BuckISE

News from The Department of Integrated Systems Engineering at The Ohio State University

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Lincoln Electric, Honda Help Students Gain Robotics, Automation Experience

Stories by Nancy Richison
Photos by Cedric Sze

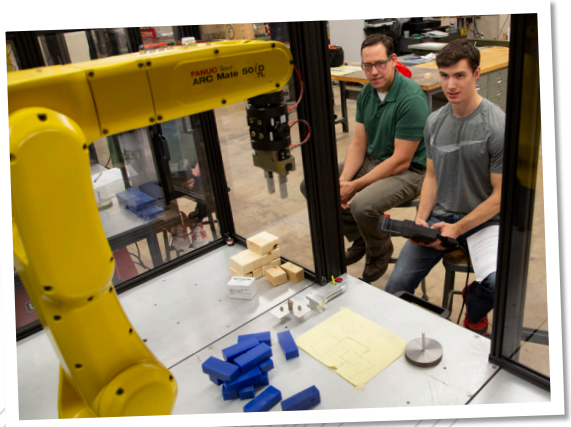
In order to increase production and perform riskier operations at a high rate of speed, modern automation requires the use of robotics and programmable logic controllers, or PLCs. In keeping at the forefront of technology in instructional courses, The Ohio State University Integrated Systems Engineering Department implemented a two-part series of lab-based courses in Industrial Automation & Industrial Robotics.

The courses provide hands-on experience in dealing with PLCs and their peripheral sensors and accessories, and then gives the students exposure to solving automation problems.

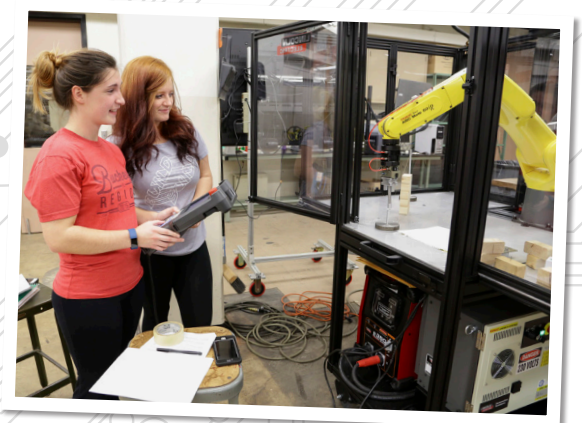
"PLCs are basically very robust and hardened computers specialized to control automated systems," says Manufacturing Laboratory Supervisor Joshua Hassenzahl, who teaches the courses with Manufacturing Engineer William Tullos.

"Our robotics program was able to get off the ground through a generous donation of two welding cells donated by Lincoln Electric," Hassenzahl says. "With these cells, we were able to offer an initial course in robotics, which directly complemented our automation course dealing with sensors and PLCs."

He says the combined automation courses were such a success that the Department had more students wanting to enroll than available spaces and sought to acquire another teaching cell from FANUC, a leading manufacturer of automated cells, or robots.



Manufacturing Laboratory Supervisor Joshua Hassenzahl works with a student on the basic programming steps for a robot as part of an Industrial Robotics course.



Students hold a "teach" pendant, which is the primary way to interface with the robot.

Department Chair Farhang Pourboghrat allocated funds for instructional support, which expanded the program, Hassenzahl says. "The other motivation for this was that it allowed us to qualify for the FANUC certification program, which will recognize the training as being FANUC-certified and approved, allowing the students to add that certification to their resume and increase their attractiveness to potential employers."

Another boost to the program occurred when Shubho Bhattacharya, an associate chief engineer at Honda North America and a member of the ISE Advisory Board, brought members of the Honda engineering management team to visit the lab. "They were impressed with the direction we were taking in the courses," Hassenzahl says, "and wanted to see how Honda could complement what we are trying to accomplish."

Bhattacharya, who is also co-director of the Honda-Ohio State Partnership, facilitated a donation from Honda North America to the ISE department to purchase a fourth robot, which was installed at the end of July.

Involvement and Dedication Help Department Grow and Innovate

Farhang Pourboghrat
Professor and Department Chair

The ISE Department had another year of growth in terms of new faculty joining the Department. These faculty members will be working on fundamental research vital to the health, growth and security of our nation, such as cognitive engineering, network economics, data analytics, machine learning, robotics and automation, and high-speed manufacturing and joining, to name just a few. You can read more about the new faculties and their research interests in this issue of *BuckISE*.

You can also learn more about a recent generous gift from Honda, which has given the ISE Department the funds to purchase a fourth FANUC robot. This new addition allows the ISE Department to increase student enrollment in the lab-based courses in Industrial Automation & Industrial Robotics, and to offer students to become FANUC-certified.

I also am pleased to announce that Professor and ISE Associate Chair Ramteen Sioshansi will lead a core team of faculty from seven colleges across the university to develop and implement next generation models for science, technology, engineering and mathematics graduate education training. The STEM traineeship program is part of a $3 million grant awarded to Ohio State by the National Science Foundation. The program, to be launched in the fall of 2020, anticipates training 80 PhD students over its four years.

In other news, the leadership of the external advisory board (EAB) has recently changed with Chuck Elgin stepping down after serving as the chair for 42 years! I cannot express enough gratitude for the time and energy that Chuck has given to the ISE Department. I also am grateful to Dr. George Smith for serving ISE in so many different roles, including as an ISE faculty member, the ISE Department chair, as well as a member of EAB since 1968! The newly elected chair of the EAB is Bobby Smyth, who I am certain will bring similar levels of energy and enthusiasm just as Chuck did in his leadership role.

I would like to close by thanking the ISE alumni for their generosity and willingness to give back to the Department. Without their gifts, the ISE Department would not be able to accomplish its goals to provide our students with the best educational program that they deserve. I look forward to hearing from you with any comments and suggestions.

Air Force Recruiting Engineers from Undergrad Capstones

When Associate Professor Michael Groeber learned that the Air Force was looking at midwestern universities for workforce development and recruitment projects, he pitched a project on autonomous robotic inspection of components.

The project involves robots scanning airplane parts to check for interior damage. He compares it to how MRIs work with the human body. “We wanted to have a project that related to what their interest is,” Dr. Groeber says.

