in the River Valley through Environmental Education, Technology, Partnerships, and PM Advance.”

**Sharif Rahman**, professor of mechanical and industrial engineering and researcher at the UI Center for Computer-Aided Design, received a \$287,820 grant from the US National Science Foundation. Rahman will study stochastic optimization for design under uncertainty with dependent probability measures.

**Fred Stern**, George D. Ashton Professor of Hydroscience and Engineering, professor of mechanical and industrial engineering, and faculty research engineer at IIHR—Hydroscience & Engineering, received a \$181,424 contract from Ricardo PLC for IIHR Wave Basin wave energy converter testing; and a \$470,170 grant from US Department of Defense, Department of the Navy, Office of Naval Research for “Global/Local Flow Measurement System for Free-running Models for Added Powering/Speed Loss, Course Keeping/Maneuvering and Instability/Capsize in Regular/Irregular Variable Heading Waves.”

**Andrew Veit**, program manager, MiniSim®, National Advanced Driving Simulator, received a \$46,258 grant from Quinnipiac University and a \$57,303 contract from PACCAR, Inc. to develop NADS MiniSim research simulators.

**Gabriele Villarini**, assistant professor of civil and environmental engineering and assistant faculty research engineer at IIHR—Hydroscience & Engineering, received a \$69,999 grant from the US Department of Commerce, National Oceanic & Atmospheric Administration. Villarini will provide diagnostic evaluation and development of multi-model applications of NMME precipitation and temperature forecasts for the continental United States and Europe.

## Presentations

**K.K. Choi**, professor of mechanical and industrial engineering and researcher at the UI Center for Computer-Aided Design, made a keynote presentation at the Automotive Testing Expo Symposium held January 19-21, in Seoul, Korea. The title of the presentation was “Development of Reliability Analysis and Multi-disciplinary Design Optimization (RAMDO).”

**Andrew Kusiak**, professor of mechanical and industrial engineering, presented a plenary address, “Manufacturing: What Comes Next,” at the 22nd International Conference on Industrial Engineering and Engineering Management 2015, held November 4-7 in Guangzhou, China.

**Jerry Schnoor**, Allen S. Henry Chair in Engineering, professor of civil and environmental engineering, faculty research engineer at IIHR—Hydroscience & Engineering and co-director of the UI Center for Global and Regional Environmental Research, participated as a delegate November 30-December 11 in Paris, France, at COP21, Conference of Parties, an annual forum to try to tackle climate on a global political level.



**1960's**

The Chemical Engineering Class of 1965 (above) attended a special 50th reunion October 28-31. Activities included a campus tour hosted by Dave Jackson, Assistant Director, Facilities Management. Stops on the tour included the UI power plant and Kinnick Stadium. Class members met with the Young Alumni Advisory Board and held a panel discussion with students over lunch. Friday evening was a banquet at the Karro Athletics Hall of Fame with faculty and current chemical engineering students. On Saturday, they attended the Family Weekend Tailgate and witnessed the Iowa victory over Maryland. Attendees were **Dave "Tice" Powell** and his wife Joyce, **Peter** and Evangeline **Mackintosh**, **Dale** and Carol **Daniels**, and **Richard Fix**.

**1970's**

Distinguished Engineering Alumni Academy member **Dean Oskvig** (BSCE 1972), president and CEO of Black & Veatch's energy business, retired at the end of 2015. Oskvig has worked at the company since 1975 and led the energy business and sat on the board since 2006. Before that, he was the division's chief operating officer, was the president of the power delivery division and held numerous other leadership positions.

**1980's**

**R. Kelly Ortberg** (BSME 1982) was elected chairman of the board of Rockwell Collins, Inc., Cedar Rapids, IA, in addition to his president and CEO responsibilities.

**Rick Rohret** (BSE 1988), mechanical engineer at Genesis Systems Group, Davenport, IA, has been given "Rock Star" status by Boeing Corporation engineers.

**Ross Tegatz** (BSE 1985), founder, CEO and president of Triune Systems, LLC, delivered the 2015 Kurtz Lecture, sponsored by the UI Department of Electrical and Computer

Engineering. The title of his presentation was, "Next Generation Portable Power Solutions."

**Mark Wiesner** (MSI 1980), James L. Mariani Professor of Civil and Environmental Engineering at Duke University was inducted into the National Academy of Engineering in February 2015.

**1990's**

**Mike Traetow** (BSE 1999) is director of technical services at TPI Composites, Newton, IA.

**2000's**

**Avery Bang** (BSE 2007, BA 2007) was named by CauseArtist as one of the 15 inspiring women CEOs that impacted the world in 2015.

