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ENGINEERING SOLUTIONS



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GLOBAL ENGINEERING

*Faculty and Students Broaden their Research
and Education Experiences Abroad*

Dear Alumni, Colleagues and Friends,



One of the Pillars of Excellence defined in UMass Lowell's 2020 Strategic Plan is "Global Engagement & Inclusive Culture." The pillar's description states that "Dynamic, global collaborations around the world support student and faculty exchanges, research and other entrepreneurial enterprises. These initiatives will contribute to the development of an inclusive campus culture." This issue of Engineering Solutions takes a look at some of the global outreach efforts of the Francis College of Engineering.

Personally, I have been very fortunate over my career—both as a student and faculty member—to see the world. More specifically, I have lived overseas three times. My first experience was through a study abroad program in Germany as an undergraduate student. Even though I was an engineering major, I joined an MBA program in Paderborn, Germany, because it met my need for a summer experience. My second experience was as a graduate student in Dortmund, Germany, performing research in warehousing and logistics. My third experience was a sabbatical, serving as a visiting faculty member in the Department of Management Sciences at the University of Edinburgh in Scotland. The last experience was special because my family joined me.

Truthfully, they were all special. The academic experiences were fantastic—from the coursework in Paderborn to solving cool industrial problems in Dortmund to writing research papers with colleagues in Edinburgh. And the foreign travels were equally amazing—from taking out a chunk of the Berlin Wall during my stay in Germany in the summer of 1990 to walking through the ruins of Scottish medieval castles. But even mundane tasks like buying food at a local market or hopping across town via public transit were "experiences," especially when English was not the common language.

These experiences, and the people that I met through them, helped shape me into the person I am today. They opened my eyes to perspectives that I had not imagined. They made me step back and look at the world from a different point of view. And they made me appreciate all that I have.

Because of my experiences, I have very straightforward advice for students (and, frankly, everyone): If you have the opportunity to study abroad, do it. The memories, experiences and lessons learned will last a lifetime. This issue of Engineering Solutions looks at the opportunities that the college offers for both our students and faculty, as well as highlighting engagements with our partner institutions across the globe. And some of our international alumni share stories of their successful careers. Enjoy the read!

As always, please feel free to contact me (Joseph_Hartman@uml.edu, 978-934-2576 or via LinkedIn) if you have a story to share or would like to partner with the Francis College of Engineering. I look forward to hearing from you, especially if this international issue moves you.

Sincerely,

Joseph C. Hartman, Ph.D., P.E.
Dean, Francis College of Engineering
University of Massachusetts Lowell

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UMassLowellEngineering

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ON THE COVER

UMass Lowell is committed to enhancing the quality of education of its students through international partnerships, collaborations and exchanges with institutions abroad. They offer meaningful cross-cultural learning experiences and strengthen the students' understanding between countries, cultures and universities around the world. This issue highlights some of the programs that are currently underway with schools in Europe and Asia, as well as a community project undertaken by Francis College of Engineering students in Haiti. To date, UML students have studied in more than 23 countries, and the list continues to grow.

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ENGINEERING STUDENTS LEARN IN THE CLASSROOM AND ON THE JOB IN THE CZECH REPUBLIC

During his studies at the Czech Technical University in Prague, Gregory Ensom '17 learned not only about electrical engineering at CTU, but also about the cultures and histories of a dozen different countries all over Europe.

After an extraordinary semester studying at the Czech Technical University (CTU) in Prague, what could former electrical engineering major Gregory Ensom do for an encore?

How about staying in Prague for an internship in the research and development department at Valeo, a multinational automotive supplier that specializes in smart vehicle technology and innovation?

During his two-month internship, Ensom helped develop the software and hardware that goes into autonomous and assisted-driving cars for companies such as Volkswagen and Renault.

"I can't begin to express how rewarding this experience was," says Ensom, who graduated from UMass Lowell in May 2017. "You hear the cliché that people find themselves when studying abroad, and it really is true. Through my experience, I have grown to be a more motivated and confident person."

Ensom was one of three Francis College of Engineering students to participate in the student exchange program at CTU in spring 2016. They were joined in the Czech Republic by Prof. Martin Margala, chair of the Department of Electrical and Computer Engineering (ECE), who was on a one-year fellowship in Prague after being awarded the Fulbright-Czech Technical University Distinguished Chair in Electrical Engineering in 2015.

The goal of the UMass Lowell-CTU partnership, established in 2011, is to promote student and faculty exchanges and research collaboration in areas such as nuclear engineering, advanced manufacturing and cybersecurity. This spring semester, two undergraduates from the Francis College of Engineering—Anne Souza in mechanical engineering and Brianna Fahrenkopf in computer engineering—are studying at CTU.



Prof. Martin Margala

To provide opportunities for professional, hands-on engineering experience, UMass Lowell and CTU have set up co-op programs for undergraduates and internships for graduate students with companies that have major centers near both the Lowell and Prague campuses.

For example, Red Hat, a leading provider of open source enterprise software, has R&D centers in Westford, Mass., and in Brno, the second-largest city in the Czech Republic. Aside from Red Hat and Valeo, other participating companies include Honeywell, Rockwell Automation and Eaton, Margala says.

The relationship between UMass Lowell and CTU has gone so well that they have decided to take it a step further.