The Air Force Research Laboratory (AFRL) is seeking to actively recruit undergraduate students who are able to obtain clearance from the Department of Defense. Dr. Groeber says the AFRL wants to identify projects that will build broad skillsets in students who then want to purse graduate degrees and careers in defense.

Through funding received from the AFRL, Dr. Groeber developed the undergraduate capstone program using robotics for inspection and quality control. In addition to scanning components on aging aircraft, he says the program also trains students to better analyze data.

Due to different parts being replaced over the years and different drawings maintained for various aircraft, Dr. Groeber says, “We can’t preprogram a robot to scan part X every time.”

The AFRL grant funds three to four multidisciplinary capstone teams in the College of Engineering. The teams design a system, scan parts and identify areas that could have damage and then more thoroughly inspect that part.

“The goal of the Air Force side is they want students who work creatively on the workforce development side,” Dr. Groeber says.

He says the systems developed could have applications across broad disciplines.

ISE Advisory Board Passes the Torch

Fellow BuckISE:

When you think of a legend, who comes to mind – Michael Jordan, Derek Jeter, Tom Brady, Woody Hayes, Urban Meyer, George Smith? It’s time to recognize another: Chuck Elgin ’78, who has led the ISE Alumni Advisory Board for 42 years, giving back so much more than he received from the ISE Department. His legacy and impact are immeasurable. Chuck may have been a behind-the-scenes force during your time in Baker Systems, but trust me when I say that you likely benefited from his leadership.

At the last Advisory Board meeting, I was overcome with emotion as a collection of my mentors and heroes elected me to step into the role that Chuck Elgin defined. In the most literal and classic sense you’ll find my approach to be: “Just don’t screw it up!”

Over the next three years, the Advisory Board will continue its hands-on engagement with students, participate in speaking events, weigh in on industry needs for curriculum, sponsor projects and promote the top-notch program we have at Ohio State.

From the point of view of someone eight years into a management consulting career, it’s obvious the ISE skillset propelled me straight into a meaningful career helping people and companies alongside others I love. It’s no accident that our current students, with their ever-expanding gifts, are receiving numerous offers upon graduation.

Whether you are a current student, a beloved alum, faculty or friend, expect the Department and Advisory Board to keep thinking big and accomplishing great things. We are more connected with professors and advisors, the college, companies, development officers and, of course, students than ever before!

There is often debate over the Midwest humility that somehow inhibits us from telling our story. I think this debate is misguided. Our profession is simply less tangible than others; that’s what makes it great. Let’s work hard to explain and promote its strengths because the ISEs I know are magnetic, mature, business and academic leaders who always bring humility to the podium alongside their incredible accomplishments and wisdom.

Wherever life has taken you, I hope you will continue to give back of your time, talent and/or treasure to the place that gave us so much.

Go BuckISE,
Bobby Smyth

If you would like more information on ISE, or would like to discuss other opportunities to assist the Department, please contact Jen Morris at morris.1392@osu.edu.

Ergonomics Graduate Capstone Gets Rolling with Honda

Two ISE graduate students, specializing in physical ergonomics, used the new graduate capstone project course, sponsored by Honda, as their culminating master’s of science project experience. Honda had ergonomics standards that could be used to assess musculoskeletal injury risk for a large variety of the manual operations in their facilities. Recently, ergonomics personnel at Honda expressed interest in exploring newer findings that have been published in the ergonomics literature.

The ISE students, Alex Kreider and Wei Yuan, worked with the ergonomics personnel at Honda of America Manufacturing, Inc. and ISE Associate Professor Steve Lavender to review the scientific literature supporting the Honda ergonomics standards. Specifically, this review process aimed to identify discrepancies and recommend updates.

Kreider and Yuan studied the peer-reviewed publications as well as conference proceedings that address the topics covered by the standards. They sought to determine if there were discrepancies between what is advocated in the literature and what is being implemented in practice by Honda. The students constructed tables for each standard summarizing the published findings. Most of the standards had several specific components. Through this review process, changes were recommended for 28 percent of the components, all of which, when adopted, are expected to enhance the safety and health of Honda employees worldwide.

Dr. George Smith Continues to Leave His Mark on Former Students

For countless alumni who passed through the doors of Baker Systems, the name of one professor stands out above all the rest: Dr. George L. Smith.

Dr. Smith came to Columbus as an assistant professor in 1968 and would move up the ranks serving as chair of the ISE Department from 1982 to 1994, until his retirement as a professor emeritus in 1995.

When asked about his legacy as one of the most beloved professors and what he did to leave such a wonderful impression on his former students, Dr. Smith says, “I tried to learn each student’s name and know them as individuals, rather than just as a student in my class.”

During his tenure as Department chair, Dr. Smith worked with former Assistant Dean for Women and Minorities Marianne Mueller to increase female and minority enrollment in ISE. He also helped to raise the national status of the ISE Department by being active at the IISE leadership level. Among his various roles were vice president, treasurer and president of the Society for Engineering and Management Systems and president of the Council of Industrial Engineering Academic Department Heads.

Personally, his proudest moment was “being named a fellow in three separate professional organizations: Institute of Industrial and Systems Engineering, Human Factors Society and World Confederation of Productivity Science.”

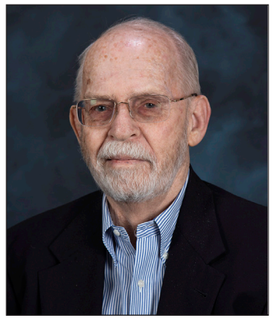
Dr. Smith, who was born in State College, Pennsylvania, earned his PhD in industrial engineering from Oklahoma State University in 1969, dual master’s degrees in psychology and in industrial engineering from Lehigh University, and a bachelor’s in industrial engineering from Pennsylvania State University.

The Pennsylvania native chose Ohio State for “two major reasons: the reputation of the Ohio State ISE Department nationally and the opportunity to work with Tom Rockwell in the human factors area.”

He says he never had to switch allegiances from the Nittany Lions to the Buckeyes. “I feel loyalty to both schools,” he says. “When the teams play in Columbus, I root for the Buckeyes. When the teams play each other in State College, I root for the Lions. The only time I feel conflicted is when the Ohio State and PSU wrestling teams meet, since I was a member of the PSU Wrestling Team from 1954 to 1957.”

