

## 'Passion for Awesome' Ignites IIE Conference

People. Materials. Information. Equipment. Energy. As members of the Institute of Industrial Engineers know, those are the systems that are the focus of our profession.

It's only fitting that those were the key elements at the center of the 2012 IIE Great Lakes Regional Conference hosted by The Ohio State University student chapter Feb. 17-19.

Led by senior and OSU IIE President Bobby Smyth, the team of 34 committee members set lofty goals for themselves. Having a two-year lead time helped, Smyth says. He immediately set about tasking committee members with assignments, which would play to their strengths.

"From the beginning, we had a vision and a passion and all the details came into place over two years," Smyth says. "It was going to make or break our college career. For our group, I think it really made it."

In the past, conference committees have raised and spent between \$10,000 and \$17,000. Smyth & Co. raised \$42,000, largely through connections they've made at OSU. Money not spent on the conference will be used to send future students to IIE's annual conference. "That's something [Conference Director] Brent [Miller] and I really wanted to be able to do," Smyth says.

Past conferences have generated a little under 200 in attendees. This year's conference saw 345 pass through the doors. They came from Ohio University, Purdue University, University of Dayton, University of Louisville, University of Michigan, University of Pittsburgh, Wayne State University, Western Michigan University, Wright State University and Youngstown State University.

"Our speaker's program is the thing I'm most proud of," Smyth says, and the key factor in driving attendance, he believes. "The speeches are the thing they're going to remember."

Smyth says he recruited the keynote speaker, OSU ISE grad Rob Savage, chief operating officer for Taco Bell, at the national conference in Cancun two years ago. "He helped fund this conference as well," Smyth says.

Other speakers included Greg Doppler, president of Cornerstone Specialty Wood Projects; Roger Frock, president and CEO of Quest Management; Michael Giuliano, U.S. patent and trademark owner of certifiedclean®; Stephen Kaufmann, financial executive and angel investor; Doug Rabeneck, executive with Accenture's Operations Workforce Optimization; Karla Tankersley, supply chain engineering expert; former OSU football coach Jim Tressel and David Velie, co-founder of Amend Consulting.

"We had global all-stars," Smyth says. In addition to speakers, the students also planned and held a career fair. "Our goal was to get every student in the room a job," Smyth says. Though results on that goal aren't yet known –

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Members of the conference planning committee with guest speakers Taco Bell Chief Operating Officer Rob Savage, Quest Management CEO Michael Giuliano, ISE Interim Department Chair Dr. Phil Smith and Faculty Advisor Dr. Carolyn Sommerich



Photo: Cedric Sze/ISE



The spirit of cooperation in the ISE Department at Ohio State makes the challenges that we face feel like opportunities.

One of the challenges has been the transition from quarters to semesters. As you can imagine, the amount of discussion and effort involved has been tremendous. However, this has been a very useful exercise to focus

attention on our definition of industrial and systems engineering, as there is no more concrete way to do this than to specify the contents of our curriculum. In some ways, the core themes remain consistent with our traditions, emphasizing the need for human-centered management and design with core courses in management systems engineering, production systems, manufacturing processes, human systems integration and operations research. The undergraduate curriculum also recognizes the need for students to experience depth in some area. Within this curriculum, students are exposed to the wide variety of different industries that need industrial engineers, including manufacturing and production, aviation, energy, healthcare, and transportation.

To remain competitive, engineering programs in the United States must lead the world in developing new innovations in design, manufacturing and production, and engineering management. Our new Dean, David B. Williams, is aggressively focusing attention on developing excellence in such areas.

In support of this agenda, the ISE Department is collaborating with the Electrical and Mechanical Engineering Departments and the Center for Automotive Research with a focus on smart energy systems, sustainable automotive systems and vehicle electrification. As part of this collaboration, ISE is now interviewing faculty candidates with expertise in stochastic modeling and optimization as applied to research on energy and the environment. ISE also is working with Mechanical Engineering and Material Science with a focus on the design and manufacture of light structures and assemblies. This joint effort is expected to create new senior-level faculty positions in all three departments. In addition, the creation of a Spine Research Institute is under way. This effort is being led by one of our faculty members, Bill Marras, in collaboration with faculty in Biomedical Engineering, Mechanical Engineering, the College of Medicine, the College of Veterinary Medicine, the College of Nursing and the College of Public Health.

