The University of Iowa

College of Engineering

MIE

MECHANICAL & INDUSTRIAL ENGINEERING
DEPARTMENT NEWSLETTER

FEBRUARY 2018

Celebrating the Past,
Creating the Future

TABLE OF CONTENTS:

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MIE advisory board members wearing 3D glasses while touring the 3D/4D virtual reality visualization lab at the Iowa Institute for Biomedical Imaging (IIBI) during Fall 2017.

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DEO Statement

Since the Mechanical Engineering (ME) curriculum was first adopted in 1904, it has evolved over time with different technical focus areas due to new knowledge and invention. In 2001, the department of ME and the department of Industrial Engineering (IE) were merged to form the current department of Mechanical and Industrial Engineering (MIE). As DEO, I have had the opportunity to learn more about the history of this department and know its faculty, students, alumni and advisory board better in order to invest in new areas by recruiting faculty and establishing new teaching and research laboratories. Over recent years, MIE continues to grow in terms of faculty scholarship and research productivity, curriculum modernization, and student organizations, activities and leadership. This issue of the MIE newsletter will take you through the past, present and future of the department. Specifically, it features the stories of: 1) an alumnus, the late Luther Smith (B.S. ME 1950) who was a passionate aviator, a war hero, a POW, a survivor, and the first African American aerospace engineer for General Electric, 2) the naval hydrodynamics program spanning over decades, and 3) a research frontier in computational geometry and machine learning. Through the characters and programs depicted in these stories, we hope to share with you the core values that keep us moving forward in Iowa and the prospects of striving for excellence.

Ching-Long Lin,
Edward M. Mielnik and Samuel R. Harding Professor

Honoring Luther Smith, B.S. ME 1950

Darcy Castro, CAF Red Tail Squadron

Luther H. Smith, was a retired U.S. Air Force captain who flew 133 combat missions in World War II, and a General Electric Co. engineer with 37 years of service. A native of Des Moines, IA, Captain Smith was an original member of the famed Tuskegee Airmen. He is credited with destroying two German enemy aircraft in aerial combat and 10 German aircraft in ground strafing missions. He was awarded the Distinguished Flying Cross, Air Medal with six Oak Leaf Clusters, Purple Heart, eight European and Mediterranean Theaters Campaign Ribbons, and the Prisoner of War Medal after being permanently injured on his final combat mission, parachuting while unconscious from his burning P-51 Mustang aircraft, and held as a prisoner for seven months until the war ended.

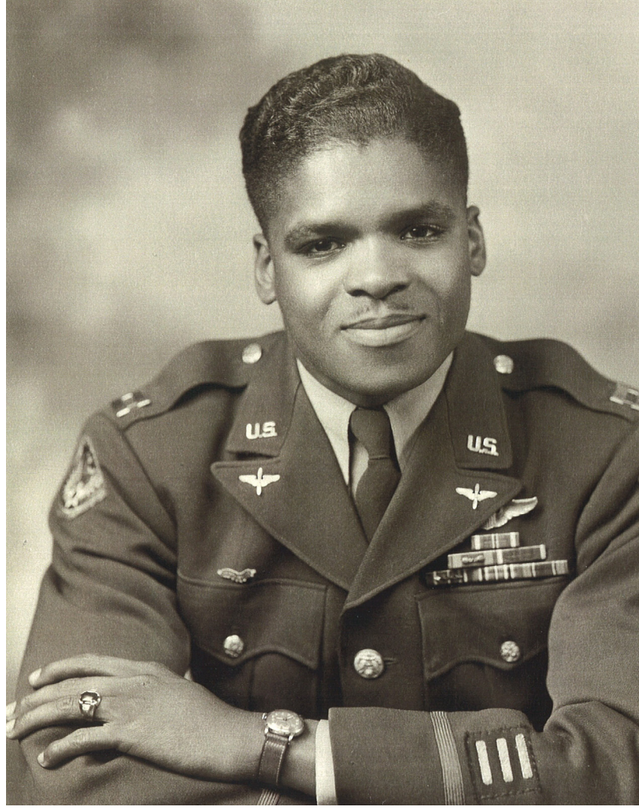
Smith's dream of flight began in early childhood. As an 11-year-old growing up in Iowa, Smith found five dollars in a field and used it to buy a ride in an airplane for him and his little brother. The experience had him hooked on aviation. The tenacious young man would walk five miles every day to the airport where he made himself useful to anyone, planning to learn all that he could and one day get a seat in the cockpit. By 1940, he had earned his pilot's license, becoming one of the first black Americans to do so.

After earning his B.S. degree in Mechanical Engineering at The University of Iowa in 1950, Captain Smith worked for GE's Missile and Space Operations in Philadelphia until his retirement in 1988. He held two U.S. patents, had published numerous technical documents and publications, and worked on special assignments with the U.S. Air Force, NASA, and U.S. Navy Submarine Command. Captain Smith was a recipient of the Society of Automotive Engineers, Aerospace International, Franklin W. Kolk Aerospace Industry Award. He served on the Architect-Engineer Evaluation Jury that chose the design for the World War II Memorial, and worked tirelessly to gain recognition for the contributions of the Tuskegee Airmen. In June 2004, he headed the 60th anniversary celebration of the Tuskegee Airmen's greatest World War II achievement, escorting American heavy strategic bombers on 200 missions throughout Europe without the loss of a single bomber to enemy aircraft.

Until his death in 2009, Captain Smith contributed significantly to the achievement of racial equality in the U.S. and the world and helped change the face of the U.S. military in a remarkably short period of time. In 2005, he was inducted as a member of the University of Iowa College of Engineering's Distinguished Engineering Alumni Academy. In February 2006, Smith received an honorary doctorate degree in public service from Tuskegee University. In June 2006, he was awarded the UI Alumni Association Distinguished Alumni Award for Achievement and in October 2006 he was inducted into the Iowa Aviation Hall of Fame. In March 2007, Smith was presented the Congressional Gold Medal, the highest civilian award bestowed by the U.S. Congress.

This past November, the UI honored six members of the armed forces for exceptional service to their country and the Hawkeye community. Criteria for the award included a strong university connection, to have served honorably, military accomplishment, and service to their community.

His son, Gordon Smith received the award on his behalf and gave a touching speech about his father's accomplishments. He told of how his father wanted to be an aviator since he was 11 years old when he took his first airplane ride at the Des Moines Municipal Airport. He also remarked on the dedication, sacrifice, and commitment that Luther Smith displayed throughout his entire military service, as an engineering student at Iowa, in his career, and beyond.



Luther's son, Gordon Smith, accepted the Hawkeye Distinguished Veterans Memorial Award for his father, this November.