Dr. Smith, a member of the ISE Advisory Board, has received numerous awards throughout his life, including a Distinguished Teaching Award from the College of Engineering in 1982, the Everett D. Reese Medal from Ohio State in recognition of exceptional service in private philanthropy in 1992 and the IISE Fred C. Crane Distinguished Service Award in 2008. In 2014, IISE established the George L. Smith International Award for Excellence in Promotion of Industrial Engineering. Although he served on the IISE Board of Trustees for many years, this award recognizes his international promotion of the industrial engineering profession to be his greatest legacy to the global IE community. He was active in the international productivity movement for more than 20 years.

Receiving the Distinguished Teaching Award remains as one of his favorite memories from his Ohio State days. Others include serving as the faculty advisor to the IISE student chapter and co-chairing the faculty-staff division of the first major comprehensive fundraising campaign at Ohio State in the late 1980s. “It was a five-year campaign from 1985 to 1990 with a goal of $350 million,” Dr. Smith recalls. “When it closed in 1990, there were gifts and pledges of over $460 million.”



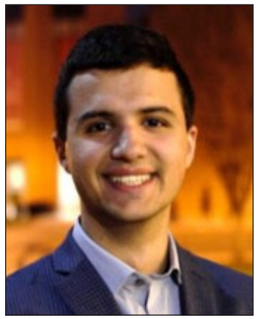
“I tried to learn each student’s name and know them as individuals, rather than just as a student in my class.”

If you would like to make a gift in honor of Dr. Smith, he and his wife have created the George & Patricia Smith Scholarship fund to support undergraduate ISE students. Please contact Jen Morris at morris.1392@osu.edu.

STUDENT NEWS

Arrows in the Quiver Team Journey

Integrated Business and Engineering Honors student George Valcarcel recently completed the Hacking for Defense™ course. We asked Valcarcel to share a glimpse into why the course had such an impact on him.



Never before had I been on a team comprised of members so different than me. To begin with, we represented different majors, including industrial systems engineering, public affairs and economics. In addition, we had both graduate and undergraduate students, an international student and a decade-plus-year age-gap between me and our oldest member.

Our team was paired with the Ohio National Guard. The Guard’s leadership expressed their desire to acquire a counter-UAS (drone) capability for use in their domestic operations. From their perspective, they viewed the core issue for our team to solve as identifying a mission-ready technology to be procured.

The integration of thousands of hobbyists and commercial UAS being flown in the national airspace poses an ever-increasing security risk. Overseas, ISIS insurgents have been strapping explosives to small UAS flown over enemy lines. In January, a hovering UAS shut down London Gatwick airport for three days, inflicting billions of dollars’ worth of economic damages.

We met with General (Ret.) Mark Bartman – the previous adjutant general, which is the highest-ranking commander in the Ohio National Guard. He carefully walked us through the nuances of the National Guard organization, including its dual authorization under both federal Title X and the state governor under Title XXXII. We also learned about the Guard’s two missions: fighting overseas and defending the homeland during disasters and emergencies.

The team then moved into the process of “beneficiary identification” – conducting interviews with Guard personnel to pinpoint which units stood the most to lose/felt the greatest pain without counter-UAS capability. An important insight emerged during a conversation with a security force commander who mentioned using counter-UAS equipment while deployed overseas with the Guard. When asked about the protocol for responding to a UAS sighting at their domestic air wing, the commander responded that the FAA only permits observing and reporting the threat, and coordination with local law enforcement to apprehend the operator. The team confronted the possibility that the root cause of the Guard’s problem was a policy gap, rather than identifying a technology as leadership initially understood.

In meeting with counter-UAS technology vendors, the team uncovered that systems for detecting, identifying and interdicting UAS – albeit imperfect – do exist, but are legally restricted from being used in domestic airspace, which is federally controlled by the FAA. The team doubled down on developing a policy advocacy strategy, with the goal of positioning the National Guard to be extended authorities by Congress for a domestic counter-UAS program. Due to the nature of deliverable being new legislation, the team shifted its primary beneficiary to be the Ohio Adjutant General whose strategic role includes championing pro-Guard policy.

The final open question involved defining an actionable pathway for deploying our policy proposal. Discussions with Guard Legislative Affairs led us to believe our proposed bill would best fit within an upcoming National Defense Authorization Act. We explored different channels to get our proposal to Congress, including the National Guard Bureau and the National Guard Association of the U.S. – the Guard’s advocacy group.

Having assembled all the pieces of the puzzle, our team delivered an executive briefing to the Adjutant General and other high-ranking Guard officers. Following our 45-minute briefing, the Adjutant General and Guard leadership team proceeded to ask us questions about our analysis and recommendations. Their feedback was overwhelmingly positive, including this statement: “Your proposal is implementable and, in a few years, will be part of the solution to address this critical threat to the Guard’s readiness”

No other university course could ever allow me to make such a tangible impact on solving the challenges faced by our national defense and security community.

ISE Faculty, Students Play Key Roles at Swedish Symposium

The Ohio State Integrated Systems Engineering program was well-represented at the Resilience Engineering Symposium this past June in Kalmar, Sweden.

Professor Dr. David Woods, Assistant Professor Dr. Mike Rayo and Research Associate Asher Balkin presented a workshop on Proactive Systemic Contributors and Adaptions Diagramming, along with graduate student Morgan Reynolds, who is pursuing her master's degree. PhD candidate Laura Maguire gave a talk on the costs of coordination in critical digital services and presented a poster exploring resilient strategies of mountain safety professionals. PhD candidate Christine Jefferies, MSN RN, assisted in running a simulation and discussion of a NASA Near-Miss Case given by Beth Lay of New York-based Lewis Tree Service, along with Balkin and Marisa Grayson, MS ISE '18. Jefferies also presented a poster with Dr. Rayo exploring resilience engineering in the ongoing design of the new Wexner Medical Center tower.

ISE graduate students Laura Maguire (third from right) and Morgan Reynolds (far right) with the 2019 Young Talents cohort at the Resilience Engineering Symposium in Kalmar, Sweden.

Maguire and Reynolds were invited to attend as part of the Young Talents Program and presented their work to a panel of mentors during a one-day seminar. Just 10 students are selected worldwide to participate in the biannual program.

