

ISE Committed to Making Black Lives Matter

May 25, 2020 will ultimately go down in history as one of the transformational moments in the Civil Rights movement in the U.S. That was the day George Floyd was killed in Minneapolis, reigniting the Black Lives Matter movement. Amid protests across the country and in Columbus, including on The Ohio State University campus, ISE Department Chair **Farhang Pourboghra**t knew he needed to address the students, faculty, staff and alumni.

In a letter to the ISE community, posted on the Department's website, Dr. Pourboghra wrote, "It is our responsibility to not remain silent about the experiences of people of color regarding racial profiling, police brutality, discrimination in the workplace, continued segregation in schools, lack of access to housing and so on. Black Lives Matter, and yet we continue to witness these injustices and atrocities committed against the Black community. For our nation to continue to be prosperous, all its citizens, regardless of race, creed and gender must be treated with fairness and equality. And for that to happen, we all need to be a part of the solution."

"In the coming weeks, I will be empowering ISE faculty, staff and students to participate in a conversation to identify and carry out improvements that will make a tangible change to the culture of ISE and make the Department a better learning environment and resource for all students."

He noted that the Department is committed to pursuing Capstones supporting Black Lives Matter initiatives, "especially if they involve data analytics, support of Black-owned businesses and the Columbus African American Chamber of Commerce." An Inequitable Systems module also is being added to the Department's Human Systems course.

Work has already begun on efforts for a more equitable system within the Department and many ISE programs



continue to seek collaboration from Ohio State's Office of Diversity and Inclusion [see "EmPOWERment story on page 7].

Associate Professor **Yannis Korkolis** has had great success in recruiting underrepresented minorities for his research, including his 10 years at the University of New Hampshire prior to his arrival at Ohio State in January 2019. He said he has found many advantages. For National Science Foundation grants, there have been policies that allow utilizing two undergraduate students, rather than one, to help with research if they are underrepresented minorities. That's not to say he doesn't select those that are best suited for the job.

"Underrepresented minorities, in many cases, they also tend to be better performers because – to get here – they had to overcome challenges unique to their status, or are trying to show to themselves or others around them what they are capable of."

Associate Professor **Ted Allen** expects to have three articles published related to improving poll access in

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ADDRESSING COVID-19

COVIDCommons is One-Stop Source for Pandemic Data

ISE Assistant Professor **Michael Rayo** is lending his expertise to a data collection project in conjunction with Governor Mike DeWine's Office, the Ohio State College of Public Health and the Ohio Department of Health to better advise public agencies regarding the COVID-19 pandemic.



Rayo

COVIDCommons is a data-sharing resource seeking to compile information on the global pandemic in one location. The information will be publicly available to aid decision-makers in determining the best courses of action.

Housed at Ohio State's Translational Data Analytics Institute, other participating partners include the Ohio Department of Education; Ohio Department of Jobs and Family Services; Ohio Department of Transportation;

Franklin County Public Health; Columbus Public Health and the Mid-Ohio Food Collective.

Environmental Health Sciences Assistant Professor **Ayaz Hyder** is serving as the principal investigator for the project, which includes additional faculty and consultants from the College of Engineering, Department of Geography, College of Medicine, John Glenn College of Public Affairs, Department of Statistics, Mathematical Biosciences Institute and Ohio Supercomputer Center.

Department Responds to Instructional Needs

As with other colleges and universities around the world, the COVID-19 global pandemic has affected everyday life in the Integrated Systems Engineering Department, especially when it comes to teaching and learning. Department leaders spent



Sommerich

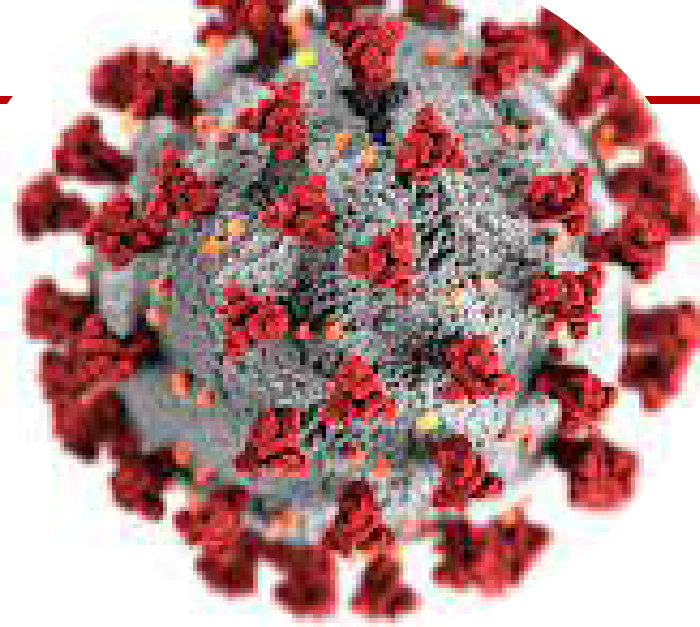
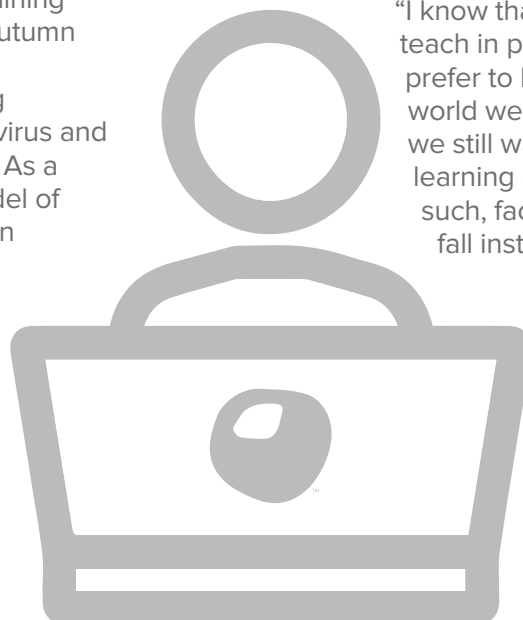
conducted.

"Some courses will be fully online, some will use a mixed-delivery and a few will be fully in-person," said **Carolyn Sommerich**, ISE Associate Professor. "In making the choice to

teach in whichever modality, I know that faculty all are trying to make the best decisions for their students and themselves (and their families). The faculty are engaged in thinking a lot about how best to teach within the constraints of the day.

"I know that the faculty would much prefer to teach in person, just as students would much prefer to learn in person. But that is not the world we are living in right now. Regardless, we still want our students to have great learning experiences in our course, and as such, faculty have been busy planning for fall instruction."

Sommerich credits Ohio State's Engineering Technology Services with being extremely responsive in providing essential computer support, including with online meetings and software to better facilitate instruction models.



ISE Steps up to Meet Demand for PPE

When crises hit, everyone turns to engineers for solutions. That was certainly the case this summer when the coronavirus pandemic created a shortage of personal protective equipment (PPE). Medical facilities around the world were impacted and in Columbus, the Ohio State Wexner Medical Center contacted the Ohio State Departments of Integrated Systems Engineering and Mechanical and Aerospace Engineering (MAE) for help. ISE Professor **Jose Castro** and MAE Professor Vish Subramaniam, who were leading a College of Engineering team providing support to the medical center, began collaborating when presented with the challenge.