**Steven Davis** (BS 2001, MS 2003), president and owner of BIO::NEOS, Inc., has been appointed to a four-year term as a member of the University of Iowa College of Engineering Advisory Board, beginning in October 2015.

**Kendall Jackson** (BSE 2009) is employed with Procter & Gamble Hair Care, LLC, in Iowa City. He was recently recognized for a \$4.8 million savings project he led at the facility.

**Allison Kerndt** (BSE 2002, JD 2005) joined the Davis Brown Law Firm in Des Moines, IA.

**William Leichty** (BSE 2007), associate research scientist with The Dow Chemical Company, Midland, MI, returned to campus to present two seminars on October 29 and 30.

**Chris Lu** (BSE 2008, MS 2010) is an analytical engineer at Caterpillar, Inc.

**Marcelo Mena** (MS 2003, PhD 2007), vice minister of the environment at Ministerio del Medio Ambiente for Chile, delivered a summary presentation at

COP21, Conference of Parties, an annual forum to try to tackle climate on a global political level held November 30-December 11 in Paris, France.

**Julie Mowers** (BSE 2005) is senior corporate counsel at Amazon.

**Andrea Rogers** (BSE 2006) is general manager at the Keokuk Waterworks.

**2010's**

**Michael Anderson** (BSE 2015) is a testing engineer technician with Entegee.

**Della Caldwell** (BS 2013, MS 2015) joined MMS Consultants, Inc., as an engineering intern.

**Blake Carson** (BSE 2015) is an implementation specialist with Intelligent Medical Objects, Northbrook, IL.

**Edward Dunkel** (BSE 2015) is a mechanical engineer with Mestek, Inc., Cedar Rapids, IA.

**Christopher Edwards** (BSE 2015) is an embedded software engineer with RFA Engineering, Dubuque, IA.

**Sean Fleming** (BSE 2015) is a performance and diagnostics engineer with SoCore Energy.

**Jason Fox** (BSE 2015) is a mechanical engineer with Powell Industries.

**Austin Hangartner** (BSE 2015) is a chemical process engineer with Exide Technologies.

**Alex Heying** (BSE 2015) is an engineering project manager with Chicago White Metal Casting, Inc.

**Siobhan Higgins** (BSE 2015) is a quality analyst with SpineCraft, LLC.

**Robert Hofer** (BSE 2013), is serving as an engineering officer in the active duty Army and is stationed at Schofield barracks, Hawaii. He recently completed a deployment to Thailand where a team of U.S.

Army and Royal Thai Army engineers partnered to build a two-room schoolhouse for the fifth and sixth grade children in Saraburi, Thailand.

**Darin Hoover** (BSE 2012) is executive officer to the commander, 92nd Air Refueling Wing, US Air Force.

**Jacob Kinter** (BSE 2015) is an engineer at Fermilab, Riverside, IL.

**Tyler Latcham** (BSE 2014 chemical engineering) is a graduate student at the University of Iowa pursuing JD and MBA degrees.

Engineering alumnus **Sajan Goud Lingala** (PhD 2013 biomedical engineering) received the 2015 Rex Montgomery Dissertation Award for his thesis "Novel Adaptive Reconstruction Schemes for Accelerated Myocardial Perfusion MRI." Lingala is a postdoctoral research fellow at the University of Southern California, Los Angeles.

**Dan Lesniewski** (BSE 2015) is a service technician for ELGA LabWater.

**Michael Meza** (BSE 2015) is an associate sales consultant with BioTek Medical Products, Inc.

**Shane Peot** (BSE 2015) is a contract test engineer with John Deere Des Moines Works.

**Frank Ross** (BSE 2015) is an operations field support analyst for Essendant, Deerfield, IL.

**Cody Rouner** (BSE 2015) is a biologic process development engineer with Vascular Solutions.

**Chyna Simms** (BSE 2015) is a structural engineer with L.A. Fuess Partners.

**Matt Tarnoff** (BSE 2014, MS 2015), consultant with Trinity Consultants, Burlington, IA, has been appointed to the College of Engineering Young Alumni Advisory Board.

**Madeline Tierney** is an R&D intern with Osprey Medical.

**Nick Turner** (BSE 2011), is a civil engineer with Emmons & Olivier Resources, Inc., St. Paul, MN.

**Yin Yu** (MS 2012, PhD 2015) is a research fellow at Harvard Medical School.

**Casey Zwolinski** is a staff engineer with Snyder & Associates, Inc.

Engineering and other UI alumni participating in RAGBRAI, the Register's Annual Great Bicycle Ride Across Iowa, attended a dinner hosted by Dean **Alec Scranton** and his wife Lisa on Friday, July 24. Attendees included **Keri Hornbuckle**, associate dean of academic programs, and her husband, Mike Cervantes; **Nick Hensch** (BSE 2013); **Jose Ponce** (BSE 2010); **Mike Carbone** (BSE 2011, MS 2013); **Nate Brimeyer** (BSE 2012); **Dan Gillen** (BSE 2014); **John Emigh** (BBA 2011, BFA 2013); and **Laura Kerr** (BFA 2014).