"I'm grateful for the rare opportunity to present to and receive feedback from some of the leading experts in resilience engineering," Reynolds says. "It provided valuable practice defending my current work, inspired new ideas to further the research and allowed me to network with many researchers and practitioners whose work has shaped my studies in the field."

Through the Young Talents Program, the mentors provided recommendations and constructive criticism.

"Both the Young Talents' experience, the formal symposium program and 'the hallway track' of informal discussions at the breaks was invaluable to me at this stage of my program," Maguire says. "It allowed me to develop my network, refine my ideas and learn about work happening in other labs around the world."

The symposium brings together researchers interested in resilience engineering, systems safety and risk management within high-risk, high-consequence domains, such as aviation, maritime shipping, air traffic control, nuclear power generation, critical digital services and healthcare. More than 140 participants from around the world gathered to share research, innovative applications and insights into the practicalities of large-scale, distributed operations. The theme of this year's conference, Speeding Up and Scaling Up, addressed the challenges faced by multinational organizations whose fast-paced work demands near perfect, 24/7 reliability.

"It was incredible to attend this conference so early in my doctoral studies," says Jefferies. "The opportunity to engage in informal discussions and networking with the brightest minds in RE was an invaluable experience. I made several new professional connections in diverse industries who were eager to hear my thoughts and offer their perspectives on questions I have. I felt truly supported as a new addition to this field."

ISE Grad Student Carmen Grande Keeps Her Eye on the Ball

Playing basketball overseas was always a big dream for Carmen Grande, who first pursued the sport as an 8-year-old in her hometown of Tres Cantos, Madrid, Spain.

Not only did she achieve that dream, but as a guard for the Ohio State Women's Basketball team, she hit the 1,000 points scored mark with more than 800 assists in the 2018-19 season. "Reflecting back on that, it's insane that I did that," she says.

Especially, when you consider that Grande also carries a 3.9 GPA as an Integrated Systems Engineering graduate student. While it can be challenging managing an athletic career at a Division I university with a rigorous course load, Grande says mental fatigue does happen, but, "If you are able to overcome that barrier, then you can achieve anything you put in front of you for the day. However, it can become tiring and it can make you lose sight of your goals. If you stay on track with basketball or engineering, usually the other one comes easily."

An average day for Grande depends on the season and the number of basketball games scheduled. Typically, she attends a couple of classes, hits the gym, grabs a quick lunch and then spends another four to five hours working out, lifting weights, watching film and attending meetings. Then, she squeezes in another meal followed by a class, study table or studying on her own for around three hours. Finally, it's time for a healthy dinner and back to the gym for a few extra shots before bedtime by 11 p.m. "Pretty busy," she says, "but manageable in my opinion."

Grande is used to putting in the work to achieve her goals. As a club team player in Spain, her team reached the championship game of the league for the first time in its history and was "one of the first teams to make big noise under Madrid's spectrum," she says. "After that, I switched to another club and there we won the Madrid F4 a couple of times and got medals in the Spanish Championships." She also helped the Spanish National Team to a first-place finish in Slovenia in 2011.

Grande was recruited by Indiana State, Akron and Ball State. As a freshman at Ball State, she was named to the All Mid-American Conference Freshman Team. Her sports honors are lengthy, culminating in 1,050 points and 841 assists making her the 31st player in NCAA history with more than 1,000 career points and 800 career assists. At Ball State, she earned a degree in mathematical science and was a two-time Academic All-MAC.

As a graduate transfer student, she was recruited by Oregon, Virginia, Nebraska, Kentucky and Baylor, but chose to become a Buckeye, "because it is an overall well-rounded program; good athletic department that gives me freedom to express who I am and explore, and amazing academic programs that are going to back me up for life if I don't end up pursuing a basketball career."

But before she decides in which direction her life will take her, Grande is pursuing her master's degree in Integrated Systems Engineering. "Right now, everything is an open question, but I am excited to figure out more about it as the year goes by!"

From ISE to MD, Problem-solving Skills Have Dual Applications

Dr. Susan Vasko's first exposure to the medical field occurred when she was an Ohio State graduate student working on her master's thesis involving the design of a railroad handbrake.

"Fine needle electrodes were inserted in the back muscles of volunteers and the data fed into a computer to measure and analyze [the electromyography]," she recalls. "After working for Honeywell in Phoenix as a human factors engineer, I had the bug to go into medicine."

When she had first arrived in Columbus, Dr. Vasko (BS ISE '79, MS ISE '80, MD '86) had planned to pursue an engineering degree following in the footsteps of her father, who was an electrical engineer. Her attraction to integrated systems engineering had been its focus on math, statistics and ergonomics. Engineers do well in medical school and as residents, she says, due to their problem-solving skills.

"From the beginning of medical school, I had an interest in plastic surgery due to its biomechanics and reconstructive focus," she says. "Engineering is problem-solving and especially useful in performing reconstructive surgery after trauma, or in cancer treatment, which involves planning for tissue requirements, function and aesthetics."

Today, Dr. Vasko is a member of the American Society of Plastic Surgeons and the American Society for Aesthetic Plastic Surgery. A fellow of the American College of Surgeons, she is certified by the American Board of Plastic Surgery, and a board examiner for the American Board of Plastic Surgery. She serves as the program director for Riverside Methodist Hospital's Plastic Surgery Residency Program, is a clinical instructor for The Ohio State University College of Medicine and a member of the ISE Advisory Board.

She says her roles with the residency program and the advisory board both focus on preparing students for their future careers and paying attention to the process of how to best achieve quality. Dr. Vasko says she is impressed by the students she has encountered at Ohio State, noting that they are more involved in industry than in the past.

"Obviously the whole computer experience is light years from the days of key punch cards," she says. "I am thrilled with the Spine Research Institute in ISE since my master's project involved this subject, plus I see the biomechanics of the medical industry being studied. This includes benefits to the surgeons in their job activities and safety, plus benefits to patient care."

Dr. Vasko says her proudest achievement is helping to educate the next generation of plastic surgeons. "Medical student and resident education not only allows me to participate in forming future doctors but pays back in staying current in the field of medicine," she says. "I was selected to be a board examiner for the American Board of Plastic Surgery for the oral boards, which ensures the plastic surgeons coming into practice are of the highest quality."