"Under a newly signed agreement, the partnership has been extended to 2021," Margala says. "We will soon start offering undergraduate and graduate students joint degree programs. Right now, we're working on a dual-degree—master's and doctorate—program for grad students."

Because of the success of this partnership, UML has also teamed up with another Czech institution, Masaryk University in Brno.

Margala notes that employers are increasingly recruiting graduates with global awareness and multicultural experiences.

"These young engineers are already accustomed to working in teams with diverse backgrounds. Companies are now pushing for diversity in the workplace, because it provides different types of training and thinking and a variety of points of view. Employers are really seeking out these kinds of skills," he explains.

Margala says study abroad experiences are very desirable to help students' résumés stand out, especially when applying for jobs at large international companies. "Employers know you already have the experience and training, so you need less mentoring and you can transition easily into your new job. This is a huge advantage for UMass Lowell graduates over other applicants." UML

UMASS LOWELL, CZECH CENTER TRAIN TOMORROW'S NUCLEAR INDUSTRY PROFESSIONALS

International Program Prepares Workforce for Growing Nuclear Energy Sector

The global nuclear energy industry is experiencing a resurgence. Currently, there are more than 440 commercial nuclear power reactors operating in 31 countries, with a generation capacity of 390 gigawatts of electricity. They supply about 11 percent of the world's energy demand, and about 20 percent of the United States' needs, according to chemical engineering Assoc. Prof. Sukesh Aghara, director of UMass Lowell's nuclear engineering program.

With more than 60 new advanced nuclear reactors being built around the world and many more applying for licenses and under development, this trend has led to an increasing demand for a highly trained and qualified workforce to design, build and operate the global fleet of reactors, maintain them and keep them safe and secure.

"They present opportunities for nuclear engineering graduates to land high-paying jobs in the nuclear energy sector worldwide," says Aghara, who also directs the university's Integrated Nuclear Security and Safeguards Laboratory (INSSL).

BILATERAL COLLABORATION ACROSS THE ATLANTIC

To meet this growing demand for a skilled workforce, UMass Lowell and the U.S.-Czech Civil Nuclear Cooperation Centre (CNCC) in Prague have developed a joint summer fellowship program for graduate students and young professionals called the Intercontinental Nuclear Institute (INI). Its goal is to help contribute to the long-term sustainability of nuclear energy projects and infrastructure around the world.

The initiative—which is supported and recognized by the International Atomic Energy Agency (IAEA), the U.S. Department of Energy, the U.S. Department of State and the Czech Government—consists of four weeks of intensive hands-on education and training in reactor system fundamentals, operations and technology and advanced reactor design as well as radiation detection, dosimetry and protection, fuel cycle management and nuclear materials safety, security and nonproliferation.

The institute is co-directed by Aghara and Assoc. Prof. Radek Škoda of the Czech Technical University. CNCC will host the fellows at Chateau Štířín near Prague for the first two weeks; UMass Lowell will host the attendees on campus for the last two. In addition to classroom lectures and workshops, mentoring, hands-on lab exercises and reactor experiments and poster presentations, there will be technical visits to several commercial nuclear power plants, research and test reactors and other industry complexes in the Czech Republic and New England.

Aghara is supported by several UML faculty and staff members who contribute to the INI program. They include former INSSL Assoc. Director Marco Marzo (who is presently secretary-general of the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials, or ABACC), Profs. Emeriti John R. White and Gilbert J. Brown (both of chemical engineering), Radiation Safety Director Steven Snay and UML Research Reactor Director Leo Bobek. Retired U.S. Navy Rear Admiral Clarke Orzalli, who served in the



Students participating in the 2017 Intercontinental Nuclear Institute (INI) separate and identify isotopes in the radiochemistry lab of the Czech Technical University in Prague.

navy's nuclear submarine fleet, is also a guest speaker during the INI banquet program.

"The mission of the INI, now in its fourth year, is to leverage existing expertise and resources at both institutions and in both countries," says Aghara. "We aim to engage a network of young professionals who will bridge the technology and knowledge gaps in the nuclear power sector, share best industry practices and spark the fellows' interest that could lead to the next innovation in nuclear energy research."

Last year, the program attracted 27 participants from 20 countries, including the U.S., the Czech Republic, Armenia, Bulgaria, Belarus, Croatia, Hungary, Kazakhstan, Lithuania, Poland, Romania, Slovakia, Slovenia, Turkey, Ukraine, Saudi Arabia, Ghana, Bangladesh, Mexico and Brazil.

"We now have more than a hundred INI graduates who are involved in the nuclear energy sector worldwide. Many of them are destined to be future leaders who will shape the long-term nuclear energy policies and strategies of their respective countries and the world," notes Aghara.

He says the INI fellowship has raised the visibility of the university's nuclear engineering program globally: "Our program dates back to the 1960s, and UMass Lowell is one of only 23 schools across the U.S. that has a research reactor and accelerator facility on campus."

Aghara adds, "The university's nuclear assets are unique and invaluable resources for our students, and programs such as INI provide a platform to our students for global engagement."

This year's INI program will be held June 3–16 in Prague and June 17–29 in Lowell. More information is available at www.uml.edu/ini. [UML](http://www.uml.edu/ini)



INI fellows tour the control room of the Temelin Nuclear Power Plant in the Czech Republic in 2017.