Castro

Initially, a molded visor was produced using MAE's 3D printers, but it was quickly discovered that the production rate would need to be ramped up beyond the 3D printers' capabilities. MAE Shop Supervisor Chad Bivens designed and machined an aluminum mold to produce the visors in the Injection Molding Lab in Baker Systems. Professor Castro, ISE Instructional Technology Specialist **Matt Mulyana**, ISE Machine/Manufacturing Lab Supervisor **Joshua Hassenzahl**, ISE Research Engineer **William Tulos** and ISE graduate student Dan Zhang began mass producing the visors.

"We started with preliminary studies and molding in early April and finished the molding the first week of June," Dr. Mulyana said. "We made roughly 10,000 molded headbands."

Production stopped after the need was met, but Dr. Castro said, "We agree to remain ready with mold materials and equipment to be able to go back to mass production as needed. We can also mass produce other parts, if needed, but this is not our main purpose. Our main purpose is to develop new technology. As an example, Matt Mulyana – during his PhD thesis – developed a new process that can decrease the cycle time for injection molding by 50 percent."

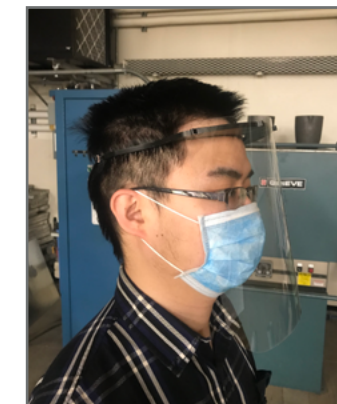
At peak production, the lab was able to produce 80 of the visors in an hour. "So, starting in the middle of April to early June, we made about 550 to 600 parts per day," Dr. Mulyana said.

In addition to the Wexner Medical Center, the visors were distributed to the Ohio State College of Dentistry with the bulk of the batches going to the Columbus Public Health Department.

Mass production is not the typical function of the lab; its main function is to educate students and develop



Above: Injection Molding Lab in Baker Systems.



Left: Ohio State graduate student Dan Zhang models the protective gear produced by ISE staff.

new processes and materials. "However, we can very easily step up to mass production," said Dr. Castro, who brought a wealth of experience to the project, having worked in

industry for more than 15 years. "Also, our Department is well-equipped to step up as needed as we have capable people like Matt, Josh and Bill who have experience in manufacturing."

Once produced, the headbands are attached to clear face shields manually. Volunteers from the ISE staff – PR Coordinator and Chair's Assistant **Jennifer Morris** and Fiscal Associate **Ann Martyniak** – stepped in to help with the assembly.

"In the past, we have done much smaller scale of mass production parts, usually a few days or a few weeks of production, but never at this scale," Dr. Mulyana noted. "We are very proud of this achievement as a Department. We were able to work together, contribute our expertise in different backgrounds, solve issues and offer solutions to this project within very short time constraints with a lot of unknowns, especially in the beginning. We realized this is just a small contribution to the overall fight against the virus, but we hope our contribution can help people who are in high-risk environments to be a little safer."

From the Chair: Heeding the Call in Unprecedented Times

Farhang Pourboghraat
Professor and Department Chair



It would be an understatement to say that 2020 has been truly an unprecedented year for the entire world due to the devastating impacts of the COVID-19. Our nation was further impacted by the death of Mr. George Floyd that highlighted the ongoing racism and the inequality that is pervasive in our institutions. The ISE Department was not spared from the impacts of the COVID-19 pandemic, which caused a major change in the delivery of our courses, the shut-down of our labs and a reduction in the budget, to name a few. However, despite the malaise, the resiliency and the cooperative nature of our faculty, staff and students have helped us to not only survive the pandemic but also assist in the fabrication of crucial personal protective equipment (PPE) for the health care communities that most needed our help. You can read more about this story in this newsletter.

Despite the COVID-19 pandemic and working remotely, the ISE faculty were very active in their research areas and their work has won them national recognition and awards. The faculty's hard work also resulted in the establishment of new research labs such as the Artificially Intelligent Manufacturing Systems (AIMS) Lab supported by industry and the Air Force Research Lab (AFRL) and the NSF-NRT EmPOWERment lab for training future PhD students interested in energy-system modeling; data science; energy policy; business, legal and social-behavioral issues; and energy technologies. With the recent hiring of three new faculty members, the department strengthened

its research and teaching in the areas of sustainability, Lean Six Sigma, cybersecurity, energy sustainability, networks, wireless systems, machine learning and artificial intelligence.

Our graduate and undergraduate students have also been actively pursuing their research interests and winning national awards and recognition for their work. Our PhD graduates have been historically recruited for their research capabilities by both U.S. and international universities. Most recently, Dr. Hamed Rahimian (ISE PhD '18) has joined the Department of Industrial Engineering at Clemson University. You can find in this newsletter the list of other ISE PhD graduates who took an academic job in the past five years. Despite the pandemic isolation, the undergraduate ISE's professional organizations (IISE, NSBE, SHPE, SWE, IRIS and BDAA) continued their activities by organizing virtual meetings and providing members with opportunities to hear great speakers, and to advance their industrial engineering knowledge and connection to their peers.

During this difficult time, the External Advisory Board (EAB) provided crucial leadership and support to the Department, students, faculty and staff. Without this support, we would have had a difficult time responding to many students' calls for financial support due to loss of jobs, internships, etc. The Board's continuous support and assistance to the Department is greatly appreciated. Finally, I would like to close by thanking the ISE alumni for your generosity in giving back to the Department. Your gifts make it possible for the ISE Department to design and execute plans that provide our students with the best educational program in the nation. I look forward to hearing from you with any comments and suggestions.

Continued from cover

the U.S. this year. In an article submitted to the *Boston Globe*, Dr. Allen presents an engineering perspective to mail-in voting. "In our analyses of elections in Florida, Michigan and Ohio elections, we have found that lines often discriminate against Black people, making them wait 30 minutes or more on average than others," he wrote. "A key part of this discrimination relates to long and variable ballot lengths and poor approaches for allocating resources."

Dr. Allen makes free software available, which "allows elections officials to predict waiting times (or line lengths) and create optimal allocation strategies with

solution quality guarantees. "

"In our expert witness work, we have found election results that would likely have been changed to honor the intent of voters if our program had been applied," he said.

As Dr. Pourboghraat wrote, "Industrial & Systems Engineering is all about making things better. We can and will do that for our Department."



ALUMNI NEWS

ISE Alum Rahimian Recognized in Pristker Awards, Joins Clemson Faculty

Hamed Rahimian, ISE PhD '18, joined the faculty of the Department of Industrial Engineering at Clemson University this fall. Dr. Rahimian was the recipient of the prestigious Presidential Fellowship in 2016 and the runner-up in the 2017 INFORMS Computing Society Best Student Paper Award while a graduate student at The Ohio State University.