Getty Image

Ohio State Changed Facebook Engineer's Life Course

Neil Naples' decision to attend The Ohio State University College of Engineering not only ensured his future career, but potentially saved his life.

After earning his bachelor's degree in engineering physics and a master's degree in integrated systems engineering from Ohio State, the Maine native was studying for his PhD in ISE in 2014 when he was diagnosed with chronic leukemia.

"Fortunately, the James (Cancer Hospital) was right there on campus," Naples says. "There was no better place to be."

Today, Naples is a diamond turning engineer for Facebook Technologies' Oculus VR, a virtual reality hardware and software developer, in Redmond, Washington.

Naples' specialty is so rare that even before he graduated, he was highly recruited. "I did five on-site interviews and one not on-site, and got six offers," he says. "People ate it up: 'You're a precision engineer and a machining guy? Come work for us!'"

The decision to take the offer from Facebook came about following a connection made as a graduate research associate at Ohio State. In the fall of 2012, Naples began working for ISE Professor Allen Yi. "He needed a student who had a background in machining and someone who was getting his PhD," Naples recalls.

Dr. Yi would eventually put him in touch with Alex Sohn, a research scientist at Facebook Reality Labs. Naples contacted Sohn in early 2018 and remained in touch with him throughout his doctoral program, and is now one of two ultra-precision engineers working for Facebook.

"His research focus was on high precision manufacturing, specifically on freeform optical surface fabrication – a difficult challenge for optical manufacturing today," Dr. Yi says of his former student.

Naples, of course, is up to difficult challenges. He still shakes his head at the coincidences that landed the New Englander in the heart of Ohio. Like many of his high school friends, he was interested in a career in machining and decided to attend Southern Maine Community College, where he earned an associate degree in precision machining and manufacturing. While there, his physics professor told him about Ohio State's engineering physics program, where the professor had earned his degree. Because it is not a major offered at many universities, Naples decided to continue his education in Columbus, which landed him right next to the James.

"It makes me wonder sometimes, I must admit," he says of the fate that placed him in the right place at the right time.

When cancer first struck, it was slow-acting and required Naples to take a pill once a day as part of his chemotherapy. By the end of 2016, the medicine became ineffective and the cancer was now termed acute lymphoblastic leukemia. He underwent an intense six-month chemotherapy protocol, and on June 14, 2017, had a bone marrow transplant.

"It took a lot of effort, but it was not impossible," Naples says. "A good day in chemo is when you're still alive at the end."

He recalls missing most of that year, from January through October, and putting his studies on hold. "The folks at the James basically took over my life," he says. "I couldn't have taken a single, one-credit class if my life depended on it.

"I was not around the lab much, then I started back one day … then two days …"

He earned his PhD in December 2018. Even better? "I'm 100 percent in remission now," Naples says. "It still kills people my age, who are otherwise healthy, like I was. It's not just the timing. It's the location. I think how close I was to the James."

GOLDEN ANNIVERSARY

Happy Birthday, Baker!

Baker Systems Engineering Building officially turned 50 years old on Aug. 12, 2018. In celebration of the building's first half-century, *BuckISE* looks at some of the changes over the years through photos of the building.

Originally built at a cost of $3.1 million, the building sits on the site of the former veterinary clinic at 1971 Neil Avenue. When it opened, it officially was named the Systems Engineering Building by the Ohio State Board of Trustees on Nov. 9, 1967. Following the untimely death in a plane crash of Department Chair David Baker, the Trustees voted on July 9, 1970 to rename the building The David F. Baker Systems Engineering Building in his honor. Dr. Baker is credited with establishing the four-year undergraduate program for industrial engineering.

Page 10: Baker then and now

This page, clockwise, starting top left:

The 1966 groundbreaking

Modern computer labs redesigned in 2014 feature a group study lab and individual stations in a "quiet room."

The newly renovated ISE Department office suite

The Spine Research Institute

Dean David Williams and Brutus participate in the ribbon-cutting for the updated student lounge in 2012.

Naghizadeh to Serve Dual Role in ISE and ECE

Dr. Parinaz Naghizadeh joins the Ohio State faculty this fall with a joint appointment as an assistant professor in integrated systems engineering and electrical and computer engineering.

Dr. Naghizadeh, who earned her PhD in electrical engineering and dual master's degrees in mathematics and electric engineering from the University of Michigan, also holds a bachelor's degree from Sharif University of Technology in Iran.

Following a postdoctoral research fellowship at UM and working as a postdoctoral research associate at Purdue University and Princeton University Edge Lab, Dr. Naghizadeh says her new role at Ohio State will allow her to do more interdisciplinary research and teaching.

"During my visits, I came to learn about many research opportunities, especially potential collaborations with ISE colleagues," she says. "I've found the Department atmosphere to be quite supportive, and I also believe I'll have the opportunity to interact and work with great students.

"There are a number of research centers across campus including the Center for Automotive Research, which I've gotten to visit, and I'm looking forward to being involved in these centers as well."

Dr. Naghizadeh was named a 2017 Rising Star in EECS (electrical engineering and computer science); a finalist in the ProQuest Distinguished Dissertation Award; and ranked 14th among nearly 350,000 participants in Iran's Physics and Mathematics Nationwide Universities Entrance Exam.

She has written numerous papers and given several presentations and invited talks. Her research interests include network economics, game theory, learning theory, reinforcement learning, and data analytics, with applications in edge computing and cybersecurity.

Design and Research Engineer Nassiri Joins ISE Faculty

A research scientist in the Simulation Innovation and Modeling Center at Ohio State, Dr. Ali Nassiri joins the ISE faculty this fall as a research assistant professor.

The overarching goal of his research is to fundamentally understand the materials behavior subjected to large plastic deformation during high-speed manufacturing, in particular, joining and forming processes.

"In the automotive, aerospace, appliance, medical device and various other industries, there is a primary need to create lightweight structures," Dr. Nassiri says. "One approach relies on the use of multi-material structures. However, due to disparate melting temperatures of materials and tendencies to form brittle intermetallic compounds, many dissimilar metal pairs cannot be joined with conventional fusion-based joining processes. To achieve this goal, we utilize a combination of cutting-edge multi-scale multi-physics numerical simulations, mechanical testing and advanced materials characterization."