UMASS LOWELL HELPS CREATE AN INTERNATIONAL PLASTICS UNIVERSITY IN INDIA



PARTNERSHIP WILL PROVIDE OPPORTUNITIES FOR JOINT DEGREES, FACULTY EXCHANGES, STUDY ABROAD AND CO-OP PROGRAMS

ABOVE: The Plastics International University (PIU), depicted in this artist's rendering, will be the first institution of its kind in India that offers academic and research programs in plastics engineering and related fields when it opens in late 2018.

UMass Lowell, which is globally renowned for its plastics engineering program, is teaming up with Plastindia Foundation, India's largest plastics trade umbrella organization, to build a world-class university for polymer technology and processing in India. The goal of the planned Plastindia International University (PIU) is to educate and train up to 1,200 students annually in plastics, chemical and mechanical engineering, industrial research, project management and entrepreneurship.

Total consumption of plastics in India is about 11 kilograms per capita and is growing steadily, while total exports of its plastics products already stand at \$8 billion. To address the current needs of India's plastics industry and provide sustainable growth, PIU will play a leadership role in supplying a more technically skilled workforce.

Construction of Phase I of PIU's new 50-acre campus is nearing completion in Vapi, Gujarat state, near Mumbai. Gujarat is one of India's major centers for plastics and chemicals manufacturing. Plastindia expects the university to open later this year with executive and professional education, admitting its first undergraduate class in the fall of 2019.

The entire project is being privately financed. Mumbai-based Plastindia Foundation donated about \$6 million as seed capital for the project, which is estimated to cost about \$30 million; the rest was raised from contributions from local and overseas Indian plastics companies.

UMass Lowell will help PIU to develop engineering curricula that meet international standards and ABET accreditation, train the faculty and assist in planning infrastructure, especially

the extensive laboratory and classroom spaces for the planned School of Engineering at PIU. Focusing on plastics engineering, academic offerings at PIU will provide tracks in product design, polymer processing and polymeric materials and composites.

In the future, the university will add a business program focused on entrepreneurship in the proposed School of Management as well as related graduate programs, continuing-education courses and seminars.

"This university is being created by the Indian plastics industry, for the industry and of the industry," says Achal Thakkar, a member of Plastindia's governing board who has been closely involved since the beginning of the project. Thakkar is also a UMass Lowell alumnus, having earned bachelor's and master's degrees in plastics engineering in 1989 and 1990, respectively.

"India's plastics consumption is expected to grow three times by 2030. With UMass Lowell's assistance, the technical workforce needed to fuel this growth will be met through PIU," he says.

"The plastics industry is huge in both the United States and India—there are tremendous untapped opportunities," says Prof. David Kazmer, who chairs UML's Department of Plastics Engineering. "The plastics industry is highly global with respect to supply chains. As such, there is a lot of human and technology exchange around the globe. While the United States and Europe have been leaders, China and now India are emerging as very significant consumers and suppliers. As a result, UMass Lowell students and faculty stand to benefit from a close relationship and interaction with PIU."

LARGEST CONTRIBUTOR OF INTERNATIONAL STUDENTS

To date, UMass Lowell has more than 500 alumni based in India. Kazmer hopes the collaboration with PIU will ultimately draw more graduate students to UML. UMass Lowell has long had strong ties to India. In fact, India is the largest contributor to UML's international student population.

"PIU's initial goal is to start a bachelor's degree program in plastics engineering very similar to that of UMass Lowell," says plastics engineering Prof. Ramaswamy Nagarajan. "We hope to have a pipeline of graduate students coming to UMass Lowell after finishing their undergraduate studies at PIU."

Nagarajan and Profs. Emeriti Robert Malloy, Nick Schott and Stephen Driscoll were responsible for facilitating the initial engagement with Plastindia Foundation in 2012.

"Vice Provost Scott Latham, Dean Joseph Hartman, Prof. Kazmer and Innovation and Workforce Development Director Sandhya Balasubramanian were instrumental in closing the memorandum of understanding and partnership agreement with PIU in 2016," says Nagarajan.

"There will be opportunities for UML students, not just for plastics but also mechanical and chemical engineers, to do a semester abroad. Having spent some time in India myself on a Deshpande delegation about entrepreneurship, I've found that immersion in a foreign culture is very informative and helps



LEFT: UML Chancellor Jacquie Moloney and PIU President Arvind Mehta hold the blue folder containing the memorandum of understanding and partnership agreement between UMass Lowell and PIU, which was signed on Oct. 7, 2016 at University Crossing. Also in attendance were, from left, Prof. Supriya Chakrabarti, Prof. Ramaswamy Nagarajan, Vice Chancellor Julie Chen, Prof. David Kazmer, Sandhya Balasubramanian, then-Vice Provost Scott Latham and Provost Michael Vayda (all of UMass Lowell), Kamal Nanavaty (PIU), Dean Joseph Hartman (UML) and K. K. Sekaria, Achal Thakkar, Raju Desai and Palak Sheth (all of PIU).

develop a larger understanding of the world, both with regard to larger societal needs as well as perspective as to one's own personal mission," says Kazmer. "There will also be opportunities for PIU students to attend UML as exchange students, and UML students' direct interaction with a diverse population also provides valuable experience for future industry interactions in a multinational workplace."