Pablo Carrica next to the towing tank in the Fluids Lab in the new annex

Generations of Naval Hydrodynamics

Mechanical Engineering Professor Pablo Carrica continues to advance the field of naval hydrodynamics, through his research and instruction, which began decades ago at the University of Iowa (UI) during the wake of WWII. Since then generations of ME faculty have worked hard to establish the strong undergraduate and graduate programs we have today.

The program's foundation began in 1954 when Lou Landweber joined the UI. He was a Professor of Mechanics and Hydraulics and a researcher at IIHR – Hydroscience & Engineering (formerly known as the Iowa Institute of Hydraulic Research) until he retired in 1982. Landweber was among the first to explore the potential of computational fluid dynamics (CFD) and developed a strong theoretical and experimental research program in ship hydrodynamics that continues to this day. In 1970, Landweber saw potential in the work of Virendra C. Patel (ME Professor Emeritus), studying the boundary layers of airplanes, and knew that it could be applied to ships as well. After being convinced to come to the UI, Patel went on to work here for decades, even serving as IIHR Director from 1994-2004. In 1983, ME Professor Fred Stern was recruited to lead and expand the ship hydrodynamics program. Over decades, Stern advanced simulation-based design, a sort of virtual reality of ship hydrodynamics to develop a safer and less expensive way to design and test naval vessels. Stern further led the effort of establishing a $4.9 million 40x20x3-meter wave basin facility that allows testing captive or radio-controlled model-scale navy ships under a variety of real-life conditions, created by the basin's six wave makers.

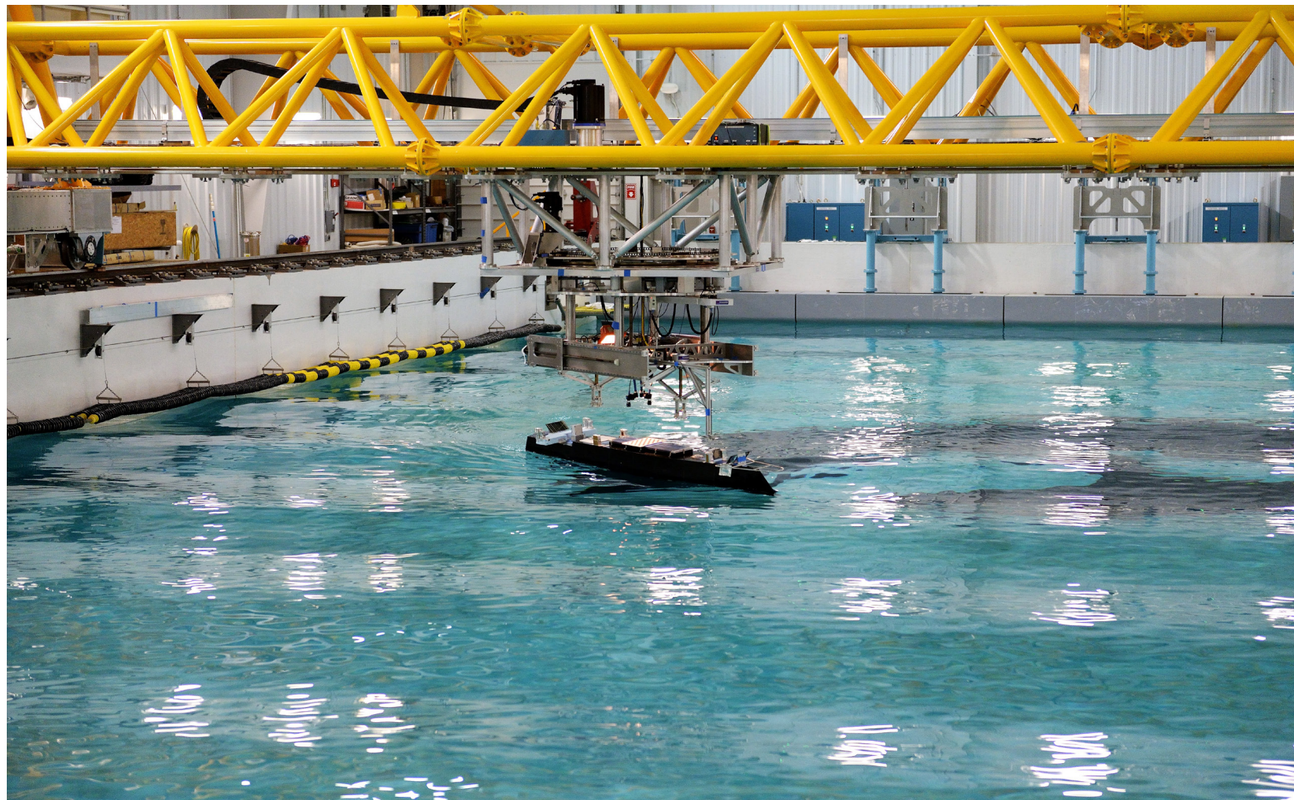
Carrica joined the UI ship hydrodynamics team in 2002 and became a ME faculty member in 2007. The program continues to expand through recruiting faculty James Buchholz in 2008 and Casey Harwood in 2017, and conducting multidisciplinary research, e.g. with ME Hiroyuki Sugiyama whose expertise is vehicle dynamics. In 2016, the MIE department began to offer a Certificate in Naval Hydrodynamics, led by Professors Carrica and Buchholz. The certificate is sponsored by the Office of Naval Research (ONR) through a grant. As a result of the grant, two new elective courses are now offered: Computational Naval Hydrodynamics (CNH) and Experimental Naval Hydrodynamics.