Additionally, his dissertation, "Risk-Averse and Distributionally Robust Optimization: Methodology and Applications," written under the supervision of ISE Professor **Güzin Bayraksan**, received 2nd place in the 2019 Pristker Doctoral Dissertation Award, given by the Institute of Industrial and Systems Engineers. The award recognizes outstanding doctoral dissertation research in industrial engineering. Dr. Rahimian's dissertation makes significant contributions both to the theory and practice of industrial and systems engineering, identifying scenarios that are critical to a decision-making problem under risk and uncertainty. The dissertation applies its methodological results to solve real-world water resources management and healthcare problems, revealing managerial insights.

Dr. Rahimian specializes in data-driven decision making under uncertainty, specifically developing new models, theory, tools and algorithms for problems with broad societal impact. Methodologically, he develops stochastic programming, distributionally robust optimization and mixed-integer programming approaches to address large-scale problems arising in the allocation of scarce resources in uncertain complex environments, and usually subject to extreme events and disruptions.



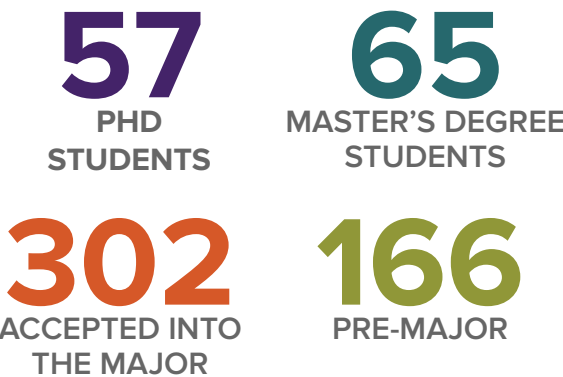
Bayraksan



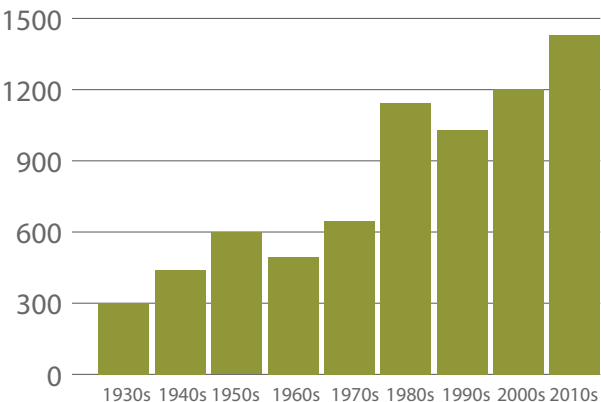
Rahimian

ISE By the Numbers...

Current students by program



Graduate growth by decade



Patrick Lynch is at ‘Home’ Supporting Connections to ISE

Director of Development Patrick Lynch may be a new face to the ISE Department, but he is a familiar one to the Ohio State College of Engineering. Patrick’s role with ISE began earlier this year after having joined the College of Engineering as Director of Strategic Engagement & Alumni Relations in 2015. Four years later, he took on the role of Senior Director of Strategic Engagement & Alumni Relations and will continue to oversee the annual fund program for the College of Engineering while supporting major gift contributions to ISE.

“I try to be the link and the connection back to the Department,” Patrick says.

A Cleveland native, he received his undergraduate degree in marketing from Miami (Ohio) University. While working at the Queens University of Charlotte (North Carolina) as Director of the McColl School Excellence Fund & Special Projects, he earned his master’s in business administration.

He also has experience in industry having worked as Operations Manager in the renewables and environment field for Cleveland-based Garick.

“It was an intentional transition for me to this role,” Patrick says of his new position with the ISE Department. “This is the engineering discipline that most mirrors my background. ISEs are all about the bigger picture and the complete process. I look forward to growing awareness about all the great things we are doing in the Department.”

Prior to travel restrictions being placed as a result of the global COVID-19 pandemic, Patrick had been traveling the country to meet with alumni and he said he looks forward to doing that again in the future. For now, he is happy to host virtual visits with “anyone and everyone to share ideas and thoughts.”

After having lived in North Carolina at the start of his career, Patrick says he and his wife Kathleen are glad to be back home in Ohio and close to family. Kathleen is a program director for Ohio State’s College of Education & Human Ecology. The couple have two children: 6-year-old son Pierson and 2-year-old daughter Ada. To further his engineering experience, Patrick says he is “getting really good at building Legos.”

If you would like to schedule a virtual visit with Patrick, his email address is lynch.576@osu.edu and his phone number is 614-292-4081.



Lynch



Advisory Board Pivots to Address Challenges of 2020

Fellow BuckISE:

This calendar year has been anything from ordinary and on behalf of the entire ISE External Advisory Board please know we are thinking about all of you. My name is Bobby Smyth (BS ’12) and I have the distinct pleasure of serving as the current chair of the advisory board. We have always tried to serve as a sounding board for the Department to help guide and advise from our personal and professional perspectives.

This year, our role has been more critical than ever to help ensure the Department, faculty, staff and students have the resources and support needed to navigate these difficult and uncertain times. During our spring board meeting we pivoted our agenda to focusing on the current needs of the Department as it navigated the coronavirus pandemic. We strategized on how to best support the students and help raise financial support for those in need.

In the months since that meeting, our focus has continued to evolve. Through conversations with Department leadership, we are working to help ensure the Department is aligning its efforts to be an environment that is more safe, inclusive and supportive for students of color. We also are working hard to ensure our board representation better reflects society and will continue to strive for the most diverse board possible.

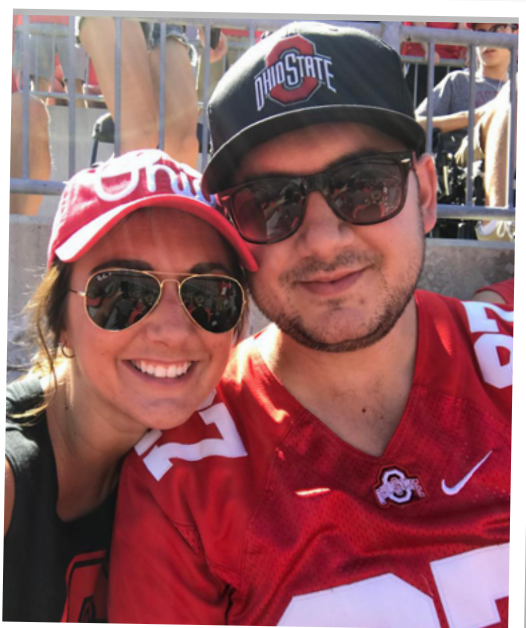
As we look ahead to the end of 2020 and the start of 2021, we want to ensure that the advisory board remains focused on supporting the Department not just now, but for the long term. We have set key priorities

for our board and organized five committees to ensure we help move the Department forward. Those committees are: Benchmarking, Curriculum, Technical Depth, Digital and Time Talent Treasure. These committees will overlay our key priorities and ensure consistency and continuity in our efforts to support the Department.

I encourage any of you who would like to learn more about the work of the board or our key focus areas to reach out to myself or Patrick Lynch. You can also learn more about the board on our website: ise.osu.edu/about/external-advisory-board.