At the SIMCenter, Dr. Nassiri has worked on several projects for automotive companies, including Honda and Ford. "I joined Ohio State in 2016 as a postdoctoral researcher at the Center for Design and Manufacturing Excellence with a joint appointment in the Department of Materials Science and Engineering. It was such an honor to join one of the best engineering schools in the nation as a researcher and work alongside the world-class faculty," he says.

Dr. Nassiri has authored or co-authored more than 30 journal and peer-reviewed conference papers. He also has received numerous awards from the National Science Foundation, North American Manufacturing Research Community, and Microscopy and Microanalysis. He received his PhD from University of New Hampshire in 2015. Prior to that, he worked several years in industry as a design and research engineer.

Korkolis Brings Constitutive Modeling Background to Manufacturing Track

Dr. Yannis Korkolis, who joined the faculty of the Department of Integrated Systems Engineering as an associate professor of manufacturing in January, says he is already impressed with the scientific expertise and diverse atmosphere he has found at The Ohio State University.

His research is at the interface of constitutive modeling, formability and ductile fracture, and manufacturing processes. He has worked on constitutive modeling of advanced aluminum alloys, formability and failure prediction, microforming, modeling of machining operations, sheet metal forming, continuous-bending-under-tension and pulsed tube hydroforming. His particular approach involves multiaxial experiments, oftentimes using unique, custom-built equipment, combined with the use of recent advanced material and numerical models. The fact that Ohio State is able to attract industry interest in this type of research was a motivating factor in bringing Korkolis to Columbus.

"Ohio State has always been at the forefront of research in my field in the United States, so that was very attractive," he says.

Dr. Korkolis, who taught Solid Mechanics, Manufacturing and Design at the University of New Hampshire, has also held visiting appointments at Kyoto University and Tokyo University of Agriculture and Technology in Japan. He has two years of experience in industry and the military, and has published more than 42 peer-reviewed journal papers and has delivered more than 120 conference papers, presentations, posters and invited talks.

Dr. Korkolis graduated from the National Technical University of Athens (Greece) with a 5-year diploma in mechanical engineering and a master's degree in computational mechanics. He earned his PhD in engineering mechanics from the University of Texas at Austin, where he worked on the formability and hydroforming of anisotropic aluminum tubes for automotive applications.

He currently serves as an associate editor for the American Society of Mechanical Engineers (ASME) Journal of Manufacturing Science and Engineering, and is the chair of the 2019 Numerical Methods for Industrial Forming Processes (NUMIFORM) conference.

IJtsma to Focus on Cognitive Systems

Dr. Martijn IJtsma joined the ISE faculty this fall specializing in cognitive systems engineering. Dr. IJtsma, who previously taught at Georgia Institute of Technology, says he was attracted to Ohio State because it is one of the only universities in the world with a program focused in cognitive systems engineering, both at the undergraduate and graduate levels.

"The university has a long and impressive track record in this research area, so I am excited to contribute to that," Dr. IJtsma says. "I am also very excited about working with the students at Ohio State. The students I have met so far have told me enthusiastic stories about their research, coursework and other activities. The atmosphere in the department is friendly and welcoming, and there seems to be a lot of interaction between students and faculty members. This makes me confident that Ohio State is a great place to work."

He says he also looks forward to the many potential collaborations through Ohio State's prominent research and industry communities that are involved in human systems integration. "I recently had the chance to meet some of the local scientists and practitioners in my field at a conference in Dayton, which was a great experience," he adds.

Dr. IJtsma earned his degrees in aerospace engineering, which include a doctorate from Georgia Tech and a master's and bachelor's degree from Delft University of Technology in the Netherlands. A member of the Human Factors and Ergonomics Society, he served as a graduate research assistant and research intern at Georgia Tech prior to coming to Ohio State.

He looks forward to developing a new graduate-level course on computational modeling of work systems and is seeking graduate students interested in human-robot team design and computational simulation to work in his lab.

Human Factors Essential in Preparing for Disasters

Professor Dr. David Woods recently shared his expertise on emergency preparedness in the event of a mass disaster at the invitation of the government of Taiwan and Taiwan Medical University. The talks were to better prepare medical facilities when faced with emergency situations.

“Most emergency medical facilities operate at near capacity or beyond capacity,” Dr. Woods says. “Even a small event is already a challenge. They do a great job trying to deal with surges that risk overload. The goal is to better plan to build the readiness to respond when these events challenge normal work.”

A pioneer in resilience engineering, Dr. Woods often is consulted prior to or after a complex system failure, as was the case with the Argentina massive blackout and computer glitch at Target stores earlier this summer. He was interviewed by Boston radio station WBUR to learn more about why complex systems fail, and by *Air Traffic Management* magazine on the Boeing 737 MAX crashes.

Dr. Woods explains that even as technology gets more sophisticated enabling greater advances, people are still a key ingredient that should not be underestimated or overlooked because they provide an essential, but hidden capability for resilient performance when surprises occur.

“People, and only people, provide the capability to adapt,” he says. “In the Taiwan case and others, it’s people stepping forward when plans break that produces resilient performance under pressure.”

ISE Professor Dr. David Woods is interviewed by a Taiwan television reporter while he visited the country to offer recommendations on disaster preparedness.

When preparing for potential disasters, he says it is essential to have the ability to anticipate the potential bottlenecks ahead and synchronize activities across multiple roles. Whatever the plan, the surprise or anomaly produces unique challenges that go well beyond what is expected, he says, such as a large mass casualty event.

A member of the Taiwan Medical University will be visiting Ohio State this fall to extend the data analysis on large mass casualty events in order to develop a guide for activities and plans that build the capacity for resilient performance.

Faculty, Students Help Recruit Krening to Ohio State

Dr. Samantha Krening was contemplating a return to industry after earning her PhD in robotics at Georgia Institute of Technology when she received a phone call from ISE Professor Dr. David Woods.

Dr. Krening had recently had a journal article published and says Dr. Woods “wanted to talk about my research and by the end of the call, he asked if I’d visit Ohio State for an interview.”

She visited Ohio State in January and recalls that “it was raining – freezing cold – and I still loved it. The people here are great – the faculty, staff, grad students and undergrads. They somehow convinced a group of undergrads to meet me for breakfast before 8 a.m., and I was very impressed by the caliber of students. Not many places are able to show off their undergrads like the ISE Department at Ohio State.”