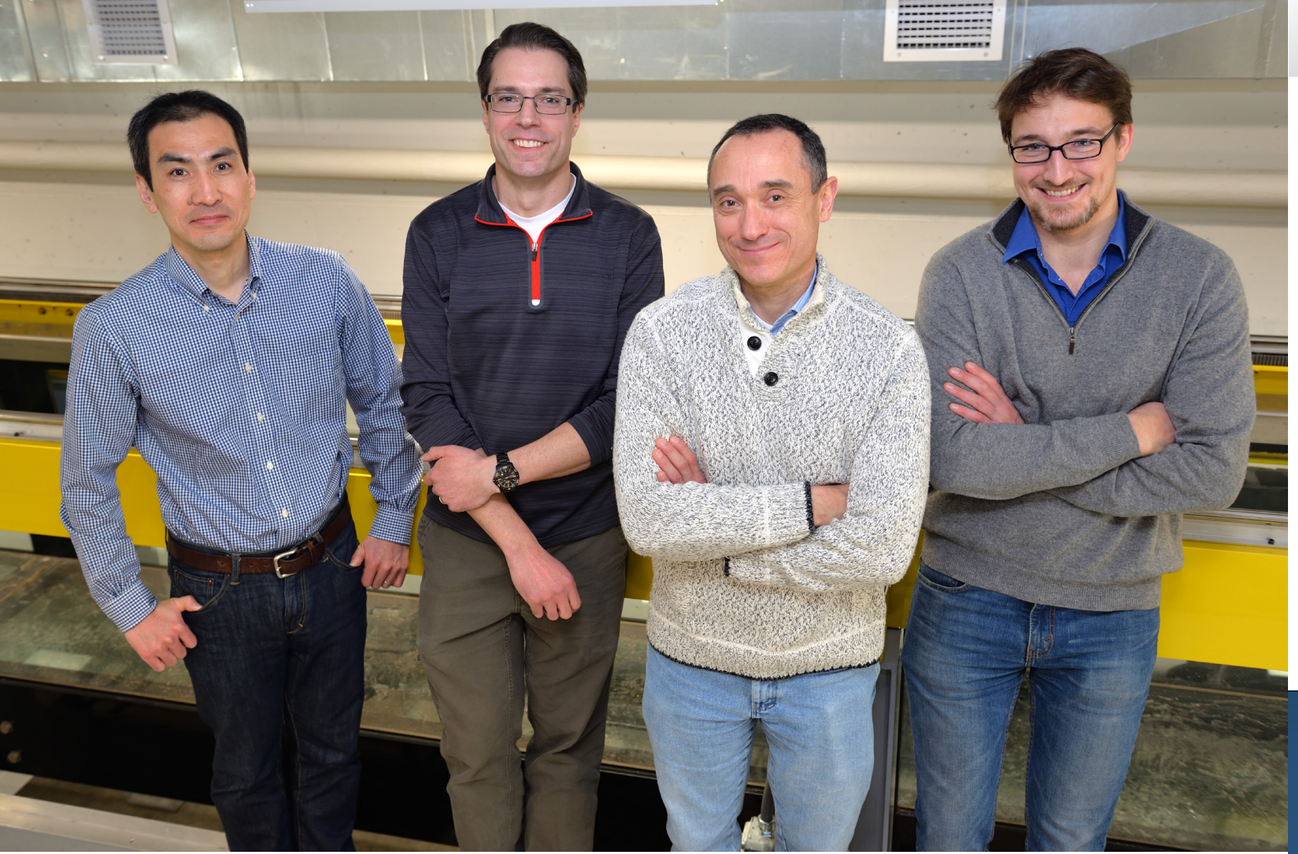
Carrica's research group, with the sponsorship of ONR, has since developed a CFD code, REX. This code has unique capabilities for naval hydrodynamic applications and is optimized to run in high-performance computing environments. REX handles complex factors such as free surface, bubbly flows, and stratification and can simulate controllers and autopilots as well. This makes REX wonderful to apply to many different machines and situations involving hydrodynamics. An educational version of REX has also been developed. Undergraduate students have been taking advantage of the opportunity to use such a code in CNH, independent investigations and senior design projects.

One of Carrica's focus areas is bubbly wakes with the ultimate goal of reducing the number of bubbles or designing a counter measure to obscure the bubbles that come off a ship, thus making it harder to track. Carrica and his team have designed a small probe, with tips made of sapphire only a few microns in diameter, which can be mounted on the hull of a ship to pierce the bubbles and allow researchers to measure their size and velocity. His team was able to conduct a series of bubble-flow experiments onboard the U.S. Navy's research vessel, Athena. Carrica also studies submarine propulsion. When a submarine surfaces, it faces problems maneuvering as it is primarily designed to move underwater.

In addition to CFD-based, Navy-sponsored projects dedicated to cavitation, bubbly flows and submarine hydrodynamics, there are currently several research programs that use REX in collaboration with other ME faculty. In one of them the performance of amphibious vehicles is studied numerically with REX, and Professor Harwood and his group are in charge of the experiments performed in the IIHR towing tank. The work involves closely coordinating the experiments and CFD work for cross validation and revealing the physics governing the flow.

Fred Stern (above) led the effort of establishing $4.9 million 40x20x3-meter wave basin facility that allows testing captive or radio-controlled model-scale navy ships under a variety of real-life conditions, created by the basin's six wavemakers as seen below.





Left to right, Mechanical Engineering faculty members: Hiroyuki Sugiyama, James Buchholz, Pablo Carrica, and Casey Harwood

Another project involves analysis of the air wake in ships moving in waves, aiming at understanding the influence of ship motions in waves and the atmospheric boundary layer on the flow field on the flight deck. In this case Professor Buchholz and his team are conducting experiments in IIHR's environmental flume taking flow field data on a fixed and moving ship. REX is used to perform computations of the airwake resulting from the ship advancing in waves and with an atmospheric boundary layer model. The CFD-predicted flow field allows investigating the effect of the downwash caused by the rotor of a helicopter which is about to take off from the flight deck of the ONR Tumblehome surface combatant advancing in waves at 25 knots (see right).

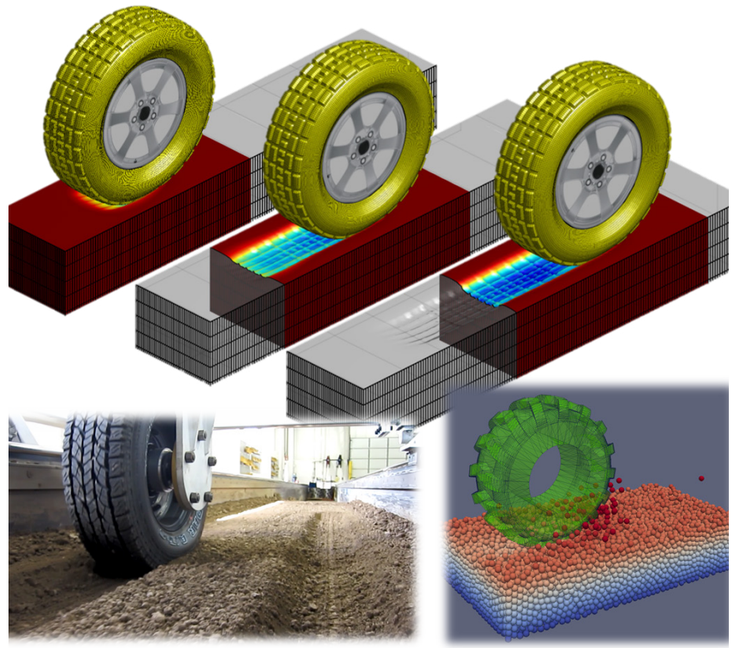
Work is also in progress with Sugiyama and his team to couple REX with the code Iowa Multibody Dynamics (IMBD). Though REX has rigid body dynamics solvers, it lacks the multibody capabilities of IMBD in terms of complex multibody configurations, contact and deformable surfaces. The coupled code will enable simulation of vehicles operating in very shallow water and the surf zone, where contact with the sand bar occurs. Essentially, Sugiyama is working to predict if a vehicle will get stuck when moving between land and water and gathering data to determine the best path.