Go BuckISE,
Bobby Smyth
ISE External Advisory Board Chair



If you would like more information on ISE, or would like to discuss other opportunities to assist the Department, please contact Patrick Lynch at lynch.576@osu.edu.
If you would like to make a gift to the ISE Department, follow this link: go.osu.edu/supportISE.

AIMS Lab Puts Artificial Intelligence to the Test

ISE Associate Professor **Michael Groeber** is hoping to bridge the gap between academia and industry by testing artificial intelligence in manufacturing systems.

Last fall, Dr. Groeber opened the Artificially Intelligent Manufacturing (AIMS) Lab in Ohio State's Center for Design and Manufacturing Excellence (CDME) in a ceremony, which featured remarks by Lt. Governor Jon Husted, who heads the state's InnovateOhio office.

According to Dr. Groeber, "The AIMS Lab provides an industry-relevant venue to develop and optimize novel, hybridized manufacturing processes; design and test custom sensors and controls; study and advance human-robot interaction; benchmark cognitive computing frameworks; and define security and ethics-based protocols."

With a number of industry sponsors onboard, the center's three floor-to-ceiling Yaskawa robot arms will test industry needs in a university setting.

"The new lab fits into CDME's core mission of working with industry partners in applied research and supporting undergraduate student development during that research," Dr. Groeber said. "The center helps industry partners work with university labs and equipment, in turn helping students become familiar with their products."



Groeber



Above, Ohio Lt. Governor Jon Husted speaks at the opening of the AIMS Lab.



Left, undergrad student Antonio Montanez operating a robot in the AIMS Lab.

Dr. Groeber serves as the AIMS Lab Faculty Director, managing it along with CDME Senior Lead Engineer for Student Programs Walt Hansen. AIMS Lab founding project sponsors include Atlas Industrial Contractors, Crown Equipment, Elite Manufacturing, Lincoln Electric, Ohio Development Services Agency,

ProcessChamp, Proto Precision Additive, Schunk, U.S. Department of Defense Office of Economic Adjustment and Yaskawa.

Interested industry partners are encouraged to contact Dr. Groeber at groeber.9@osu.edu for more information.

Sound of Alarm Lets Medical Personnel Identify Patients' Need

Patients and medical workers at The Ohio State University Wexner Medical Center are seeing first-hand the benefits of ISE Assistant Professor **Mike Rayo's** hospital alarm research.

Working under the Wexner Medical Center's P30 Centers grant from the Agency for Healthcare Research and Quality, Dr. Rayo contributed to University of Plymouth Professor of Applied Psychology Judy Edworthy's article, "**Getting Better Hospital Alarm Sounds Into a Global Standard**" for *Ergonomics in Design: The Quarterly of Human Factors Applications*.



Dr. Rayo's research looks at distinguishing the sounds of the alarms enabling medical personnel to identify the urgency and the medical category as outlined in his paper, "**Using Timbre to Improve Performance of Larger Auditory Alarm Sets**," which was published in *Ergonomics*.

Dr. Rayo is a member of the Association for the Advancement of Medical Instrumentation Committee, led by Dr. Edworthy, to draft a new global safety standard for medical alarm signals.

Multidisciplinary Research 'EmPOWERs' NextGen Energy Leaders

Ohio State's EmPOWERment research trainee program is opening new doors to harness the data revolution while preparing graduate students for both academic and non-academic careers in sustainable energy systems.

Through a five-year, \$3 million National Science Foundation Research Traineeship (NRT) grant, "Convergent Graduate Training and EmPOWERment for a Sustainable Energy Future" will provide PhD students with the opportunity to pursue interdisciplinary training in energy-system modeling; data science; energy policy; business, legal and social-behavioral issues; and energy technologies.

"We're training students on how to develop policy and the regulatory framework for a more sustainable energy future," said ISE Associate Chair and Professor **Ramtean Sioshansi**, who serves as principal investigator. "Basically, one of our goals is to broaden and diversify a pool of students working in STEM fields."

Dr. Sioshansi said the program builds on what Ohio State's Discovery Themes and Institutes are doing in the areas of sustainability, material research and translational data. He said the College of Engineering is well-represented on the team that also includes the College of Arts & Sciences; Fisher College of Business; Education & Human Ecology; Food, Agricultural & Environmental Sciences (CFAES); Moritz College of Law; and John Glenn College of Public Affairs.

Diane Boghrat is the administrative program coordinator for EmPOWERment. Before joining ISE, she served as co-owner and CEO of Simuleer, an R&D company based in LA. She said EmPOWERment is designed for students' own pace, with 19 credit hours of curriculum requirements needed for completion, as well as co-curricular requirements, such as participation in a student community of practice that is focused on energy, mentorship activities, annual research expositions and communication activities. Boghrat anticipates training 80 PhD students during the first four years and 20 students each year after that.

Dr. Sioshansi emphasized the importance of finding a diverse blend of trainees, including by gender, ethnicity and disciplines. Co-Principal Investigator and CFAES Professor **Elena Irwin** is working with the Ohio State Office of Diversity and Inclusion to encourage and support participation of underrepresented minority students enrolled in STEM graduate programs.

"We want different ways of thinking and different educational backgrounds," Dr. Sioshansi said. "The big difference with this program is that it's very cross-cutting. One stylized example is a mechanical or electrical engineering student may know how to design a solution but may be looking at it in isolation and not looking at the regulatory side of the problem."

Through the interdisciplinary program, EmPOWERment will encourage students to examine a full spectrum of issues and not just their specialty. "They'll have communications training and professional skills training," Boghrat added. "It's a skill-building opportunity and a chance to build a professional network."

Currently, EmPOWERment is not a stand-alone degree program, but Dr. Sioshansi said it may become an interdisciplinary graduate program at some point. It will be noted as a graduate interdisciplinary specialization on participants' degrees.

In addition, Boghrat has been working with the Battelle Center to design curricular and co-curricular components

as modular "packages," some of which are available to other interested graduate and undergraduate students as standalone options.

Boghrat also has partnered with several external organizations on energy, policy-making and regulatory guidelines. "These partners helped identify skills needed," said Dr. Sioshansi.

The program begins with a two-week onboarding "boot camp" with help from EmPOWERment's external partners. Dr. Sioshansi envisions internships and externships will emerge from the interaction with these businesses and agencies, which include American Electric Power, Cargill, ENGIE North America, First Solar, Huntington, Siemens, Worthington Industries, Los Alamos National Laboratories, Ohio Energy Project and the Public Utilities Commission of Ohio.



Sioshansi

Energy-system modeling
DATA SCIENCE
energy policy
BUSINESS
 Legal and social-behavioral issues
ENERGY TECHNOLOGIES

Ohio State ‘Homecoming’ for Daniel Gingerich

Daniel Gingerich joins the faculty as an Assistant Professor in ISE and Civil, Environmental and Geodetic Engineering. Dr. Gingerich also is a Core Faculty member with The Sustainability Institute.

He did his post-doctoral research at Stanford University and Carnegie Mellon University, and was an Oak Ridge Institute for Science and Education Postgraduate Research Fellow at the National Energy Technology Laboratory. Dr. Gingerich earned his PhD in Engineering and Public Policy from Carnegie Mellon, his master’s in Civil and Environmental Engineering from Auburn University and a bachelor of science degree in Civil Engineering and bachelor of arts degree in Political Science from Mississippi State University.