He adds, "There is a shortage of trained plastics engineers globally, so the job prospects for our graduates are excellent. We expect PIU will offer a robust co-op program very much like our own. The need for highly capable plastics engineers is critical to efficiently and responsibly address global plastics consumption." **UML**

More information about PIU is available at www.plastindia.edu.in

UMASS LOWELL AND SHENKAR COLLEGE JOIN FORCES TO DEVELOP SMART, SELF-CLEANING COATINGS

Innovative Work by International Team of Faculty and Student Collaborators Is Awarded Two Patents

A team of plastics engineering faculty and student researchers at UMass Lowell and Shenkar College of Engineering, Design and Art in Israel has developed new self-cleaning coatings that are low-cost, durable and easy to apply; these could potentially revolutionize materials in the optical, aerospace, automotive and construction industries, among others.

The nanotechnology-based coatings have “superhydrophobic” surfaces that strongly repel water and ice, making them non-adhesive and non-wetting. This means they can resist corrosion and reduce friction, which translates into potential use in a wide range of commercial and military applications.

“The coatings are cost-effective and are based on commercially available materials,” says UMass Lowell Prof. Joey Mead, who is part of the research team that studied and fabricated the special coatings. “They can be easily applied by spray-coating techniques over different surfaces and materials.”

Aside from Mead, the team also includes UML Prof. Carol Barry, Shenkar College Profs. Hanna Dodiuk and Samuel Kenig and Shenkar graduate Tehila Nahum, who earned her Ph.D. from UMass Lowell in 2016.

The results of the team’s innovative work were awarded two U.S. patents and have been published in leading academic journals and presented at technical conferences. Several companies have expressed interest in commercializing the technology.

In practical terms, the coatings can be used to treat the exterior of aircraft. For example, the wings and fuselage can be treated with superhydrophobic coatings to significantly decrease buildup of snow and ice, which can affect the plane’s flight control and safety. This also can help eliminate the need to use toxic chemical de-icers, reducing aircraft maintenance cost and servicing while minimizing environmental pollution. Superhydrophobic coatings can be applied to any new or existing surfaces, from ship hulls to kitchen appliances and medical devices.

Textile fibers treated with superhydrophobic coatings can be used in protective clothing and self-cleaning fabrics and tents to reduce soiling and cleaning cycles; surfaces coated with a layer of superhydrophobic material can be employed for anti-graffiti walls and display panels and car windshields, to name a few.

THE PHILANTHROPY OF DAVID PERNICK

The partnership between UML and Shenkar College is made possible through the Pernick Fund, which was established by David Pernick, a 1941 textile engineering graduate of UMass Lowell (then Lowell Textile Institute). Before Pernick passed away in 2014, he and his wife, Frances, celebrated the 60th anniversary of his graduation by creating the International Program of Graduate Studies in Plastics Engineering. The program brings doctoral students like Nahum from Shenkar College (located in Ramat, Gan, near Tel Aviv) to UMass Lowell, as well as faculty from Lowell to Israel, to conduct research and collaborate in academics.

While completing her doctorate, Nahum performed studies at the university’s Center of Excellence in Nanomanufacturing and the NSF Center for High-rate Nanomanufacturing, alongside Mead, Barry, Dodiuk and Kenig. Nahum helped develop novel, polymer nanoparticle-based superhydrophobic coatings that offer improved durability in terms of abrasion, erosion and scratch resistance under harsh conditions—work that formed

the basis of her doctoral dissertation and for which the team was awarded the two patents.

“The joint intellectual property reinforces and enhances the academic and technical standing of the researchers from UMass Lowell and Shenkar,” says Kenig.

“We are excited about the possibilities for this technology. Without the support of the Pernick Fund, along with that of the federal government and the Commonwealth of Massachusetts over the years, none of this would have been possible. It is truly a story where philanthropy has led not only to educating our future engineers and scientists, but also to strengthening the local economy and creating new materials to solve real-world problems,” notes Mead, who is the director of UMass Lowell’s Nanomanufacturing Center.

“Profs. Dodiuk and Kenig have been coming to UMass Lowell for research and to teach courses for the past five years. Prof. Barry and I have been going to Shenkar College almost every year. Since Tehila’s graduation, we have also co-advised other Shenkar students, including Orli Weitzmann and Eyal Cohen,” says Mead, who was named the 2017 UMass Lowell Distinguished University Professor.



Nahum, third from left, poses with UMass Lowell Profs. Carol Barry and Joey Mead and Shenkar College Profs. Hanna Dodiuk and Samuel Kenig.

“I have found this collaboration with faculty and students from Shenkar College to be one of the most enjoyable experiences of my professional career. I look forward to more great work as we go forward,” she says.

A SPRINGBOARD TO PROFESSIONAL SUCCESS

With her education and hands-on research experience with UMass Lowell and Shenkar College, Nahum has gone on to work as a principal formulations engineer at Adaptive Surface Technologies, Inc. (formerly SLIPS Technologies, Inc.) in Cambridge, Mass.

Nahum, who came to the university with a master’s degree from Shenkar and was able to complete her Ph.D. in less than three years, says her work through the Pernick Fund provided real-world, industry-oriented research experience that has given her an edge as a working professional.

“I am really thankful to the professors from both UMass Lowell and Shenkar College and to the Pernick Fund for giving me this wonderful opportunity,” she says. [UML](#)

Tehila Nahum, Ph.D. '16, is part of a team of researchers, including faculty members from UML and Shenkar College in Israel, that secured two patents on superhydrophobic coatings. Here, Nahum takes water contact-angle measurements of a superhydrophobic surface at UMass Lowell’s Nanomanufacturing Center.