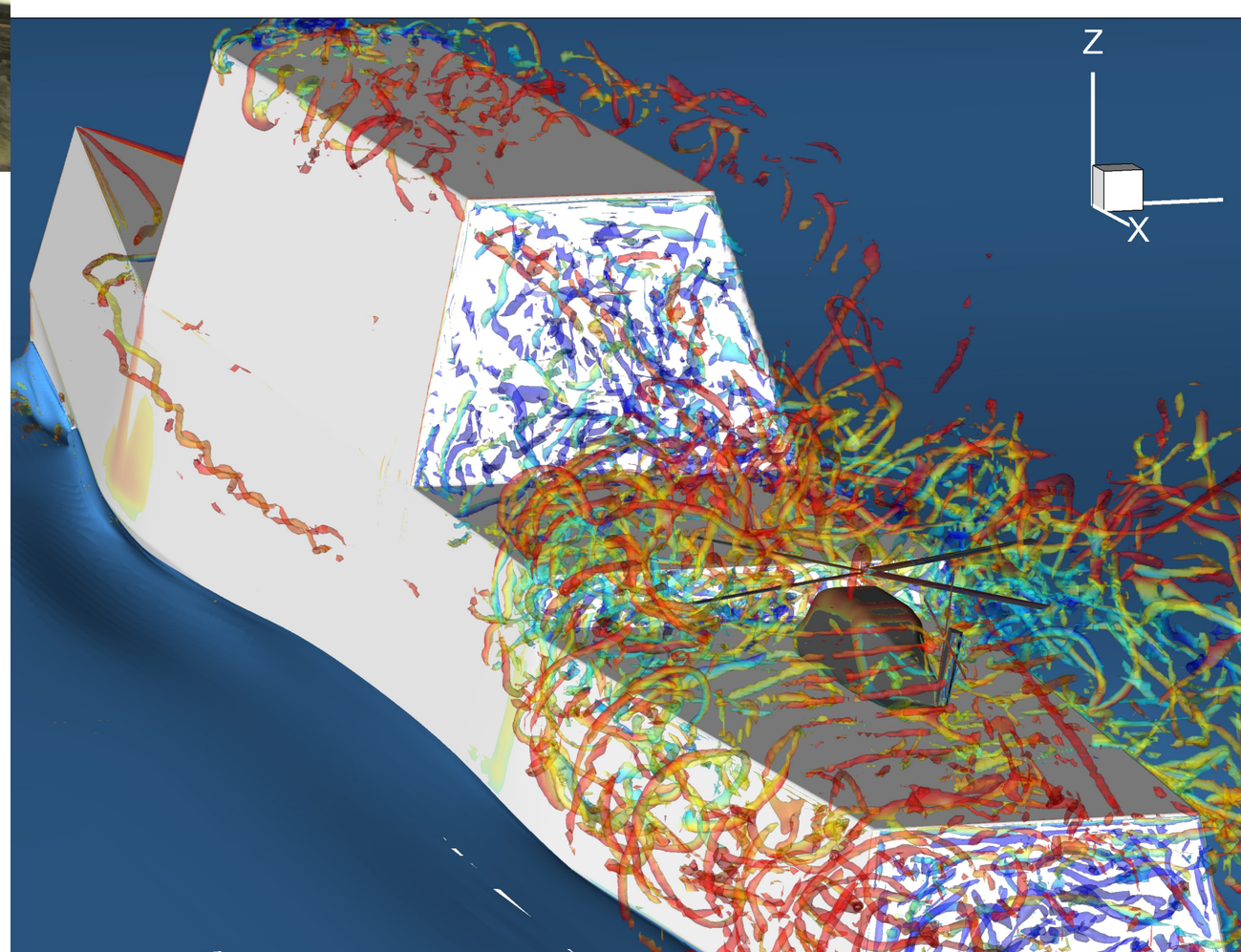
The towing tank in the photo above has been designed for educational use by Carrica and Buchholz, through a grant from the ONR Workforce Development and STEM Education program. A towing tank consists of a long channel filled with water, and an instrumented carriage that can tow and maneuver marine vessel or propeller models along the channel while acquiring measurements of resistance, thrust, or other hydrodynamic quantities to characterize performance. They use it in Experimental Naval Hydrodynamics (ME:4176) and in the Naval Hydrodynamics section of the Program for Enhanced Design Experience (PEDE, ME:4186). This semester, a PEDE team of students will be using it to test a ducted propeller they designed for the UI roboboat competition team IMARC (imarc.org.uiowa.edu/), after having run several design simulations with the educational version of REX. Carrica and Buchholz are also working with Jane Russell at ITS instructional services to conduct research on the teaching methods being adopted in the naval hydrodynamics program, using REX and the towing tank.

Our Mechanical Engineering program is fortunate to have several faculty working in the area of naval hydrodynamics. Through their continued collaboration and teamwork, we can look forward to many exciting developments and applications for their research.

Right: Research simulations and physical tests of Prof. Sugiyama's multi-body dynamics work, including a finite element continum model and a discrete element model

Below: An image of the flow fields on a SH60 helicopter taking off from ONR Tublehome flight deck. This project was led by Prof. Buchholz. Notice the considerable downwash caused by the rotor-induced flow.





Geometric Deep Learning @ IDEA lab

Industrial Engineering Assistant Professor, Stephen Baek leads the Innovative Design and Art Laboratory (IDEA lab) at the University of Iowa. They do research in computational geometry and machine learning with a wide variety of multidisciplinary applications—geometric machine (deep) learning, statistical shape analysis, 4D scanning, computational design and fabrication, digital human modeling, driver state detection/analysis, sports performance analytics and injury prediction. The IDEA lab aims to develop new technologies for creating custom-tailored, high-fidelity avatars based on computational geometry and machine learning technologies.

Baek is affiliated with the Center for Computer Aided Design (CCAD) and the Public Digital Arts (PDA) cluster. Recently, he has received funding for two new projects. The first, titled "Developing Connected Simulation to Study Interactions Between Drivers, Pedestrians, and Bicyclists" is sponsored by U.S. Department of Transportation (PI Daniel McGehee, co-PI Stephen Baek). The second project titled "Driver State Detection via Deep Learning" (PI Stephen Baek) is sponsored by Aisin Seiki, Co., Ltd.

Connected simulation technology offers enormous potential to study the interactions among road users and to assess the impact of new technologies on safety and mobility. Thus, in the first project to study these interactions, simulators must bring visible representations of people into the simulated world so that drivers, pedestrians, and bicyclists can see the gestures, gaze, and actions of other road users. This requires the introduction of avatars, graphically generated human figure models that mimic the motions of participants. Researchers in the IDEA lab are advancing new methods of simulation by connecting multiple driving, pedestrian, and bicycling simulators at the University of Iowa and developing avatar technology as well. The chief outcome will be a new generation of multi-user simulators that will yield insights into how road users interact and how new technologies and designs influence road safety and mobility.