Dr. Gingerich said he was interested in Ohio State because of its appreciation for an interdisciplinary approach to learning. “All of the interesting questions in how we build a society that is more sustainable and resilient are interdisciplinary – even if you’re only looking at one aspect of society – in my case infrastructure.” He says. “Because you aren’t doing work that fits neatly into one field, it can be hard to find an



Gingerich

intellectual home in a single department. However, ISE demonstrated that they value this interdisciplinary work by supporting a position like mine that is split between two departments and an interdisciplinary institute.”

He is looking forward to bringing the different skillsets together “to do research that will guide society’s transition to more sustainable infrastructure and to help train the next generation of engineers in these interdisciplinary perspectives.”

“Sustainability challenges are wicked problems that will involve rethinking and redesigning systems where society, the environment, and technology interact,” he said. “As a systems engineer, I have a set of frameworks and tools for thinking about how to analyze and create new systems. But as a trained environmental engineer and policy analyst, I also bring to the table a deep understanding of the environment and the technologies and policies we use to protect it.”

Dr. Gingerich also brings with him deep family connections to Ohio State and Columbus. “My grandfather got his DDS from OSU and I live a few blocks from where he grew up in Columbus,” he said. “When my grandmother passed away, I inherited her cat called Scarlet (the Gray). My mom was born at Ohio State’s hospital and after she played the Michigan fight song on the piano (the first song she learned as a kid); her parents abruptly ended her piano lessons. In many ways, coming to Ohio State feels like a homecoming!”

Tracy Owens Brings Union of Theory and Practice to ISE

Associate Professor of Practice Tracy Owens is bringing his 20 years of experience as a Lean and Six Sigma practitioner to the ISE Department. Professor Owens began teaching ISE 5810-Lean Sigma Foundations and coaching the project leaders for 5811/5812-Lean Sigma Certification Project I & II autumn semester.

“In addition to the great satisfaction and learning that I gain from working in the field, I have always enjoyed teaching others how these tool kits can really change the way we work,” he said, “and sometimes even the way we think. The industrial engineer has always been a role or person who I admire for the thoroughness of their process evaluation. We will learn from each other.”

Professor Owens earned his master’s degree in International Business from Seattle University and a bachelor of science degree from Excelsior College



Owens

and has been an adjunct faculty member for the MBA programs at Capital University and the University of Dayton. He is a Fellow Member for the American Society for Quality and has worked in industry for LexisNexis, Smiths Medical and Penske Logistics. He served as Senior Interrogator for the U.S. Army and conducts Black Belt training and coaches candidates to project completion with his company, Solve4X Tactical Consulting. Professor Owens is the Founder and Principal Consultant for Ohio Six Sigma.

He acknowledged the challenges of teaching students during the COVID-19 pandemic. “In the last several years, I have been teaching the Lean and Six Sigma curricula via web-based media, so I’m familiar with remote delivery,” he said. “The material does not lose anything in a digital format as long as we get the student’s undivided attention when the teaching is underway. The pace of delivery may need to be accelerated, though, especially if we are dealing with a shortened semester.”

Professor Owens said he hopes to enhance the union of theory and practice in his new role with ISE. “Plus, this field is not stagnant. New developments and approaches are emerging and we all need to stay sharp. Marrying the traditional with the innovative is a genuine pleasure.”

Dr. Yener Brings Passion to INSPIRE



Yener

Professor **Aylin Yener** hopes to inspire the next generation of engineers. She joined Ohio State’s College of Engineering in Spring 2020 and holds the Roy and Lois Chope Chair in Engineering, as well as being a professor of ISE, Electrical and Computer Engineering, and Computer Science and Engineering.

“As a faculty member, my duties are advancing the science in my disciplines by conducting world-class research, educating the future of scientists and engineers, and serving the Ohio State academic community,” she said. “My research is in foundations of networked systems and my expertise areas relate to the three departments in the College of Engineering in which I hold the professor position. My research group is called ‘Intelligent Networked Systems Powered

by Innovation and Research in Engineering’ – our acronym is INSPIRE. Our research areas include cybersecurity, energy sustainability, networks, wireless systems, machine learning and AI, with core competency in information theory, communication theory, signal processing, statistical learning and optimization. I will be teaching courses related to these areas.

“Additionally, I am passionate about equity in academia and, in particular, supporting women at all levels – from undergraduate students all the way to senior faculty.”

Dr. Yener previously was a University Distinguished Professor of Electrical Engineering at Penn State University and has taught at Stanford University and Lehigh University, and was a graduate research assistant at Rutgers University. She was awarded

her PhD and master’s in Electrical and Computer Engineering from Rutgers and earned bachelor’s degrees in Electrical and Electronics Engineering, and Physics from Bogazici University in Istanbul, Turkey.

She currently serves as the IEEE Information Theory Society President. Her publications include five book chapters, 92 journal papers and 228 conference papers. She has been awarded research funding for 16 National Science Foundation grants, two Defense Advanced Research Projects Agency programs, one Army Research Laboratory Collaborative Technology Alliance grant and nine other programs.

Dr. Yener said she was drawn to “the broad expertise and excellent scholarship in the ISE Department. The environment is collegial and collaborative, which I also really liked. I look forward to being part of this outstanding Department.”

Faculty Awards, Honors & Recognition

Güzin Bayraksan, Associate Professor of ISE and Multifaceted Mathematics for Rare, High-Impact Events in Complex Energy and Environment Systems Principal Investigator, was elected Chair of the Stochastic Programming Society. The SPS is a worldwide group of researchers and practitioners who are developing and applying models, methods, theory and software tools for decision-making under uncertainty. As chair, she will lead the SPS governing board, the Committee on Stochastic Programming and serve a four-year term. Under Dr. Bayraksan's leadership, SPS began a webinar series called "Decision Making in an Uncertain World," featuring prominent researchers from around the world; initiated a **newsletter** highlighting real-world impacts of stochastic programming; and launched SPS' social media platforms, including **Twitter**, **LinkedIn** and **YouTube** to reach a broader set of researchers and practitioners.

At the XV International Conference on Stochastic Programming in Trondheim, Norway, in August 2019, Dr. Bayraksan delivered a plenary presentation on "Effective Scenarios in Distributionally Robust and Risk-Averse Stochastic Programs." The talk detailed the framework to identify scenarios that are critical to a decision-making problem under risk and uncertainty.

Dr. Bayraksan co-organized a workshop on "Mathematical Optimization of Systems Impacted by Rare, High-Impact Events," together with researchers from Argonne National Laboratory, the University of Wisconsin-Madison and the Courant Institute at New York University. The workshop's goal was to provide a worldwide forum for exploring new models and solution approaches for optimization under uncertainty to address these challenges. Dr. Bayraksan gave a talk on how to address rare, long-term, extreme droughts to better manage water resources at the workshop, which took place June 24-28, 2019, in Providence, Rhode Island.