**Dr. Philip Smith**  
*Interim Chair*

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"They're still interviewing" – the conference provided ample opportunities for students to submit resumes to potential employers Battelle Memorial Institute, Caterpillar, Kroger, Medline Industries, Newell Rubbermaid, Procter and Gamble, Stryker, Therma-Tru Doors, Universal Woods, Walmart and Whirlpool.

Smyth credits the success of the conference to knowing the audience and knowing what they care about. "We know what they want to hear the speakers talking about," he says, "and we know they want jobs. It was our passion to make it awesome."

And that includes budgeting; booking the conference site at the Ohio Union and hotel rooms; coordinating shuttles; preparing signage; designing a program; and menu planning. "Being an IE really helped with the flow of people," Smyth says, adding that organizers were aware of concerts at Schottenstein and Nationwide arenas that they took into account when scheduling the shuttle buses. "Our group, overall, spent about 4,000 man hours," Smyth says. "That's why it was so successful."

Conference Director Brent Miller says he couldn't be more proud of the hard work and planning put forth by committee members. "The conference itself went off without a hitch," he says. "We organized CABS [Campus Area Bus Service] buses to shuttle the students over, which controlled our registration arrival. In only 30 minutes we had over 220 attendees signed in and getting coffee and bagels. Our speakers had spoken with each other prior to arriving and their talks flowed seamlessly from one to the other embracing the conference theme, 'IIE Takes You Places.'"

"We're still riding the wave," says Smyth, who graduated in the spring and has a job lined up as project manager for Amend Consulting in Cincinnati. He says feedback has been extremely positive.

Perhaps the best sign of the conference's success came from University of Michigan peers who will be hosting next year's conference.

"We got the 'Thanks a lot' comment quite a bit," Smyth says, with a smile.

## How Firm Thy Friendship, O-HI-O

Time and change will surely show, how firm thy friendship, O-HI-O. I'm sure you're all aware of the words to our alma mater. These words certainly ring true these days. Consider:

- Our new College of Engineering Dean, Dr. Dave Williams, joins us from the University of Alabama-Huntsville. I had a chance to meet Dean Williams and his wife Margie at the OSU-Wisconsin football game. Wonderful people. I know you'll be impressed with Dean Williams and his visionary plans to continue to build upon the successes of the past and innovate for the future of Ohio State Engineering.
- We welcome as interim ISE Department Chair Dr. Phil Smith. I'm looking forward to working with Dr. Smith, as are all the members of the Alumni Advisory Board as he continues the tradition of excellence that we all have grown accustomed to from The Ohio State University Integrated Systems Engineering Department.
- We also have a new football coach at Ohio State, Urban Meyer, who knows a thing or two about the spread offense and aggressive defense.
- 2012 is an election year and we'll be electing a president and members of Congress. Challenges continue to plague the economy, especially in Ohio.

Time and change ...

The good news is that with the right attitude and skills, anything is possible. Our graduates from The Ohio State University Integrated Systems Engineering Department are trained to excel, regardless of the challenges thrown at them.

With new leadership comes new ideas and innovation. Personally, I'm excited about what lies ahead. I hope you will join me in embracing these opportunities and assist our new leaders at the Department and college level in any way you can.

How Firm Thy Friendship, O-HI-O.

**Chuck Elgin** (BS, ISE '78)  
*Chair, ISE Alumni Advisory Board*



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If you would like more information on ISE, or would like to discuss other opportunities to assist the Department, please contact Interim Executive Director of Advancement Lindsey Margaroli at margaroli.1@osu.edu or 614-292-9310.



## Küçükyavuz's NSF Career Grant Seeks Solutions in Uncertain Situations

Simge Küçükyavuz, assistant professor of Operations Research, is studying ways in which to take the guesswork out of decision-making, especially when some important data are unknown. Sounds like a nearly impossible mission, which is what makes the implications of her research invaluable to government and industry.