Much of Baek's previous work includes statistical shape analysis and parametric modeling of human body shapes. His previous work established a mathematical foundation for describing complicated shapes using numbers, conducting arithmetic operations between shapes, and understanding the mathematical space of shapes. Since joining the University of Iowa in 2015, he has implemented such a parametric human modeling technology on the UI's virtual soldier, SANTOS™, in order to allow simulations covering more diverse anthropometric shapes. In this new project, Baek and his research group will advance the current understanding of the space of human body shapes by integrating dynamic surface geometry information. This will be accomplished through the IDEA lab's cutting-edge 3D imaging facility.

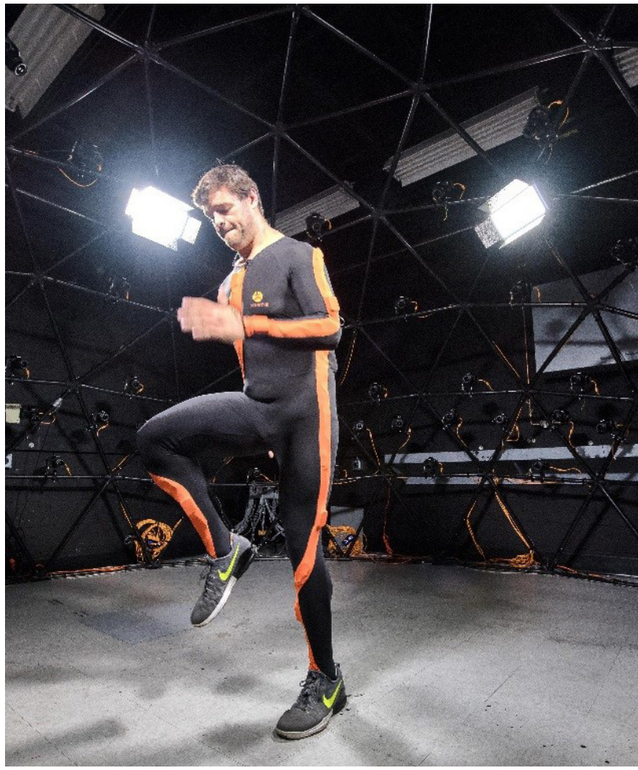
idea lab

FACULTY EXCELLENCE

In the second project, Baek aims to employ deep learning for detection of driver state. Understanding the physical and emotional state of the driver is a key challenge for the control of varying levels of vehicle automation. Particularly, understanding what the driver is doing and feeling as he/she drives (i.e. drowsy, upset, texting, etc.) is crucial for designing the transition between different levels of automated driving. One practical solution to this challenge is to use image sensors to monitor the state of the driver. However, extracting and understanding the visual cues from image sensors is not a trivial task, as they are too complex to be recognized by hand-crafted algorithms or hard-coded rules, not to mention other difficulties caused by conditions like drastic change of illumination, limited space and locations to install sensors, etc.

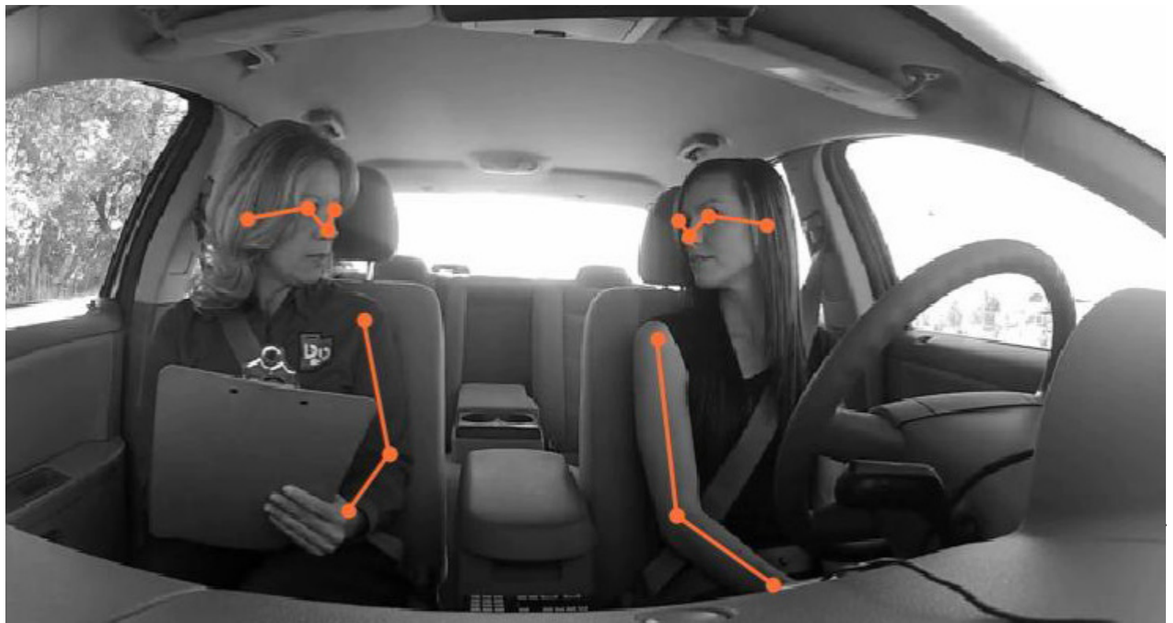
To this end, deep neural networks, i.e., a family of neural networks with many hidden layers, can help in identifying important visual features and defining recognition rules by analyzing a large number of image data. In fact, in the last five years, thanks to the deep neural networks, the field of computer vision has experienced an unprecedented advance in detecting, recognizing, segmenting, and labeling objects appearing in images. In this regard, the IDEA lab possesses various technologies and know-hows for deep neural network-based image/geometry understanding, especially for marker-less human motion detection and tracking.

In this project, the IDEA lab will translate this new technology into a set of novel algorithms that will substantially augment Aisin's driver monitoring system. The new algorithms will allow automated vehicles to be better aware of the physical and emotional state of the driver by providing more structured information (e.g., driver pose, facial expression, etc.). This will significantly improve a car's ability to understand various in-cabin situations in real-time and to mitigate the potential risks by, for example, alerting a drowsy driver or temporarily overtaking the control from a distracted driver.