ISE Professor **Antonio Conejo** was elected as INFORMS Fellow, one of the highest honors in the operations research profession. He was honored at the 2019 INFORMS annual meeting in Seattle in October 2019. INFORMS Fellow are examples of outstanding lifetime achievement in operations research and

the management sciences. They have demonstrated exceptional accomplishments and made significant contributions to the advancement of OR/MS over a period of time. Professor Conejo was recognized for his contributions to formulation and implementation of optimization models for operations and planning of electric energy systems and electricity markets, and for outstanding service as an educator and leader in the INFORMS community.

Mike Rayo, Assistant Professor of Health & Rehab Sciences and ISE, was tapped to serve as a co-director of a Lab in Residence for Ohio State's Translational Data Analytics Institute. Centered around the healthcare system, the goal will be to improve the detection rate of hospital acquired infections and patient decompensation, while improving the overall design process.

ISE Professor and Associate Chair **Ramteen Sioshansi** will be recognized at the Institute of Industrial & Systems Engineers Annual Conference & Expo this fall with the 2020 Operations Research Division's Excellence in Teaching Award. Dr. Sioshansi is being honored for his course, ISE 3210 Nonlinear and Dynamic Optimization, which was developed to meet the needs of students facing complex optimization challenges in their capstone course projects. Dr. Sioshansi and ISE Professor Antonio Conejo developed the textbook for the class, "Optimization in Engineering: Models and Algorithms," to introduce the advanced subject matter making it accessible to the general engineering undergraduate audience.

Aimee Ulstad, Associate Professor-Clinical ISE, received the Ohio State College of Engineering Charles E. MacQuigg Award for Outstanding Teaching for 2019. The award is named for the late Dean of the College of Engineering and is presented annually to faculty who have demonstrated, in a superior manner, their interest in and willingness to help students, their interest in improvement of the high reputation of the College of Engineering and their outstanding teaching ability. Award recipients are nominated and elected each year by students in the College of Engineering.



Conejo



Ulstad

Once a Buckeye, Always a Buckeye

Outstanding scholars continue to walk the halls of Baker Systems. Here's a look at the roles recent graduates have taken on since completing their doctorates and post-doctorate work at The Ohio State University Department of Integrated Systems Engineering.



Alizadeh



Dominguez



Duggan



Ha



Hwang



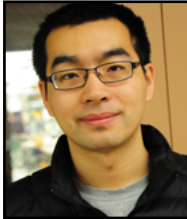
Rahimian



Roychowdhury



Sheidaei



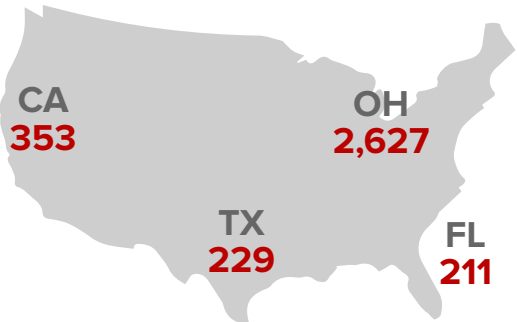
Zhang

Mina Alizadeh, '19, advised by William S. Marras, is a postdoctoral researcher at The Ohio State University.
"Ardi" Ardiyanto, '20, advised by Carolyn Sommerich, is an instructor on the faculty of the Engineering Department of Mechanical and Industrial University at the Universitas Gadjah Mada, Yogyakarta, Indonesia.
Ruth Dominguez, '15, advised by Antonio Conejo with Miguel Carrion, is a member of the faculty at University of Castilla-La Mancha.
Joseph E. Duggan, Jr., '18, advised by Ramteen Sioshansi, is a member of the faculty at the University of Dayton.
Jinjin Ha, advised by Yannis Korkolis, is working as a faculty member at the University of New Hampshire.
Jaejin Hwang, '16, advised by William S. Marras, is a member of the faculty at Northern Illinois University.
Bruce McFall, '18, advised by Jose M. Castro, is an adjunct instructor at University of Cincinnati.

Bassam Mohammed, '17, advised by Farhang Pourboghrat, is a member of the faculty at University of Basrah, Iraq.
Hamed Rahimian, '18, advised by Güzin Bayraksan, is a member of the faculty at Clemson University.
Sayak Roychowdhury, '17, advised by Theodore T. Allen, is an Assistant Professor Grade-I, Department of Industrial and Systems Engineering, at the Indian Institute of Technology Kharagpur.
Azadeh Sheidaei, '15, advised by Farhang Pourboghrat, is a member of the faculty at Iowa State University.
Radin Zaid Radin Umar, '15, advised by Carolyn Sommerich, is a member of the faculty at Universiti Teknikal, Malaysia Melaka.
Lin Zhang, '19, advised by Allen Yi, is a postdoctoral researcher at Keio University, Japan.
Bining Zhao, '18, advised by Antonio Conejo and Ramteen Sioshansi, is a postdoctoral researcher at Pennsylvania State University.

ISE By the Numbers...

Top four states where ISE alumni live



6,098
LIVING ISE ALUMNI

35
COUNTRIES ARE HOME TO ISE ALUMNI

732
ISE ALUMNI DONORS TO OHIO STATE IN FY '20

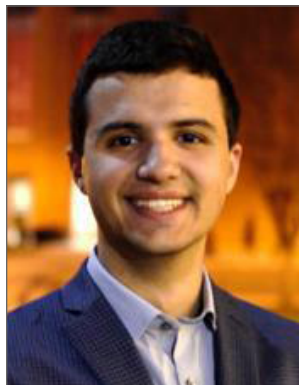
\$576,673
RAISED FOR ISE DEPARTMENT IN FY '20

STUDENT NEWS

First Urban Air Mobility Symposium Showcases Birthplace of Aviation

Throughout his undergraduate career at Ohio State, George Valcarcel, ISE '20, was known for taking his interests to the highest level. In the summer of 2019, while interning at Ascension Global, a boutique aviation consultancy in Washington, D.C., his innate curiosity ignited an excitement to learn more about the emerging industry of urban air mobility.

"In October 2019, I pitched the idea for a symposium to Dr. Elizabeth K. Newton at the OSU Battelle Center for Science, Engineering and Public Policy," says Valcarcel, who as a student was a University Innovation Fellow, member of Ohio State's Integrated Business and Engineering Honors Program, and co-founder of Interdisciplinary Resource for Innovative Students (IRIS).



Valcarcel

Valcarcel had taken Dr. Newton's course, Rapid Innovation for Public Impact. Soon he had her support, along with her team at the Battelle Center, and that of Mechanical and Aerospace Engineering Professor Jim Gregory and Knowlton School of Architecture City and Regional Planning/Center for Aviation Studies Professor Amber Woodburn McNair.

He then approached Fred Judson, Director of the Ohio Unmanned Aircraft Systems Center, and Tim Sweeney, Director of Advanced Manufacturing, Aerospace and Aviation for JobsOhio, who agreed to serve as organizing partners.

With his team all set, they put together the Ohio Urban Air Mobility Symposium, which took place Feb. 27 at the Blackwell Inn Conference Center, and showcased The Ohio State University and the State of Ohio's strategic air mobility projects.