Dr. Krening says she became very excited about the possibility of teaching these students, pursuing her own research questions and working with the professors here. “It doesn’t hurt that Ohio State has some of the best human-systems research in the U.S,” she says.

Her research in interactive machine learning involves enabling people to naturally and intuitively teach robots how to perform functions.

She holds a master’s and a bachelor’s degree in aerospace engineering both from University of Colorado at Boulder. At Georgia Tech, Dr. Krening was a graduate research assistant, and had previously worked in the Jet Propulsion Laboratory at NASA. In addition to teaching experience at Georgia Tech and NASA, she has served as a guest lecturer at the European Space Agency where she taught more than 60 engineers to use the SPICE toolkit for spacecraft missions.

BuckISE on the Move

Ohio State ISE students participate in a variety of student chapters of professional organizations that add to their education and help prepare them for the workforce. Here’s a roundup of some of the activities sponsored by Institute of Industrial and Systems Engineers (IISE), Big Data and Analytics Association (BDAA), Society of Women Engineers (SWE), National Society of Black Engineers (NSBE) and Society of Hispanic Professional Engineers (SHPE), and two new student organizations: University Innovation Fellows (UIF) and Interdisciplinary Resource for Innovative Students (IRIS).

SWE

The Society of Women Engineers’ mission this year centered around community, according to SWE Conference Coordinator Dana Gill. This was accomplished by focusing efforts on the recruitment and retention of members.

“As always, SWE sought to encourage members to achieve their full potentials both professionally and personally,” Gill says.

She says, the most successful events included outreach events – the Engineering Ball and the Recharge Engineering Retreat. “More than 400 engineering students gathered at the ball and enjoyed a fun, social night together,” according to Gill. “The Recharge Engineering Retreat was an overnight event in which 60 engineering students traveled to Mt. Sterling and participated in relaxing, rejuvenating activities to learn more about themselves.”

Other outreach events included interaction with Girl Scout troops, middle school STEM events and a pen pal program with high school girls interested in engineering.

Twenty-four members attended the national conference in Seattle and 26 members attended the WE18 SWE conference in Minneapolis, participating in an outreach event called Invent-It-Build-It where more than 3,000 young girls joined them to learn about engineering.

Upcoming events include the popular professional development workshop, and social, educational and alumni events. SWE also will be holding the annual SWE Career Fair to help Ohio State engineering students obtain internships, co-ops, full-time jobs and research opportunities.

UIF

Eight current Ohio State students serve as University Innovation Fellows on campus and are part of a global community through the Stanford Hasso-Plattner Institute of Design, according to George Valcarcel, one of the fellows. A third-year ISE major, Valcarcel collaborated with other members of the Integrated Business and Engineering Honors Program to establish Ohio State's first Leadership Circle to apply to the global UIF program through Stanford. Valcarcel says he saw UIF as "an opportunity to further impact and enhance multiple dimensions of the overall innovation and entrepreneurship eco-system on Ohio State's campus."

An intensive six-week training program required the Ohio State team to "get out of the building" to engage key campus stakeholders and map the landscape of the university's innovation and entrepreneurship centers and resources. "This process allowed for the team to identify patterns and distill key areas of opportunity for the new OSU University Innovation Fellows initiatives," he says. These included:

- Creating curriculum that is more multi-disciplinary and entrepreneurial-minded
- Fostering more collaboration between forward-thinking student organizations
- Developing on-campus spaces for student collaboration and innovation
- Better connecting the Ohio State campus and Columbus startup eco-systems

After completing the training program, the team headed to Silicon Valley for an energizing meetup with more than 250 innovation fellows representing institutions from around the world. The fellows visited Google headquarters and Stanford, where they learned about inspiring change at universities, leading grassroots movements and understanding the intricacies of collaborative spaces.

In fall 2018, four more students were accepted as OSU's second Leadership Circle of innovation fellows. The current UIFs are excited to welcome a third cohort of Buckeye innovation fellows in fall 2019 and look forward to continuing to fuel the engine of positively changing higher education through their efforts, Valcarcel says.

IISE

The Institute of Industrial & Systems Engineers held its annual Leadership Summit on Jan. 26, 2019, with Sonia Chhabria and Laura Brzozowski serving as the lead coordinators. "The Leadership Summit is a great chance for all business and engineering students to come together and build their network and leadership skills," says Natalie Garcia, IISE vice president of brand management. This year's summit is scheduled for Jan. 25, 2020.

Members of the Ohio State IISE attended the regional conference at Youngstown State University in February. "The regional conference is a great chance for students to learn about how new ideas and technologies are impacting the field of industrial engineering," Garcia says. "Additionally, it is a great opportunity for students to network with ISEs from other universities."

In addition, the group hosted ISE alumnus and former Yum Brands COO Rob Savage who shared advice on advancing in their careers.

IISE members also enjoyed a friendly bowling competition among members of its cohort program.

The program serves as a mentorship program among upperclassmen and underclassmen "to guide and help them throughout the year," Garcia says.

In the coming year IISE plans to tour the Columbus UPS facility, host company information sessions and attend the annual conference in New Orleans in May 2020.

NSBE

The National Society of Black Engineers hosted several programs to strengthen the bond of its membership academically, professionally and socially, says NSBE President Sina Musie.

"Academically, we host collaborative study tables three times a semester, around the time midterms and finals land, with the Society of Hispanic Professional Engineers and the Society of Women Engineers, in order to give our members an area to study, form study groups, and be around other engineers when most of campus study spots are filled," Musie says. "Professionally, first, we have collaborated with many sponsors, such as Honda, Arconic, Texas Instruments, ThermoFisher, and more, in order to bring our membership networking opportunities and informational sessions to learn more about what engineering is like after they graduate college. Second, NSBE, SHPE and SWE collaborated hosting an Etiquette Dinner, where all of our members could attend in business, professional attire and learn how to eat dinner foods properly, as well as learn how to talk and act in a professional setting.