Above: IDEA lab's dynamic 3D scanning facility

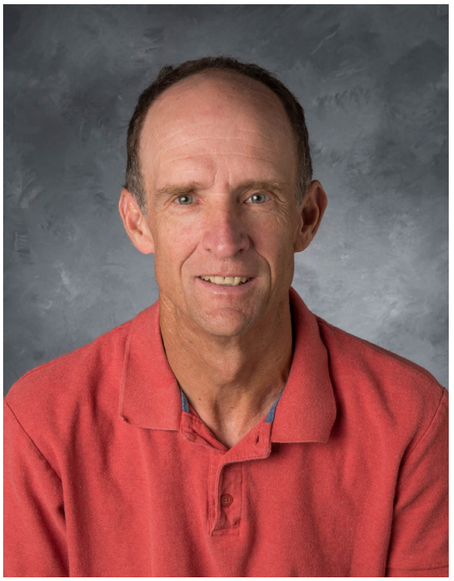
Below: Deep learning-based human motion tracking algorithm applied to driver cam images



Iowa is one of a few states in the US to take close up shots of American Bald Eagles in action during the winter. This photo was taken at Lock & Dam 14 on the Mighty Mississippi River, LeClaire, Iowa.

New Faculty, John Mirth

Professor of Instruction, Mechanical Engineering



John Mirth joined the University of Iowa for the Fall 2017 semester as a Professor of Instruction. He received his bachelor's degree in Mechanical Engineering from Ohio University, and his MS and PhD degrees from the University of Minnesota. His technical areas of expertise are in Engineering Design, including Kinematic Design, Design Theory and Methodology, Computer-Aided Design, and Machine Design. Mirth's previous positions include assistant/associate professor at the University of Denver, associate/full professor at the University of Wisconsin-Platteville, and professor at Rose-Hulman Institute of Technology.

Mirth's personal teaching philosophy revolves around engineering principles. He explains that he applies Lean Management Principles – a method used to identify and minimize waste within a system – in all his classes. Mirth sees each class as an individual system and examines it to eliminate wastes of time, energy, and resources to successfully guide his students. He strives to construct unique and engaging learning environments in his classes. By constructing the course syllabus around projects, instead of lecture and homework, he hopes to encourage students to be more invested in the material.

Since beginning at the University of Iowa, Mirth has hit the ground running. He is the instructor for Experimental Engineering (ME:4080) for the academic year. During the fall semester he also instructed Engineering Instrumentation (ME:3351) and is teaching Dynamics (ENGR:2710) this spring. He has also been involved with the Mechanical Engineering Design Project (MEDP) and feels very excited to take over instruction for the spring semester as he will be working closely with senior engineering undergraduates to design and develop a semester-long project.

Honoring Emeritus Professor, Ralph Stephens

"Quality education makes quality students do quality work."

ME Emeritus Professor Ralph Stephens retired from the University of Iowa after 47 years in 2012, although he remains active in the department to this day. After receiving his PhD from the University of Wisconsin studying fatigue and fracture mechanics in 1965, he was hired by the University of Iowa, where he worked for the rest of his career.

Stephens describes his career as a professor as both joyous and fulfilling. He recalls a very vivid memory of sitting on the tiled floor outside his office with one of his graduate students. Together, they planned out his masters thesis in the hallway with papers spread out around them. Stephens explains why this particular instance was so meaningful to him. He could have held a meeting with this student in his office, but they would have sat with a desk in between them in a formal environment with a very clear hierarchy. Instead, Stephens preferred to place himself and his student in an environment, however uncomfortable or comical sitting on the floor might seem, in which teacher and student were at the same level, collaborating together to find the best solution.

Stephens has been an influential member of the College of Engineering from the start. In 1970, he helped to start the biological engineering program at the University of Iowa despite having no background in bio-engineering. He even designed instruments to aid in research that bio-engineers and medical professionals perform.

A few years before his retirement, Ralph Stephens wanted to give the UI yet another gift. He and his late wife Barbara donated $250,000 to support the Professor Ralph and Barbara Stephens Experimental Engineering Lab in the Seamans Center for the Engineering Arts and Sciences. The gift contributed to a new class offering, equipping the lab and endowing annual funding for the lab. Even after his retirement, Dr. Stephens is still an active member of the MIE department and continues to participate in events such as Senior Design Night.

UIowa BAJA: Planning for the Future

SAE BAJA (Society for Automotive Engineers) consists of competitions that simulate real-world engineering design projects and their related challenges. Specifically, engineering students design and build their own prototype, all-terrain, single-seat vehicle. The goal of the competition is to challenge students with design and manufacturing tasks that occur when introducing a new product to the consumer industrial market. Teams compete against one another to have their design accepted for manufacture by a fictitious firm. Students must function as a team to not only design, build, test, promote, and race a vehicle within the limits of the rules, but also to generate financial support for their project and manage their educational priorities.

Each year, Baja SAE hosts national competitions for schools around the world to demonstrate how effectively their team designed and fabricated their off-road vehicle. These are 4-day long competitions consisting of static events (a sales presentation, design presentation, and technical inspection), dynamic events (acceleration, maneuverability, hill climb, and a suspension course/rock crawl), and ends with a 4-hour endurance race.

President of the student organization, Kayla Denson happily comments that joining Iowa Baja was one of the best choices she made in her academic career. Explaining that, "prior to joining this team, I had no shop experience and knew next to nothing about cars; with these experiences, I can directly apply to my career aspirations in industry. I understand the process of designing, funding, and fabricating a project." As the president of the club, Kayla also is gaining additional leadership experience and learning the logistical components of making an organization successful. Kayla tries hard to make the team as competitive as it can be and works to ensure their success even after her graduation.

Currently, Vice President Rob Pohren is designing front suspension and steering components for the 2018 national's vehicle that will compete in Pittsburgh, Kansas this May. During this past semester, he also taught new members solid modeling software so they themselves could practice designing for the team. Rob feels most excited about involving as many new members in the construction of the 2018 competition vehicle because in previous years, only upper classmen on the team played a large part in this. By getting potential future leaders involved early, knowledge will be passed along and the team will continue to grow and better itself.

This racing photo was taken at the Caterpillar Edwards Demonstration & Learning Center during Summer 2017.

During the summer of 2017, several returning team members spent time updating and renovating the workshop. A majority of the time went towards cleaning and reorganizing so they could use the space more efficiently. The team took inventory of all of their prototyping materials, gaining a clearer idea of which tools and materials they truly need. They also refinished their floors, bought a new air reel hose, added an extra worktable equipped for laying carbon fiber and refurnished the workshop.

Director of BAJA Public Relations, Bram Williams put much of his energy towards renovating the workshop office space. Now, the team has a better area to host meetings, conduct research on designs, and collaborate on components of current prototype cars. In addition to the workshop renovations, the team secured a new testing facility on the west side of campus. The site spans over four acres and will be used to test prototypes more thoroughly.

The University of Iowa Baja SAE team has made huge strides over the last few years. They plan to be consistently competitive by sharing knowledge from all levels and continue to challenge themselves to think as creatively and critically as possible. The team feels very excited about the number of new Baja members and looks forward to the years to come.