Valcarcel said the event's goals were three-fold: generate awareness of the progress being made in Ohio and bringing thought leaders to the Buckeye State; promote networking and connections among academia, government and industry participants; and



The Urban Air Mobility Symposium focused on use cases; operational challenges; vertical take-off and landing vehicles and enabling technologies (like the drone pictured here); infrastructure; and community integration and economic development for the air mobility ecosystem.

offer a common vision and call to action to take the next steps toward contributing to air mobility.

"Our event was unique because it is one of the first in the U.S. to focus on what air mobility will mean for a specific community – in this case Ohio – and also was one of the first major air mobility events hosted by a state university," Valcarcel said.

Panelists and keynote speakers addressed use cases; operational challenges; vertical take-off and landing vehicles and enabling technologies; infrastructure; and community integration and economic development. The list of speakers was just as impressive, representing NASA, Uber Elevate, Sikorsky, Honeywell Aerospace, Elroy Air and the Federal Aviation Administration, and included a keynote by Dr. John S. Langford, President of the American Institute of Aeronautics and Astronautics and the Founder of Electra Aera.

"I also owe credit to [Department Chair] Farhang Pourboghraat and my ISE Professors Sam Krening, Martijn Ijtsma and Mike Rayo for supporting me through a crazy year as a student planning this conference, as well as for showing interest in attending my event/ getting the word out across – not only our Department – but to other faculty and students across the College of Engineering," he said.

Two hundred people, including faculty, students, government stakeholders/regulators and members of the industry attended. Valcarcel is currently recruiting a team of Ohio State students to co-chair and continue to host the symposium, while he plans to remain an advisor even after he heads to Chicago to work as an Incoming Business Analyst for McKinsey & Company.

Students' App is Finalist in mHealth International Symposium

Ohio State ISE students Jesse Marquisee, Christine Jefferies, Greg Metzger and Jacob Keller were finalists for the 2020 International Symposium on Human Factors and Ergonomics in Healthcare Mobile Health for Consumers Application Design Competition.

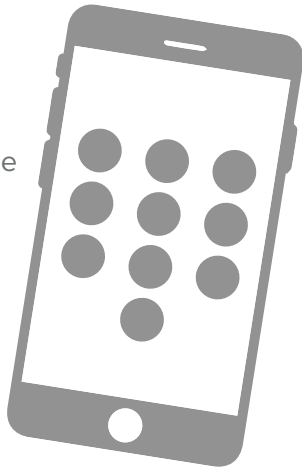
Their mobile application allows individuals to manage their own healthcare data as well as provides a translation engine between electronic health records. Think smartphone wallet for healthcare information.

The team received a \$250 award with Marquisee presenting their design at the 2020 symposium originally scheduled for Toronto, but switched to online due to the coronavirus pandemic. It was presented during the Digital Health session of the conference



Marquisee

Marquisee, who served as the team lead, said the idea for the Personal Electronic Health Record (PEHR) came together by combining two ideas. "One idea was an app that acts as a centralized and curatable data hub for your healthcare information in a telehealth setting," he said. "The second idea was saving patients' time and money by reducing the number of trips they needed to make to the hospital for a set of elective surgeries. We integrated a workflow and screening process to improve a user's healthcare experience by utilizing user-centered design and cognitive systems engineering principles." The app includes questions to screen symptoms and allows users to select their preferred hospital where services are offered. When finished, the information is sent to the selected hospital's care team for review.



We've Got Spirit!

We may not be able to cheer on the Buckeyes in the 'Shoe this year, but we can still show our Buckeye pride at home. The Ohio State College of Engineering has launched "Party in a Box," complete with pompoms, Koozies and pennants. Show your ISE spirit while cheering on the Bucks.

Get yours at engineering.osu.edu/buckeye-engineering-party-box. Sales of the boxes will help fund the College of Engineering Priority Fund.



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 Big Data and Analytics Association (BDAA), Institute of Industrial and Systems Engineers (IISE), Interdisciplinary Resource for Innovative Students (IRIS), National Society of Black Engineers (NSBE), Society of Hispanic Engineers (SHPE) and Society of Women Engineers (SWE).

SHPE

The Society of Hispanic Engineers focuses on chapter development, professional development, academic development and community outreach.

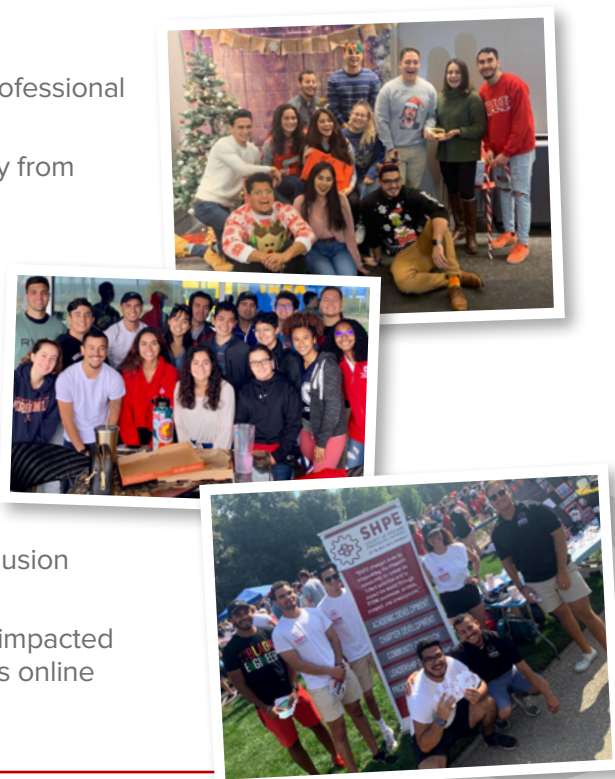
"We strive to create an environment that feels like home – a family away from your family," said SHPE Vice President Omer Alrefaai.

Past activities have included:

- Mentorshpe – providing mentoring for new and continuing members
- Networking brunch – offering members the opportunity to prepare for career fairs
- Dia de Ciencias – an event to give back to the community

In addition, Alrefaai said, "We try to expose STEM-related majors to high schools and provide them with information about college application deadlines, sponsorship, and the Diversity, Outreach and Inclusion office here at Ohio State."

The group meets biweekly, and Alrefaai said, "While the pandemic has impacted our activities, we have a great eboard working digitally to get our events online and provide that familia aspect safely, yet creatively to our members."



IISE

The Institute of Industrial and Systems Engineers hosted its annual Leadership Summit January 25, 2020. Students who attended heard from key speakers, including Princeton City School District Superintendent Tom Burton and Former Accenture Senior Director Jim Dickey. Attendees had the opportunity to receive a professional headshot, participate in mock interviews and attend breakout sessions focusing on financial wellness, opportunities and time management.

In February, IISE members traveled to Western Michigan University in Kalamazoo Michigan for the Regional IISE Conference. This was a great chance for students to



NSBE

The National Society of Black Engineers kicked off the 2020-2021 academic year with its first general meeting via Zoom in early September, which coincided with NSBE Week. Other activities included networking events and a talk on "Start Your Semester Strong." The group's activities also have included a virtual Recruiting Bootcamp with General Electric, an activities fair and a scavenger hunt.