The research projects of Küçükyavuz are primarily funded by three active grants from the National Science Foundation (NSF) that total nearly \$1 million. These include the Faculty Early Career Development award for "Mixed-Integer Optimization under Joint Chance Constraints," the NSF's most prestigious award in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations.

"In my research, I address optimization problems where there is uncertainty in the data," she says. The uncertainty could be related to weather or the demand for a product or service. Küçükyavuz's research attempts to help decision-makers reduce costs in such uncertain en-

vironments while meeting high service levels.

The applications of her research are broad and could have positive impacts on decisions made in supply chains, transportation, emergency management, telecommunications and energy systems. "NSF is very interested in fundamental research that is general enough to have applications that span multiple problems and industries," she says.

Küçükyavuz plans to develop a unified theory and computational methodology to advance decision-making tools. "The next steps for me are to apply the optimization tools that I have been developing to new and emerging application areas," she says. For example, she has recently begun a project to address optimization problems in air traffic flow management with support from the Center for Aviation Studies at OSU.

As an integral part of her research projects, she is supervising three PhD students with diverse backgrounds. She finds her role in mentoring these students and helping them develop their independent research skills to be one of the most gratifying parts of her work.

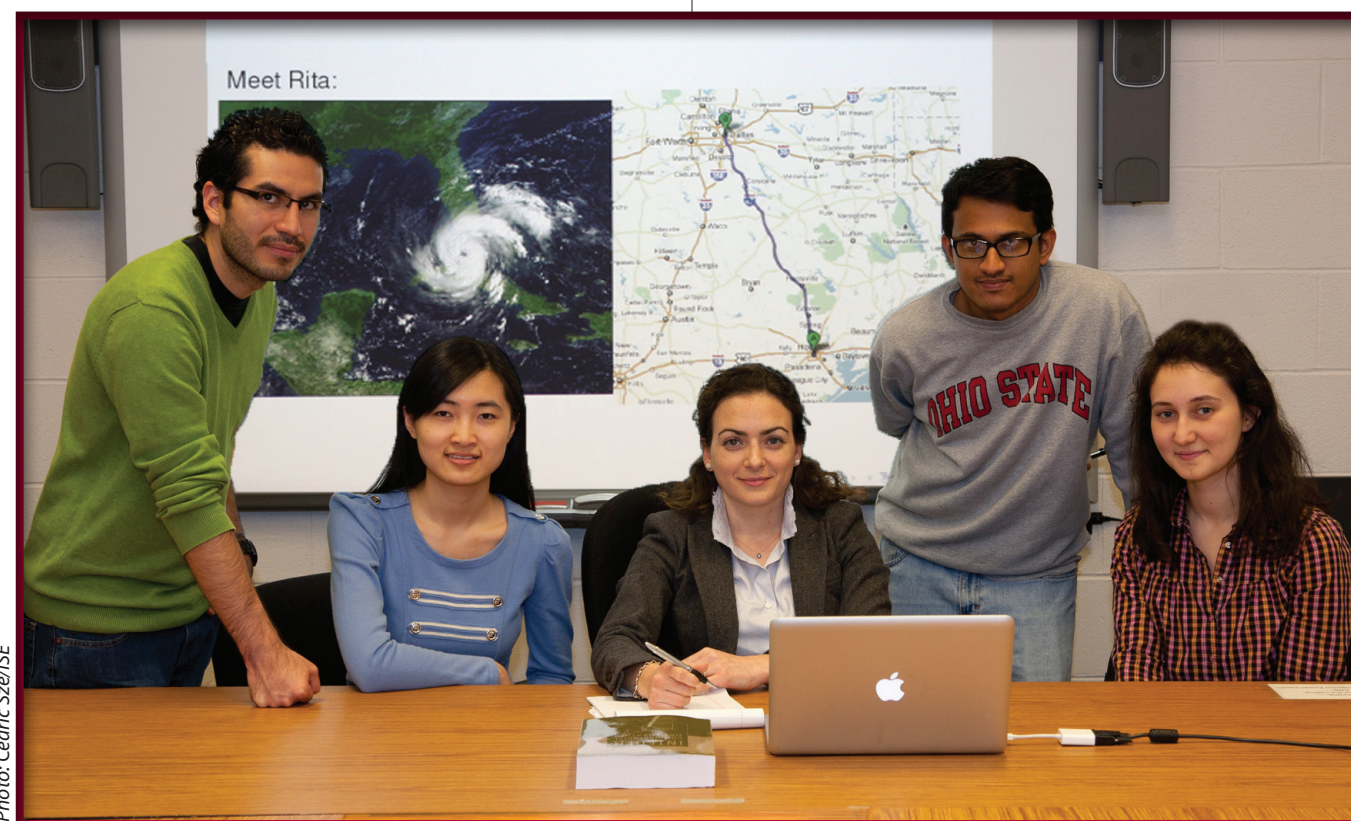


Photo: Cedric Sze/ISE

Assistant Professor Simge Küçükyavuz (center) with students (left to right) Hugo Taracena Pinzon, Minjiao Zhang, Dinakar Gade and Pelin Damci-Kurt.

## Yi's 3D Freeform Microlenses Produce Multi-faceted Look at Microscopic Objects

Much like insects detect movement in a variety of different directions, ISE Associate Professor Allen Yi is perfecting 3D microfabrication to create lenses which mimic their vision patterns.

While insects generally have poor vision, their eyes are composed of thousands of individual photoreceptor units working in tandem to process images and detect movement with extremely limited computing power.

In a paper he wrote with postdoctoral researcher Dr. Lei Li for the *Journal of the Optical Society of America*, Yi explains, "In this research, a freeform optical prism array was designed and fabricated to achieve 3D stereo imaging capability for microscope and machine vision applications.

"The principle of the freeform prism array investigated in this research can be applied to microscopy, machine vision and robotic sensing, and many other areas."