TAIWAN INTERNSHIP PROGRAM

GIVES STUDENTS A TASTE OF GLOBAL ENGINEERING



ABOVE: UML chemical engineering major Ashly Tran (to the right of the boulder, wearing sunglasses) enjoys a summer day at Sun Moon Lake in Taiwan, where she interned at the National Chung Hsing University (NCHU) in 2016. With her are other students from the United States, Japan and Taiwan.

RIGHT: UML civil engineering senior Felix Lao (back row, right) and UML chemical engineering senior Vivian Chung (front row, right) explore Taiwan's National Museum of Natural Science in Taichung in 2017 with fellow NCHU interns.



Chemical engineering major Ashly Tran came to UMass Lowell with specific goals—namely, getting hands-on lab experience and doing serious research as an undergraduate. One thing that wasn't high on her list was studying overseas. But when a professor recommended that she apply for a summer internship program at Taiwan's National Chung Hsing University (NCHU), Tran was all in.

"I don't think I ever wanted to go on a study abroad, but when opportunity presented itself, I thought, why not?" says Tran, a junior.

Tran applied and was accepted to the program, which brings engineering students from around the world to NCHU's engineering college for two weeks each summer to collaborate and learn.

Tran, who did her internship in 2016, spent her days in a lab with researchers plating bacteria cultures and using high-performance liquid chromatography (HPLC) to analyze various compounds. She spent her free time soaking up a variety of cultural experiences in Taichung, Taiwan's second-largest city. She learned how to navigate the challenges of daily living in a foreign city and developed confidence in her ability to adapt and thrive in unfamiliar situations.

For Tran, participating in the program was motivating and whetted her appetite for more hands-on engineering experiences, which she got last year through a professional co-op job at Pfizer.

"It really opened my eyes to what's out there," says Tran, whose goal is to work in the biotechnology sector. "I highly recommend the program. Not only for the perks, but also because coming back, it made me want to gain more experience in the working world."

UMass Lowell has been participating in NCHU's internship program since 2013, and eight Francis College of Engineering students have taken part so far. NCHU covers tuition, housing and meals; students are responsible for airfare and spending money. While on campus, the visiting students are paired with a host student who acts as a guide—and sometimes as an interpreter. In addition to time spent in the labs, the students visit area businesses and explore cultural and historic attractions, including the popular night markets and Sun Moon Lake.

"I learned a lot. I learned how engineering is experienced in a different culture," says Felix Lao, a senior civil engineering major who participated in the program in the summer of 2017.

Lao worked in a lab with graduate students who were conducting research related to graphene, the ultrathin, ultrastrong flexible conducting material that has potential applications in everything from mobile phones to airplanes. He was impressed with NCHU's state-of-the-art facilities and equipment and with the level of responsibility students had in managing the lab. He liked the tight-knit community he saw among the students and faculty.

"I highly recommend the program. Not only for the perks, but also because coming back, it made me want to gain more experience in the working world."

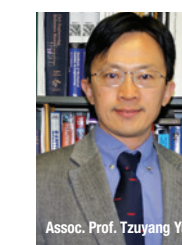
"They stuck together. That was memorable," he says.

For Lao, a chief benefit of the experience is the global network of friends and colleagues he now has.

"The most important thing for me was getting to know students from different countries and from other schools. I made a lot of friends," he says.

In addition to UMass Lowell, student interns have come from the University of Delaware, the University of California, Davis and the University of Washington in the U.S., and from institutions in Taiwan, the Czech Republic, Canada, Japan, Thailand, Vietnam, Indonesia, Malaysia and other countries.

Faculty also participate in an exchange with NCHU. Assoc. Prof. Tzuyang Yu of the Department of Civil Engineering has



Assoc. Prof. Tzuyang Yu

traveled there twice as part of a visiting faculty program that includes teaching a class and leading a research discussion.

The experience helps him think about the best approaches to teaching, he says.

"I've taken the opportunity to talk to their faculty about what challenges we face in teaching this generation of engineers," he says. NCHU's faculty includes Francis College

of Engineering alumnus Chenju Liang '99, '03, who is now chairman of NCHU's environmental engineering department.

For students, study abroad experiences strengthen their education, Yu says.

"It benefits our students by giving them perspective about how people on the other side of the globe live, how they think, what they eat, how they commute," says Yu. "This insight will help them decipher myths about different cultures."

The experience of an international internship can also open doors to employment opportunities abroad, where a degree from a U.S. university is highly valued, Yu says.

The university's partnership with NCHU is one of four with Taiwanese universities; the other schools are National Taipei University of Technology, Chung Yuan Christian University and National Chiao Tung University.

Lao, who wants to pursue a career as a traffic engineer, believes the NCHU internship may boost his chances as he prepares for the next step on his career path.

"I think the program will help with my applications for graduate school," he says. [UML](#)

GLOBALIZATION

A DRIVING FORCE IN GERMANY



Francis College of Engineering students can take in history at Berlin's Brandenburg Gate (top left) and the natural beauty of the mountains (top right) while studying abroad in Germany.