"Third, before the fall engineering career fair, NSBE hosts our Diversity Company Social. This event is open to every student, but more targeted towards our membership. It is a more relaxed version of the big engineering career fair. However, students and company representatives network, collect resumes, and hand out interviews to students. It helps our members network early, practice their elevator pitches, and obtain interviews beforehand, all while getting an extra opportunity to learn how to act in a professional setting. Fourth, we host a Conquering Conference event every year in March, that revolves around providing the membership resume reviews, mock interviews, professional development tips and elevator pitch practice.

"Socially, we strive to have our membership see each other as a big 'NSBE Family.'"

Musie says NSBE's membership has a retention program in place that connects underclassmen with upperclassmen within their same major. The students exchange contact information and are required to meet a certain number of times each semester.

"Mentors are supposed to give advice and help the underclassmen with whatever they may need," Musie says. "This helps our members create a stronger bond amongst each other, and it also helps them know they aren't alone in their field."

NSBE also hosts a family cook-out at the beginning of the school year to help the membership get to know each other early, and a local event at Northland High School called A Walk for Education, which was created to promote higher education to minority high school students.

"This helped our membership volunteer by giving back to the community," Musie says. "Similarly, we host a combined event with SHPE called STEM Challenge. This is where we have local middle school students come to Ohio State and learn about engineering by doing multiple activities that relate to different disciplines."

SHPE

The Society of Hispanic Professional Engineers' year was filled with many big firsts and new achievements, says President Alejandro Nunez.

"We were able to organize monthly outreach events and new social events, including volunteering for Habitat for Humanity, hosting a clothing and food drive, participating in MLK Day of Service, going to Topgolf, hosting a baking night, and organizing our yearly SHPEsgiving potluck event," he says.

The group's signature fall events included a networking brunch, Dia de Ciencias (Day of the Sciences), SHPE National Convention and Holiday Toy Drive Fiesta.

"We had our largest attendance yet at the SHPE National Convention with a total of 37 attendees where all attendees that were looking for a job received an interview and/or offer," Nunez says. "We were also able to collect 52 toys and $397 cash donations – our highest amount in the last three years since the event's inception – for the Ohio Hispanic Coalition's Three King's Day celebration in partnership with the Latinx Student Association and the Hispanic Business Student Association."

For the spring STEM Challenge, hosted in partnership with the National Society of Black Engineers, Nunez says the groups saw a larger turnout than before of middle school students to participate in engineering-inspired activities. In partnership with Caterpillar Inc., NSBE and SWE, SHPE created the new signature event called Etiquette Dinner where attendees were taught formal dining table manners to prepare for the professional world.

This past spring, SHPE was awarded the Diversity and Inclusion Enhancement Award for the second consecutive year at the College of Engineering's Student Organization Awards program for inclusion efforts within the College of Engineering and on campus. The group also received the SHPE Regional Blue Chip Award for its ability to exercise the five pillars of SHPE: academic development, professional development, leadership development, community outreach and chapter development.

"For the next year to come, we hope to enhance our recruitment and retention efforts to reach more students by implementing smarter marketing strategies and diversifying the kinds of events we host," Nunez says. "We are hoping to host a field day during the fall where members can get to know each other more, revive our MentorSHPE program to bolster our members academically and socially, and start up a small-scale project team where our members, especially underclassmen, can receive relevant hands-on experience as engineers."

BDAA

The Big Data and Analytics Association "is built on outstanding weekly company tech talks about real applications of data analytics and workshops to learn hands-on skills balanced and applicable across many disciplines," according to BDAA Marketing Director Kelly Meaden.

Highlights of the past year included:

- Connecting more than 250 students to more than 20 companies at BDAA's annual career fair
- Solidifying a partnership with the Translational Data Analytics Institute
- Collaborating with the Business Builders Club and Interdisciplinary Resource for Innovative Students to present a three-part series, which included workshops on project management, R programming and user experience

IRIS

The Interdisciplinary Resource for Innovative Students was co-founded by members of Ohio State's Integrated Business and Engineering Honors Program, including third-year ISE majors George Valcarcel, outgoing president, and Nolan Hanna, incoming president. The initial vision of IRIS was to break down silos between disciplines on Ohio State's campus to "solve the world's most pressing problems." Over the past two years, the organization has evolved to focusing on educating students across disciplines in the toolkits of "human-centered design" and "lean innovation," says Valcarcel.

"IRIS promotes the use of the design-thinking framework as a way to tackle the fuzzy front end of opportunity identification and creative problem-solving," he says. During its meetings, IRIS members enjoy "learning by doing," working through hour-long, themed, design-thinking sprints and deep-dive workshops. Reflecting the broad applicability of human-centered design to a variety of problems and industries, IRIS brings in practitioners from Columbus area startups and corporate innovation teams, as well as teams up with other student organizations and professors on campus for workshops.

Events from IRIS's second full school year as a club include:

- Collaborating with Big Data and Analytics Association and Business Builders Club on a three-part Columbus start-up product management workshop featuring Root Insurance, and a user-experience workshop at Beam Dental
- Co-hosting a workshop with DriveOhio and the Smart Campus club to develop user personas and use cases for autonomous shuttle transportation for students on campus
- Hosting Salesforce Ignite's innovation consulting team to facilitate a design workshop around imagining the future of retail banking
- Hosting ISE Assistant Professor Dr. Mike Rayo for a collaborative workshop with the Artificial Intelligence club on human-centered automation exploring a tool designed to help nurses anticipate and respond to patient decompensation events
- Hosting a workshop at L Brands on empathizing with end-users and developing personas and journey maps
- Hosting Worthington Industries to discuss building effective teams for innovation with an emphasis on cross-functionality and multi-disciplinary perspectives towards problem-solving
- Hosting a workshop with Nationwide Insurance investigating the relationship between design thinking and systems thinking and how they can work together to solve more complex problems
- Creating three unique hackathon project experiences: HackAI with the Artificial Intelligence Club, DataFest with the Department of Statistics and Datal/O with OHI/O
- Hosting six socials to connect students within BDAA and other organizations, including Institute of Industrial & Systems Engineers

In the coming year, Meaden says plans include expanding the BDAA mentorship program, which connects upperclassmen and underclassmen, and hosting a lecture series on data analytics.

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Keep in Touch!

The Ohio State University Department of Integrated Systems Engineering would love to hear from you.

Please drop us a line to tell us about stories or information you would like to see in future issues of *BuckISE*.

Contact Jen Morris at morris.1392@osu.edu.