### Future Engineers

**Rachel** (BSE 2011) and **Justin Hahn** (BSE 2011) welcomed Logan Robert on October 5, 2015.

**Eryn** (BSE 2011) and Jason Stone welcomed Harper Louise on October 14, 2015.

**Jennifer Brozik** (BSE 2006) and Kevin Pidima welcomed Mason John on October 17, 2015.

**Frank O. Albertson, III** (BSME 1953) of Fort Myers, FL, July 17, 2015.

**Edwin L. Anderson** (BSChE 1956) of Newtown, PA, October 1, 2015.

**Tedford G. Andrews, Jr.** (BSME 1958) of Seguin, TX, June 21, 2015.

**Raphael Beresford** (BSChE 1952) of Basking Ridge, NJ, December 27, 2015

**Richard L. Bonnett** (BSChE 1954) of Grundy Center, IA, September 8, 2015.

**Clifton Boots** (BSEE 1949) of Anaheim, CA, October 27, 2015.

**Alan R. Borden** (BSCE 1953) of Burlington, IA, September 9, 2015.

**Gail Breckenridge** (BSME 1950) of Louisville, KY, November 24, 2015.

**Paul J. Cerny** (BSCE 1929) of New Rochelle, NY, October 13, 1989.

**Derio B. Dalasta** (BSEE 1941) of Waverly, OH, May 12, 2015.

**Thomas E. Daniels** (BSEE 1948) of Oakhurst, NJ, August 21, 2015

**V. Danushkodi** (PhD 1975) of Kansas City, MO, December 10, 2007.

**Laurence A. Divine** (BSChE 1952) of Orlando, FL, July 20, 2015.

**Philip C. Gee** (BSCE 1968) of Vicksburg, MS, September 7, 2015.

**Charles Green** (BSChE 1956) of Webster, NY, April 28, 2015.

**Russell C. Hagerman** (BSME 1949) of Indianapolis, IN, June 19, 2015.

**Richard F. Holck** (BSEE 1960) of Highland, IN, March 4, 2015.

**James W. Hyland, Jr.** (BSChE 1948) of Toledo, OH, December 26, 2015.

**Larry D. Jones** (BSChE 1969) of Prosperity, SC, October 23, 2015.

**Stevens F. Johnson** (MS 1979, PhD 1951) of Bemidji, MN, October 24, 2015.

**Sang Nim Kim** (MS 1967, PhD 1970) of Randolph, NJ, June 15, 2015.

**Richard G. Knudtson** (BSEE 1959) of Goleta, CA, July 28, 2015.

**Donald M. Ludvigson** (BSEE 1967) of Burnsville, MN, February 27, 2015.

**Herbert C. Macy** (BSME 1954) of Prescott, AZ, September 30, 2015.

**Thomas P. Marie** (BSCE 1959) of Crystal Lake, IL, September 21, 2015.

**Francis B. McDaniel** (BSChE 1952) of Yorba Linda, CA, 2015.

**John F. Meenan** (BSCE 1949) of Rock Island, IL, December 27, 2014.

**Richard C. Muhlenhaupt** (BSME 1960) of Littleton, CO, July 13, 2015.

**Peter J. Neuspiel** (BSCE 1951, MS 1952) of Media, PA, June 7, 2015.

**Robert L. Paul** (BSEE 1949) of Midland, MI, June 20, 2015.

**Leo E. Pedersen** (BSEE 1959) of Houston, TX.

**Steven J. Peluso** (BSChE 1971) of Wilmington, DE, September 22, 2015.

**Kenneth E. Rayl** (BSCE 1960) of Waukegan, IA, August 17, 2015.

**Gene Ritchie** (BSME 1979) of Findlay, OH, July 11, 2015.

**Herman G. Ruppert** (BSME 1942) of Tucson, AZ, September 5, 2015.

**Lenard O. Rutz** (PhD 1958) of San Marino, CA, February 4, 2015.

**Henry D. Schiffer** (BSCE 1958) of Milwaukee, WI, June 3, 2015.

**Carroll F. Schneider** (BSME 1948) of Alpharetta, GA, May 12, 2012.

**Rodney W. Sellers** (BSME 1977) of Davenport, IA, June 11, 2015.

**Richard L. Shell** (BSME 1961) of Wesley Chapel, FL, June 26, 2015.

**Charles E. Small** (BSEE 1952) of Westborough, MA, June 17, 2015.

**Lyle A. Stanley** (BSChE 1970) of Woodstock, GA, October 30, 2015.

**James R. Stricklin** (BSME 1964) of Mansfield, TX, August 15, 2009.

**Glenn E. Thompson** (BSEE 1938) of Burlington, IA, March 29, 2011.

**Ray Treese, Jr.** (BSIE 1973) of Berea, KY, February 12, 2015.

**William G. VanAllen** (MS 1948) of Reno, NV, November 6, 2004.

**Robert E. Van Dyke** (BSE 1944, MA 1951) of Davenport, IA, September 22, 2015.

**Paul E. Whear** (BSEE 1960) of Winter Haven, FL, December, 2014.

**Gary W. Williams** (BSEE 1959) of Destin, FL, June 3, 2015.

**Leonard J. Yuska** (BSME 1938) of Round Rock, TX, April 22, 2008.

**W. Stanley Zagorski** (BSEE 1955, MS 1956) of Goshen, KY, November 10, 2015.

**Harry C. Zeisloft** (BSME 1941) of Centennial, CO, March 31, 2012.

**William R. Zimmerman** (MS 1972) of North Aurora, IL, November 1, 2015.

# College Memorializes Two of Its Most Distinguished Alumni

Two of the College of Engineering's most distinguished alumni are being remembered in 2015, having achieved preeminent achievements during their careers.