Partnerships with Pforzheim, Hochschule Darmstadt Universities Offer Students Valuable Engineering Lessons

Thanks to automakers such as Audi, BMW, Porsche and Mercedes-Benz, Germany is synonymous with engineering excellence.

But sit in the driver's seat of one of those cars for a moment and consider the steering wheel.

"How many nations are involved in manufacturing that simple part?" asks Matthias Weyer, dean of the School of Engineering at Pforzheim University, located in the southern Black Forest region of Germany. "The suppliers of the steering wheel and their sub-suppliers are spread over 15 countries... Engineers therefore need to be more globally positioned and networked worldwide."

Francis College of Engineering students looking to gain that valuable international experience have many options from which they can choose through the university's Study Abroad Office. That includes two programs with partner institutions in Germany: Hochschule Darmstadt University of Applied Sciences (H_DA) and Pforzheim.

Francis College of Engineering Dean Joseph Hartman says that while every study abroad experience gives students a valuable opportunity to become immersed in new cultures, the programs in Germany are ideal for students looking to earn the maximum number of engineering credits toward their degrees.

"It's a great experience, yet practical," says Hartman, who visited Pforzheim in 2013 and collaborated with Weyer to help establish Engineers Made in Germany (EMIG), a six-week program where students can earn nine credits by taking two engineering courses and one German language course (at beginner or refresher level). Only three U.S. schools are invited to participate in EMIG each year: Penn State University, Lehigh University and UMass Lowell.

"They put together a wonderful program that includes cultural sightseeing, engineering and business visits, and a great curriculum centered on automobile production," Hartman says. "What better place to learn about building cool cars than Germany?"

Now in its fifth year, EMIG runs this summer from May 18 to June 30. A half-dozen UMass Lowell students participate each year.

Gabriel Fernandez, a junior mechanical engineering major from Dunstable, Mass., took part in EMIG last summer. He says it was "the best experience of my life, without a doubt."

While Fernandez appreciated being able to earn six mechanical engineering technical elective credits and three arts and humanities credits while in Pforzheim, he also loved the opportunity to explore more of Europe. The program includes a four-day trip to Berlin, a three-day trip to Munich and several daylong excursions. Students also have three weekends to explore on their own.

"I got to visit Paris and Rota, Spain, two places I've always wanted to go," Fernandez says. "I doubt I will ever get another chance to experience as much of Europe and have as much fun as I did in those six weeks."

Irini Billiri participated in the program in 2014, two years before graduating with her bachelor's degree in mechanical engineering in 2016.

"The six weeks I spent in Pforzheim will forever hold a place in my heart," says Billiri, a Billerica, Mass., native who now works as a product test engineer at GE Healthcare in Westborough.

"Being a student in another country was a very positive experience for me," says Billiri, who adds that she was able to apply a lot of what she learned in Germany in her classes at UMass Lowell.

Located about 80 miles north of Pforzheim, near Frankfurt, is Hochschule Darmstadt University of Applied Sciences. In 2015, the school was awarded a four-year, 800,000-euro grant (about \$950,000) from the German government to enhance relationships with five strategic partner institutions. UMass Lowell was chosen along with Penn State, Purdue University, the University of Wisconsin-Platteville and the University of Wisconsin-Stout.

Students can participate in a four-week summer program (running this year from July 15 to Aug. 11), a winter intersession program or a full semester program. Like at Pforzheim, the H_DA program combines engineering courses with a German language class, along with site visits in and around Darmstadt, which is known as the "City of Science."

Nicholas Langberg, a junior chemical engineering major from Lancaster, Mass., participated in H_DA's summer program in 2016. He was even able to arrange a two-month internship in a chemical engineering research lab at the school before the program started.

"It ended up being one of the best experiences of my life," Langberg says. "Not only was I able to have this great experience abroad, but I was also able to gain real-world experience in my field of study, which I hadn't really had yet."

With more and more disruptive technologies coming onto the market that promise to change the world dramatically, Pforzheim's Weyer says it's more important than ever for engineers to have a global mindset.

"We're creating a foundation for future forms of cooperation," Weyer says, "as we build mutual trust among institutions and friendships between people." [UML](#)

"What better place to learn about building cool cars than Germany?"

STUDENTS TACKLE CIVIL ENGINEERING CHALLENGES IN HAITI

*Service-learning Capstone
Class Works on Sanitation Issues
in the Caribbean Nation*

Civil and environmental engineering senior Nicole Belanger with her two new friends at Pwoje Espwa, an agricultural teaching orphanage in Les Cayes, Haiti, in January.



Five civil and environmental engineering students traveled to Haiti over winter break, armed with plans for a septic system for a new home in the town of Les Cayes. Another half-dozen will go there over spring break to follow up. Their goal: to build a model system that could be easily adapted and replicated for other homes, using only basic tools and local materials.

The sanitation project is part of an outreach program by a large agricultural teaching orphanage, Pwoje Espwa (Project Hope) in Les Cayes. The orphanage wants to help neighboring families that send their children to its schools to solve a problem that's endemic to Haiti, the poorest country in the Western hemisphere: lack of sanitation and consequent contamination of drinking water sources.

The task of designing a sanitation system is a service-learning capstone class in civil and environmental engineering, created by the students themselves with help from faculty.

The usual capstone has students work on a more traditional civil engineering project, such as a highway bridge, that's already been designed professionally by a faculty member. Senior Paul Salibe signed up for the Haiti capstone instead "because it's a real-life project instead of a theoretical one. There are complications that come with designing something that's actually going to be used."