According to the *Journal* article, "The 3D stereo view can supply more information than a regular 2D view. By using the freeform prism array, nine clear 3D stereo views can be obtained simultaneously. This can save time and potentially eliminate the need for adjusting the viewing direction as well as the need for focusing the camera to obtain the same amount of information. Moreover, the relative position accuracy of the stereo images formed by the freeform prism array are already determined precisely by the ultraprecision machining process, and the image location have been calculated; therefore the positioning accuracy will be much higher than using devices that require adjusting viewing directions."



Photo: Cedric Sze/ISE

ISE Associate Professor Allen Yi holds a freeform optical mold insert used in injection molding of precision polymer optics.

In addition to freeform microlenses, one of the major research focused areas in Professor Yi's group is thermal forming of precision glass optics. One of his current projects is supported by a National Science Foundation Faculty Early Career Development Program (CAREER) award. "The goal of the CAREER award is to seek fundamental understanding of the mechanics involved in the glass-forming process and how that impacts optical performance of the molded optics," Yi says. The results were also implemented in a recently completed project for NASA in which thermal slumping of thin sheet glass optics was successfully modeled in order to identify ideal process conditions without doing the actual experiments.

"The key to our research is that we want to do everything with high precision but at a very low cost," Yi says. "We have a very niche skill that's in high demand."



## Ray Sharp

Ray Sharp is a senior from Westerville, a suburb of Columbus. He is on course to graduate with a bachelor's degree in May 2013.

**Internships:** Ray participated in an internship with Cooper Industries last summer where he was involved in the company's environmental, health and safety initiatives. "Some of my projects included auditing the company to make sure it met the OSHME (Occupational Safety Health Management Evaluation) safety standards. I also gained some ergonomic improvement experiences with various employees throughout the department."



Photo: Cedric Sze/ISE

**Career plans:** "Ideally, I would like to continue working for Cooper and take advantage of their operations leadership program they have to offer. It's a great opportunity to explore more facets of the industry while still being able to apply the tools I have gained from working toward my degree here at the University."

**He's got 'Spirit':** Ray is a member of the OSU Spirit Team. "I usually help out with different event requests for the cheerleaders and Brutus programs. Making sure there is consistent communication between both parties. On game days, I, along with my teammates, help to make sure the show runs smoothly with the different T-shirt and ball blasters. We have to make sure Brutus gets to all the places he needs to be at safely and smoothly, things of that nature." He says the time commitment averages about 25 to 30 hours a week, including training, games and other events.