Upcoming events include meetings with companies: Accenture, Boeing, Eaton, Honda, Marathon, PepsiCo, Texas Instruments, Thermo Fisher Scientific and WillowTree

NSBE strives to increase the number of culturally responsible black engineers who excel academically, succeed professionally and positively impact the community. Currently, the organization at Ohio State includes more than 100 members, who have given more than 50 hours of community service and represent 13 engineering majors.

In May, following the civil unrest sparked by the death of George Floyd in Minneapolis, NSBE Ohio State Chapter President Kamila Thompson posted on social media with the hashtag Black Lives Matter, "We do not judge how every person expresses their anger and stand with those who fight for justice as we continue to uplift black engineers to be culturally responsible in how we reject racism. We applaud everyone's bravery in these tough times and encourage everyone to use their voice and continue to demand change. Thank you NSBE fam for representing us well and stay safe in this fight."

That same month, NSBE won the 2020 Outstanding Diversity and Inclusion Enhancement Award during Ohio State's Student Organization Awards ceremony. NSBE was cited for its work with other universities to advance STEM through 12 outreach projects and encouraging K-12 students to become engineers.



network with other industrial engineering students throughout the Midwest and learn about their programs and experiences. One of the unique features of this conference was the opportunity to visit Western Michigan's new medical school. Students were invited to tour this state-of-the-art facility and learn various ways industrial engineering applies to the healthcare industry.

IISE is proud of its cohort program that serves as a mentorship program for students in the club. Some of this year's events included bowling, ice skating and a football watch party. Outside of the cohort program, IISE also offered several social opportunities to its members through happy hours and intramural sports.

While time on campus was cut short in the spring due to the COVID-19 pandemic, IISE still hosted virtual meetings. Members had the opportunity to hear from Kevin Condon, who is the vice president of engineering & optimization for Target Food and Beverage, and learn about how his role changed during the pandemic. "It was very interesting to hear some of the solutions his team came up with in order to adapt to the changes in demand throughout the country," said IISE Member Erin Abramczyk.

In the coming year, IISE plans to continue hosting meetings and events virtually in order to provide its members with opportunities to advance their industrial engineering knowledge and connection to their peers.

SWE

The Society of Women Engineers is an organization supporting women in engineering at Ohio State and seeks to provide an inclusive community for its members since engineering is a predominantly male field. “Our mission is to empower women to achieve full potential in careers as engineers and leaders, expand the image of the engineering and technology professions as a positive force in improving the quality of life, and demonstrate the value of diversity and inclusion,” according to SWE’s Vice President Amanda Slager.

This year, SWE’s theme centers around making the connection, which is especially important in the current COVID-19 climate and the move toward hosting mainly virtual events.

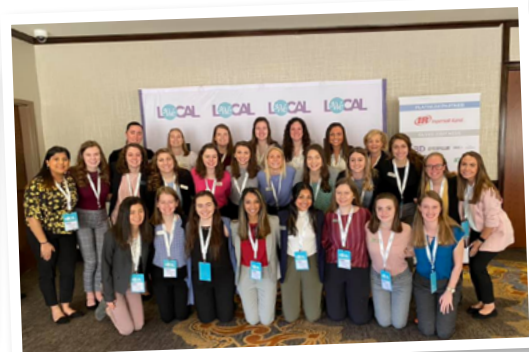
Slager said the most successful events last year included the Dress for Success Fashion Show and the Wellness Program. “About 70 engineering students attended the fashion show where members modeled some of their own clothes to give ideas of what to wear in various professional settings,” according to

Slager. “The Wellness Program was established to help our members prioritize their own well-being and still stay involved in SWE through events such as workout classes, healthy eating challenges and body positivity workshops.”

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-seven members attended the national conference in Raleigh and 31 members attended the WE19 SWE conference in Anaheim, 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 virtual professional development, social, educational and alumni events. SWE also will be holding the annual SWE Career Fair in the spring to help Ohio State engineering students obtain internships, co-ops, full-time jobs and research opportunities.



IRIS

Four years ago, Interdisciplinary Resource for Innovative Students was founded by several students in the Integrated Business and Engineering Honors Program. They sought to tap into the wealth of talent from students of all majors and academic talent. IRIS’ members are unified under the concept of Design Thinking – a process for human-centered innovation.

Students in the club learn valuable skills for product development while connecting with successful professionals in the Columbus area – from startups to Fortune 500 companies. Events from the past year have included:

- An onsite visit to Lextant, a Columbus-based consultancy with a strong foundation in Design Thinking to enhance user experience. Lextant’s workshop gave IRIS members insight into their methods of using images to better understand what consumers are seeking in a product.

- An onsite visit to Nationwide’s new innovation hub in the Arena District with Innovation Product Manager Zach Friedman, discussing the “Scaffolding of Abstraction,” a term he uses to describe the biases we take with us when addressing complex problems.
- Natasha Pongonis, co-owner of Nativa, a multicultural marketing agency, visited with IRIS students to show her work with data analytics using web-scraping and natural language processing to analyze public sentiment about certain topics.
- Morgan Howard, innovation manager of Safelite, led a discussion of the “empathy” portion of Design Thinking and the importance of utilizing it in effective market research.

IRIS plans to continue hosting similar events, as well as pursuing a partnership with a client for a long-term project throughout the semester.



BDAA

The 2019-2020 school year saw the continuation of many longstanding Big Data and Analytics Association events, “such as the BDAA Career Fair in the fall, many fruitful Tech Talks with our sponsors, and BDAA socials at campus-area restaurants,” according to BDAA Internal Relations Director Kelly Meaden. “We also hosted the first-ever BDAA Formal in November. We hope to host many more formals in the future, when it is safe to do so.”

Other activities included an Intro to Analytics workshop series for freshmen (and other students who were new to the field) last fall, along with a Python workshop series in the spring. BDAA partnered with CoverMyMeds for tours of their office. Additional student visits were taken to COTA and Alliance Data. “This spring, we hosted a few virtual meetings,” Meaden said, “and many of our members were able to engage with the Can’t Stop Columbus campaign to aid in coronavirus research and analytics in Columbus.”

Over the summer, BDAA matched its members’ donations to Campaign Zero and The NAACP Legal Defense and Educational Fund, raising a total of \$1,958 for the two organizations.



“We are still working to finalize plans for this upcoming year. However, we remain dedicated to BDAA’s mission: Inspire, Empower, Connect,” according to Meaden. “The plan is to host all meetings in a virtual format to keep our events safe and our members healthy. We intend to have meetings on Tuesday evenings via Zoom. To accommodate students who are located in different time zones, have other schedule conflicts, or are just curious to learn more from our speakers, we hope to bring our Tuesday guests back for a virtual chat session on Thursday afternoons.”

BDAA is partnering with the College of Arts & Sciences to co-host the Quantitative & Data Career Expo in September. Meaden said, it is believed that “this collaboration will provide the best opportunity for all students at OSU to find jobs and internships within the data analytics field at a myriad of great companies.”

For more information, follow BDAA on social media: @bdaaosu.

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.





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.