UIowa Engineering Student Team Wins the Midwest Big Data Hackathon

This September, College of Engineering graduate students Babak Haghighi (Mechanical), Ali Mokhtari (Civil), and Pooya Rahimian (Computer Science) won the Tech Domain Award and placed second overall in the 2017 Midwest Big Data Hackathon competition. The Hackathon was a two day non-stop event with over 150 participants. More than 30 teams of graduate and undergraduate students worked on a variety of different projects. Running on just a few hours of sleep, Haghighi, Mokharti, and Rahimian created a desktop application called Emotify, which provides song suggestions through Spotify for users who enter a specific emoji.

Being the recipients of the Tech Domain award means their project was judged to be the most practical for future growth in a variety of ways and it's easy to understand why. Once further developed, Emotify can be used to send music over text simply by pressing an emoji. A user could even create their own emoji-based playlist or find playlists of top-rated songs for specific emojis. The team even designed the system to improve its suggestions based on user history data.

Despite the competitive environment, Haghighi, Mokharti, and Rahimain laughed amongst themselves almost the entire time. The teammates explained that the competition was a wonderful opportunity for startups. They gained experience designing and programming as a team under pressure using a software they wished to learn more about. Industry sponsors were brought in to referee the event and advise the teams. Ultimately, the hackathon brought teams of students together to enthusiastically compete against one another, generating and implementing new solutions for real world problems.

UIowa Engineering Students Participate in SpaceX Sponsored Competition

Since 2015 SpaceX, an aerospace company founded by CEO Elon Musk has held a Hyperloop design competition. This competition challenges teams of college engineering students from across the country to design and, for some, build a prototype transport pod for a Hyperloop tube. The Hyperloop consists of two huge underground tubes running from San Francisco to Los Angeles and teams work to develop pods to carry passengers over 700 mph safely though those tubes. The created vehicles are judged by the maximum speed reached with successful deceleration.

University of Iowa undergraduate engineering students, Lamis Awdi (Industrial) and Suman Sherwani (Electrical) first submitted a prototype design to the competition in its first year. Awdi recalls the competition environment as being extremely intense but goes on to add that for her, it was a dream come true to be able to participate. Three years later, Sherwani and Awdi have recruited a team of over 40 fellow engineering students from a variety of disciplines to develop and submit an improved design for their prototype. Learning from their previous designs, the team decided to use either air skis or wheels for the mode of transport, explaining that the other option, magnetic levitation, is too expensive to be realistic.

Industrial engineering Assistant Professor Stephen Baek was asked by the team leaders to be their faculty advisor and he immediately jumped at the chance. Baek feels very impressed by and proud of the students for all their hard work and while he is unable to aid in the design process, he helps the team by providing them with the resources and space that they need.

Ultimately, the team feels motivated to see and be a part of such rapid growth in the industry and feels hopeful about the future impact of fully realized Hyperloop transport systems. Awdi explains that she feels honored just to be a part of the creative process of designing something that, until very recently, seemed like something straight out of science fiction. The team can collaborate with other teams across the nation and, by working through the entire design, development, and creation process, University of Iowa students gain priceless and extremely exciting educational opportunities.

HYPERLOOP
POD COMPETITION

Amanda Pietsch

B.S. Mechanical Engineering, 2007

Engineering alumna Amanda Pietsch (BS 2007 Mechanical Engineering) has won the 2017 Technology Association of Iowa (TAI) Diversity Champion Award at an awards ceremony November 14 in Des Moines, IA.

Pietsch is a process pro for Deere & Company, Davenport, IA, and is currently working to provide process support and support change management of a Global IT program. Since volunteering for her first "Introduce a Girl to Engineering Day" event, Pietsch has become involved in Science, Technology, Engineering, and Math (STEM) outreach and is the "Girl Day" committee lead for the John Deere Society of Women Engineers employee group. Through the committee, support is provided to John Deere locations across the enterprise to plan and execute "Introduce a Girl to Engineering Day" events at many locations.

Pietsch is also the lead Year 2 mentor for the Explore Engineering Post 1175 at John Deere Davenport Works, working with high school students to further explore their engineering interests and prepare for college. She also volunteers for STEM events focused on introducing kids to STEM concepts through hands on activities.

Technology Association of Iowa winners were selected based on their professional experience, history of innovation, ability to think creatively and solve problems, and demonstration of leadership.

Finalists from the University of Iowa College of Engineering included Fatima Toor, Assistant Professor of Electrical and Computer Engineering, for research innovation and leadership; Kristine Bullock, Engineering alumna (BSE 2009 Biomedical Engineering), Southeast Iowa STEM regional manager, for STEM Champion; Sara Kaalberg, Chemical Engineering PhD candidate, for Collegian Innovation and Leadership; Sophia Mallaro, Electrical Engineering Senior and Undergraduate Research Assistant, also for Collegian Innovation and Leadership; and Engineering alumna Kim Beardsley (BSE 1990 industrial engineering), Vice President, Worldwide Parts Services for Deere & Company, and College of Engineering Advisory Board member for Leadership Innovation.

The Technology Association of Iowa is a statewide, member-based organization uniting Iowa's technology community by connecting leaders, developing talent, driving public policy, and fostering diversity and inclusion. TAI's members work together to support the industry and advance Iowa's reputation as a technology state. The organization is a collection of technology leaders who have come together as Iowa's statewide voice for technology.

Nick Novotny

B.S. Industrial Engineering, 2004

M.S. Industrial Engineering, 2005

Nick Novotny graduated with his B.S. in Industrial Engineering in 2004 and his M.S. in 2005. As an undergrad, he completed three summer internships and even took a year off to complete a process engineering co-op at the 3M Company in St. Paul, MN. Nick strongly recommends that all engineering students search for internships as he believes it helped him differentiate himself from his peers when he left the University and entered the industry world.

When he first arrived at the University of Iowa, like many freshman, Nick was an undeclared major. He happily recalls now retired Professor Peter O'Grady who strongly influenced his career path: "Professor O'Grady presented the Industrial Engineering program to the undeclared freshman seminar and I declared my major as Industrial Engineering the following week. I was drawn to Industrial Engineering based on the science of continuous improvement and the wide variety of career paths including Management/Leadership." Professor O'Grady was also his Master's Thesis Advisor and provided him with several teaching assistantship opportunities that he truly enjoyed. Nick also remembers Professor Andrew Kusiak, who is still with the UI as instrumental to introducing the topic of machine learning and non-traditional optimization methods to him explaining that he still uses the methods he learned in his career.

Nick happily remarks that he has been so lucky to be mentored by very intelligent and caring people throughout his career and tries to pay that forward as much as possible by mentoring others. Recently he gave a lecture to senior Industrial Engineers on real world case studies and has advised the MIE department on a potential new elective focus area. Nick finds his continuing involvement with the University of Iowa extremely rewarding.

Nick is currently the Plant Manager at the Bemis Company in Des Moines, IA. In his career, he enjoys leading teams of people to produce results that were otherwise thought not to be possible and consistently feels amazed at what can be accomplished when everyone is working towards common goals.