**How do you manage a full course load with your Spirit Team duties:** "Juggling my Spirit Program duties with my course load is challenging. It just takes a lot of communication with my professors and teammates. A lot of discipline as well."

**Campus activities:** Ray also serves as a University Ambassador, is president of University Foundation Student Ambassadors, and is a member of Phi Gamma Delta and IIE.

**When did you know you wanted to be an engineer:** "I would say spring quarter of freshman year is when I was certain I wanted to be an engineer. Engineering was something I originally did not plan on pursuing. However, as I looked around for different majors it just seemed like something I could see myself pursuing in the near future."

## Alicia Borgman Fernandes

Alicia Borgman Fernandes is a graduate student from Pleasant Grove, Calif. She earned her undergraduate degree in applied mathematics in 2001 from California State University – Long Beach and a master's degree in operations research in 2003 from Northeastern University.

**Campus Activities:** Alicia is an active member of the Buckeye Tang Soo Do club. The club trains in the martial art of Tang Soo Do, which is a blend of Kung Fu and Taekwondo.

**Area of ISE Specialization:** Cognitive Systems Engineering, "at the intersection between people, technology, and work." Alicia works in aviation, developing procedures, roles and technologies to help people coordinate effectively with each other in planning air traffic flows, especially when there are disruptions such as thunderstorms.



Photo: Cedric Sze/ISE

**Best thing about OSU:** "The size of OSU creates so many opportunities for students. If you feel like there is something missing from your life, academic or otherwise, chances are that there is a resource on campus that can fill that gap. The size and reputation – especially the storied history of this department – also allows the university to attract top faculty, and so, we really do have the opportunity to learn from some of the best in our field. I've taken more classes at OSU that changed my world view than I have during any of my other (many) years in education."

**Best advice you've been given:** "A demo should never, ever crash. My boss always made sure that we were well prepared for any meeting with the client and that any software we demoed or gave them was stable. If you aren't sure how it will work, don't let the client see it. It is better to leave out functionality if it isn't stable, even if it could wow them. Also, never rely on someone else's technology to work for your demo. If you're showing off a web-based application, it's okay to show the client something from the web. But have a local copy in case your connection is bad. It sounds obvious, but I've seen a lot of demos go horribly wrong."

## Minjiao Zhang

Minjiao Zhang is an international student from Xi'an, China. She is a PhD candidate specializing in operations research: mixed-integer programming, large-scale optimization. She is on course to complete her dissertation and graduate in May 2013.

**Career Plans:** Minjiao says she hopes to stay in an academia setting, and ideally, would like to find a faculty position.

**Campus Activities:** Her extracurricular interests have included the OSU student chapter of Institute for Operations Research and the Management Sciences (INFORMS), which she currently serves as president. Last year, Minjiao was treasurer for the organization.



Photo: Cedric Sze/ISE

**What type of research have you conducted at OSU:** "I have been working with my adviser Dr. Simge Küçükyavuz for almost three years," Minjiao says. "We finished one project on multi-echelon lot-sizing problems and another one on dynamic decision-making problems."

**Best thing about OSU:** "I love the knowledgeable and dedicated professors around us," she says. "I love the OSU students' passion of study and sports. I also love this big campus."

**Awards and Achievements:** Minjiao was the recipient of a university fellowship during her first year at OSU. Recently, she was selected to present her research poster presentation titled, "Branch-and-Cut Method for Dynamic Decision-Making under Uncertainty with an Application in Probabilistic Lot Sizing" in the IIE Doctoral Colloquium at the IIE conference in Orlando this May.

**When did you know that you wanted a career in ISE:** "I like math and I am interested in applying math in practice," Minjiao says. "After I was aware that operations research is a combination of math and engineering, I knew this was what I wanted to do. Now I am enjoying doing optimization in the fields of supply chain management and logistics."

## Elizabeth Schweizer

Elizabeth Schweizer is a senior from the Dayton suburb of Oakwood. She is set to graduate with a bachelor's degree in June.