John P. Craven (PhD 1951 mechanics and hydraulics) died February 12 in Hawaii. Thomas E. Daniels (BSEE 1948) passed away August 21, 2015, in Ocean, NJ.

Both were members of the college's Distinguished Engineering Alumni Academy, which recognizes only 75 living and late graduates, at this time, who have garnered remarkable professional achievements in their lifetime.

John Craven had more than 40 years of experience in the innovation, development, design, construction and operational deployment of major oceanic systems.

After earning his Ph.D. at Iowa, Craven worked at the David Taylor Model Basin of the Naval Surface Warfare Center at Carderock, Maryland, working on nuclear submarine hull designs. He later became its Chief Scientist. While working for the Navy, Craven helped pioneer the use of Bayesian search techniques to locate objects lost at sea (Bayesian search theory). Craven's work was instrumental in the Navy's search for the missing hydrogen bomb that had been lost in the Mediterranean Sea, off the coast of Spain in 1966. Craven's next large accomplishment was in the search for and locating of the submarine USS Scorpion (SSN-589), which had disappeared in deep water in the Atlantic Ocean west of Portugal and Spain.

After leaving the Navy, Craven became the Marine Affairs Coordinator for the State of Hawaii and the Dean of marine programs at the University of Hawaii. Craven also served during the Carter Administration on the U.S. government's Weather Modification Commission. During that time, a hypothetical method was developed to significantly reduce the impact of tropical cyclones.

In 1990 he established the Common Heritage Corporation for the management of innovation for the benefit of the common heritage of mankind. Craven was a member of the National Academy of Engineering. Craven's latest undertaking before his death in 2015 was to link islands in the Pacific Ocean with sustainable energy, agriculture, and fresh water through the use of Deep Ocean Water pumped up using pipes from offshore. He was developing a new and innovative cold-water therapy, which may produce significant health breakthroughs and slow the aging process.

Tom Daniels provided principal advice, assistance and guidance while employed as a Special Assistant to the Director for Space and Strategic Systems in the Office of the Assistant Secretary of the Army (Research, Development and Acquisition) and Assistant Director of Army Research and Technology at the Pentagon. Prior to that he was the Acting Director of the Combat Surveillance and Target Acquisition Laboratory of the U.S. Army Electronics Research and Development Command in Fort Monmouth, New Jersey and a member of the Senior Executive Service.

His work influenced long range strategy, planning and prioritization of space technology and space systems. Until his death in 2015, he had decades of broad professional experience in design, development, production, and fielding of complex electronic equipment to the U.S. Army.

His experience included systems development, systems integration, electronic digital computers, electronic warfare systems, navigation systems, satellite systems, ground surveillance radars, nuclear radiation detection and measurement systems, identification friend-or-foe equipment, meteorological data systems and special sensors, high level panels, source selection boards, and study groups.



# IOWA ENGINEER

The University of Iowa  
College of Engineering  
Office of the Dean  
3100 Seamans Center  
for the Engineering Arts and Sciences  
Iowa City, Iowa 52242-1527

Phone: 319-335-5764  
Fax: 319-335-6086  
E-mail: iowa-engineer@uiowa.edu

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## Family Weekend Tailgate