"I would not be at this point in my career without the education I received at the University of Iowa. My education as an Industrial Engineer taught me how to solve problems using scientific methods to be a productive employee and has given me the confidence that I can teach myself anything that I put my mind to."

Meet Some of our Amazing Staff!

Department Administrator, Donna Palmer is new to the Mechanical and Industrial Engineering Department, but she is not new to the University of Iowa. She started working at the University in February 1989 in the Psychology Department, and time has flown by quickly since then. She completed her Bachelor's degree from the Tippe College of Business while working fulltime. On a daily basis, Donna rides a UI van pool and commutes to and from Wellman, Iowa where she lives with her husband and two college-age daughters.
She enjoys spending time with her family. Some of Donna's hobbies include flower and vegetable gardening during the summer months and sewing and quilting during the winter months. She also volunteers with 4-H activities and serves on the Washington County Extension Council.

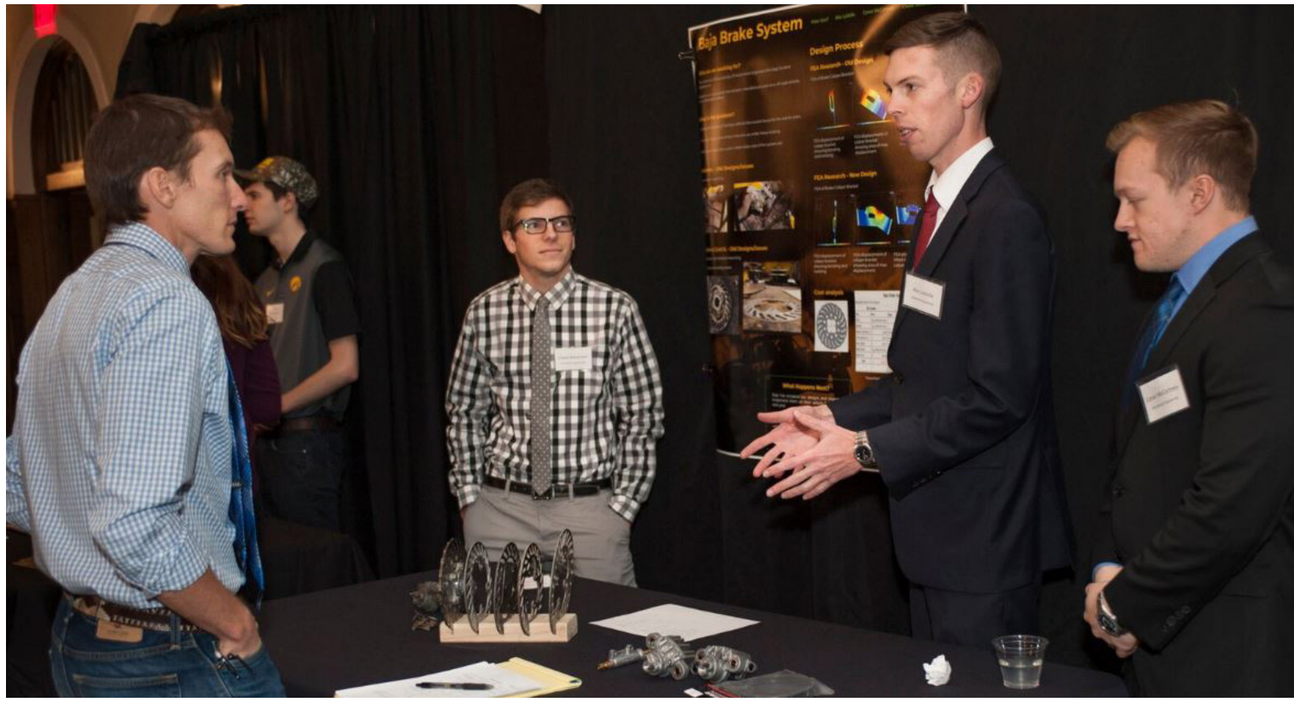
Maria Chusin has been a Student Office Assistant in the MIE office since May 2017. She is sophomore at the UI, double majoring in Art History and Studio Art. Maria's artistic focus is mainly on exploring the history of religious iconography and using those symbols in depictions of people's everyday relationships with 21st century technology to emphasize the spiritual power of such things as smartphones and televisions. In her free time, Maria tries out vegetarian recipes, goes to concerts, and takes road trips during the weekends.

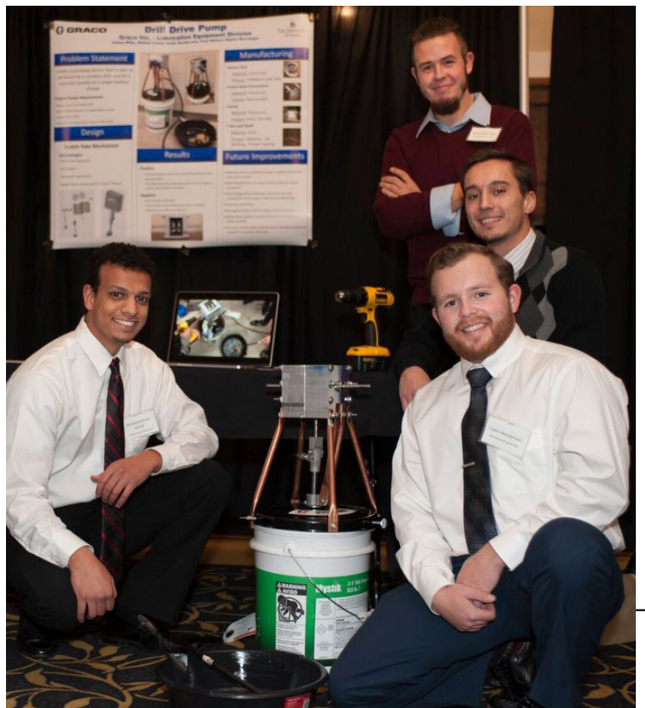
Lab engineers Zane Brewer (right, B.S. ME UI 2016) and Brian Snider (left, B.S. ME ISU 2012) recently joined the Engineering Technology Center in the College of Engineering to manage three laboratories in the Seamans Center: The Ralph and Barbara Stephens Experimental Engineering Laboratory, The Design for Manufacturing Laboratory, and The Fluids Laboratories.

They are responsible for maintenance and organization of lab equipment and instrumentation, oversight of activities occurring in the labs, supporting teaching in the laboratories, and providing technical support in the development and expansion of the labs.

Senior Design Night Photos

Students presented their research posters to each other, university faculty, and industry sponsors this December





The University of Iowa
College of Engineering

Mechanical & Industrial Engineering
The University of Iowa
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MIE Department & Friends

Photo taken from MIE's 2017 Winter Party. Faculty, Staff. and graduate students mingled and had fun!