**Career plans:** Elizabeth has a job lined up as an integrated systems engineer at Walt Disney Parks & Resorts in Orlando. She previously served two internships with Disney and took advantage of networking opportunities to interview for a full-time position while still an intern.

**Campus activities:** Elizabeth is serving as the Walt Disney Parks & Resorts campus representative at Ohio State recruiting students for internships and helping them with the application process. She reports quite a few OSU students are going to work for Disney, including five ISE interns and another graduate working full-time. She also served as the vice president for Alpha Pi Mu and as the dance captain for her sorority, Alpha Xi Delta.



Photo: Cedric Sze/ISE

**Words of wisdom:** "Students don't realize how important a personal connection is. It's one thing to have a killer resume, but a personal connection is key. Everybody's a free agent and is marketing and branding themselves."

**IIE involvement:** Elizabeth served as the executive vice president her junior year and served on the planning committee for the Great Lakes Regional Conference this year.

**Favorite hobby:** When not pursuing her degree, Elizabeth, shown in the picture above with ISE student Benjamin Freidenberg, can be found performing ballroom dance. A pre-professional ballet dancer while growing up, she says she "got hooked" on ballroom dancing while on a cruise and frequently helps out with social dancing classes at Ohio State.

**When did you know you wanted to be an engineer:** "It was a gradual process. I originally wanted to become a doctor and was in chemical engineering. I heard a woman speak on integrated systems engineering. My passion and interests really aligned with industrial engineering. It's the best decision I ever made."

**Parting thoughts:** "Never be afraid to start something new. It's never too late."



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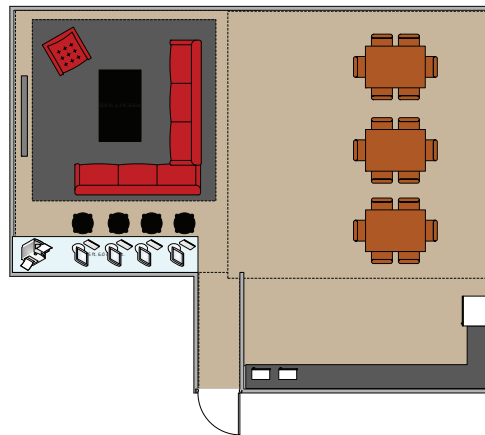
## 70-year-old Pact Between 'Buddies' Continues to Have an Impact on Today's ISE Students

Nearly 70 years ago, three undergraduate industrial engineering students made a pact: Once they had the financial resources, they would give back to their alma mater. In 1987, William A. Dunning, Bruce E. Higham and Albert F. Sprock – all graduates of the class of 1943 – established the Dunning, Higham, Musil and Sprock Fund to be endowed with gifts from their estates. The fourth name is in honor of Anthony J. Musil, a fellow engineering student who left school early to serve in World War II. Musil was killed in action Dec. 13, 1944.

"They were all buddies," says Edward Brill, who served as the caretaker for Mr. Higham during his later years. Brill says they set up the endowment "because they wanted to help the engineering school."

The fund supports research, teaching, service program, facilities and alumni functions in the Department and allows the former OSU engineering students to continue to make a difference in perpetuity. A portion of the fund currently is being used to create a student-designed study space in the Department.

Senior Kelsey Larsen has taken on a leadership role among a team of 10



*A rendering created by a team of 10 ISE students shows the layout of the new study area funded by an endowment from 1943 industrial engineering graduates. To the right are group study tables, with a lounge area to the left.*

ISE students working to design the space. She says it is targeted toward undergraduate students and "will contain both tables and kitchen accessories giving students a place to store healthy meals and provide group study spaces."

About 80 students provided feedback on what they would like to see in the space. "We plan to have a kitchen area with a fridge, several microwaves and a coffee maker," Larsen says. "We also plan to have at least three group study tables. There will be a couch and a set of computers to be used."

She says students will not only benefit from the finished project, but also "because we are learning how to manage a project in a big institution. Additionally, the space will give us the opportunity to work in groups better with the group tables."

Larsen appreciates the fact that the area is being funded by former students who have chosen to give back. "I know I have personally done things I wouldn't have been able to do without the help of alumni, such as going to conferences," she says. "We couldn't do these things without our generous alumni."