The Haiti capstone is the convergence of several university programs: the service-learning capstone option, started several years ago by Senior Lecturer Edward Hajduk, who oversees the undergraduate civil and environmental engineering major, and Linda Barrington, service-learning coordinator for the Francis College of Engineering; Engineers for Change, a student club; the group Biodigester-Aided Solutions for Haiti (B.A.S.H.), which began as a DifferenceMaker team; and the Haiti Development Studies Center, founded by physics Prof. Robert Giles in Les Cayes as a base for faculty and students to do research on solving life-threatening problems facing people in Haiti and other impoverished nations.

Seniors Nicole Belanger and Kayla Dooley are the driving force behind this year's Haiti capstone. Last year, they revitalized Engineers for Change and joined B.A.S.H., which is designing a biodigester to convert pig manure from the orphanage farm into fertilizer and methane fuel.

Belanger traveled to Haiti with Giles and other B.A.S.H. team members early last year to see if they could restart an existing biodigester at Pwoje Espwa. That's when the orphanage asked for help designing septic systems for families living nearby. Belanger, Dooley and their friends in Engineers for Change had been looking for a service-learning capstone project—and decided this was it. A smaller group will also keep working on the biodigester, with help from alumna-turned-mentor Maureen Kelly '15, '16.

Belanger says going to Haiti was both humbling and empowering. "I've always been into volunteering, but then when I saw Haiti and met the people, I wanted to get even more involved—and I thought I could actually do something to help them," she says.

Belanger recruited more students and began planning. The college agreed to pay for the students' plane tickets to Haiti, and Engineers for Change held multiple fundraisers to cover the cost of supplies, local transport and their stay at the Haiti Development Studies Center. Belanger and Dooley also recruited a new faculty member who specializes in clean drinking water, Asst. Prof. Onur Apul, to help Barrington teach the course.

"We don't feel discouraged. Now that we know what the problems are, we're just going to work around them."



Civil and environmental engineering student Owen Gannon digs a hole to test the permeability of the soil for a septic system near Pwoje Espwa.

The 12 seniors spent the fall semester learning everything they could about septic systems, from how to conduct percolation and soil tests with hand tools—a shovel, a ruler and sieves—to how to measure elevations using a laser and level and then draw up site and technical plans.

But shortly before the first students arrived in Haiti in January, they learned that their mission had changed. The orphanage's project manager asked students to explore alternative designs—such as composting toilets or a container-based sanitation system—better suited to the area's high water table, which can make septic systems that won't contaminate groundwater too expensive to build. "Plans changed every single day while we were down there," says Dooley. Adds Belanger, "We learned that you have to be adaptable."

Barrington and Giles had tried to prepare the students by explaining some cultural norms and conditions of life in Haiti. But Dooley was still stunned by the magnitude of Haiti's waste management problems. "There were piles of trash on every corner, with pigs, goats, chickens and dogs rooting through them to look for food scraps," she says.

At the same time, she was impressed by the resourcefulness of the people, who were rebuilding hurricane-damaged homes and roads using hand tools and basic materials. "It was daunting to see how much work people do day-to-day. A lot of their methods and techniques are like what we used before machinery."

Although the students' project has changed, they're more motivated than ever. "We don't feel discouraged. Now that we know what the problems are, we're just going to work around them," Dooley says. [UML](#)

FOR MK AND SHULING RAHEJA, UML OPENED A WORLD OF OPPORTUNITIES



MK Raheja and his wife, Shuling, who met in a lab at the university more than 30 years ago, vacationing in Bergen, Norway in 2016.

On Aug. 27, 1981, his student visa barely a day old, MK Raheja '86 flew out of the airport in Bombay, India (now Mumbai) on a jet bound for Boston. He had never been out of his native India or on an airplane. Four days later, he was attending his first class at the Francis College of Engineering on his way to earning his Ph.D.

"I had no idea what to expect," Raheja recalls. "It was a whole new world to me."

Thirty-seven years later, as the driving force behind the introduction of billions of dollars in medical innovations, it is a world he has had a clear hand in shaping.

Raheja's path began improbably. In the early 1980s, as a doctoral student in polymer science and plastics engineering at UMass Lowell (having earned a bachelor's degree from Bombay University), he came under the mentorship of Prof. Joseph Salamone, the chair of the Chemistry/Polymer Science Department at the time, who had founded a small company dealing in contact lenses. The company was soon sold to Bausch + Lomb; Prof. Salamone recommended MK for a job there, which he got. Several promotions followed, leaving him, by the time he left 10 years later, as vice president in charge of research and development.

MK's personal life was also shaped by his experiences at UMass Lowell. Working in a campus lab one day in the spring of 1984, he met a Taiwanese student named Shuling who was pursuing a master's degree, also in polymer science, and for whom, as she describes it today,

"UMass Lowell was the cradle in which I learned to be a scientist." The two were married three years later; their only child, Anita, was born in Lowell in 1988.

The years that followed were a blur of shifting jobs and homes for the family: 11 years with Bausch + Lomb, first in Wilmington, Mass., then in Rochester, N.Y.; from there to Cincinnati in 1997, where MK rose in six years from chief operating officer to president of a midsize pharmaceutical company backed by venture capital; then to Atlanta in 2003, as senior vice-president and chief technology officer of CIBA Vision, the global eye-care division of Novartis; and finally to California six years later as global head of corneal and cataract R&D for Abbott Medical Optics, a company focused on cataract and refractive eye surgery.

For the first 10 of those years, Shuling was pursuing her career with the chemical giant W.R. Grace, where she worked as a researcher of coatings for packaging. She left in 1996, just before the move to Rochester, in part, she says, to be able to spend more time with their daughter.

"Anita was just entering second grade then, and I had been working all of her life. I thought it was the right time to change roles," Shuling says.

Abbott was bought early last year for \$4.3 billion by Johnson & Johnson. Raheja, still in California and still head of global R&D, today oversees all its technology and product development involving ophthalmic

implants—the artificial lenses that replace the eye's natural lens following cataract surgery. More than 23 million cataract surgeries are performed globally every year; over half of all Americans will suffer from cataracts by the age of 80.

But many soon may suffer less, and see better. Of the more than 40 new products he has brought to market, says Raheja, there may be none more exciting or with more potential for change than one launched last year in the U.S.: the Tecnis Symphony intraocular lens (IOL), approved by the U.S. Food and Drug Administration in 2016, which, according to the Berkeley Eye Center, will be "the first [FDA-approved] lens that provides patients with high-quality vision at all distances."

"It will make a real difference in the lives of many people," says Raheja. "I'm proud to have been a part of it."

Over the course of the past 30 years, in addition to the range of jobs Raheja has held around the U.S., he has led R&D centers in at least 10 countries around the world—while also doing his part as a guide and mentor to other, younger members of his field. In Southern California, where he and Shuling live today, he serves on the industry advisory councils of both the Paul Merage School of Business at the University of California, Irvine and the Keck Graduate Institute of Applied Sciences in Claremont. He is also a charter member of TIE, a global not-for-profit network of entrepreneurs. In recognition of all his achievements and contributions, Raheja will be inducted this spring into the UMass Lowell Francis Academy of Distinguished Engineers.



The Rahejas' daughter, Anita, meanwhile, now nearly 30 and an associate brand manager with Mattel, lives just up the road from them in Los Angeles. Her husband, Matt Light, an attorney there, rounds out a most diverse family: "Four different looks, three different religions," says Raheja with a laugh. "That's about as global as you can be."

But the couple agrees: None of it, the career, the family, the successes, could have happened were it not for the people, events—and happenstance—of those early four years at UMass Lowell.

"It was a new beginning for me, the place I was first introduced to the diversity of global cultures," notes Shuling. "I think that's part of why we enjoy traveling so much."

As for MK: "I got a great education, and a professor who led me to a career. And a girlfriend who today is my wife. What more could you ask from a school?" [UML](#)

ALUM FINDS SUCCESS TRANSITIONING FROM ENGINEERING TO ENGINES

Tony Abdulmassih '85, '87 felt prepared for anything after earning his bachelor's and master's degrees in mechanical engineering from UMass Lowell. He went to work as an engineering consultant for Nashua-based Ingersoll Rand in the company's new products development program from 1988 to 1994.

He was a whiz kid, well-prepared. He earned eight patents, all related to machinery for the pulp and paper industry. He met and married his wife, Ruth-Ellen. Things were good.

Then came a call from Silicon Valley, where startup dreams were yielding big dividends. Productivity Technologies wanted to hire him as an analytical engineer. Abdulmassih accepted the job and moved his young family from New Hampshire to San Francisco. The company specialized in robotics and automation. It had projects connected to the Golden State power company PG&E, Disney and the Schlage lock company.

But the venture wasn't bulletproof.

After six months, the company ran out of funding. It stopped issuing paychecks. A couple months later, everyone received layoff notices and Productivity Technologies declared bankruptcy. Despite the setback, Abdulmassih was undeterred.

"I decided to open my own business," he says. He had survived two previous layoffs in his career "and then the robotics company went under. I did not want to go through this again."

He looked at a variety of businesses, including restaurants, coffee shops and car washes. "I chose the car repair/service station business because the numbers made better sense, and I saw better potential," he says.

He built T&R Automotive Center, on San Francisco's busy California Street, from scratch. He began with little knowledge of car repairs, but as an engineer, he had a knack for taking things apart and putting them back together. With a pair of hired auto technicians, Abdulmassih's business began fixing mostly European cars. He learned as he went.

When one of the technicians threatened to leave unless he got a large raise, Abdulmassih vowed to never again be held hostage by what others knew and he didn't. So he watched. Listened. Read. He learned everything he could. T&R Automotive is now a small but unique business. These days, all sorts of European-built cars end up there: failing Ferraris, ailing Aston Martins, limping Lamborghinis.

"I saw an opportunity in exotic car repairs when the economy started to go downhill in 2004 to 2006 and auto shops in the Bay Area started to close down because of lack of business," he says. That left only local dealers specializing in Ferrari and Maserati repairs.

While the flailing economy had presented him with an opportunity, expansion also brought the need to learn the intricacies of high-end cars. "I took it as another challenge and goal," says Abdulmassih. He devoured any information he could find about Ferraris—and, while he was at it, Maseratis, Aston Martins and other luxury vehicles.

Today, T&R services four to six high-end cars a day, as well as other European vehicles. The business now employs seven people. Abdulmassih has become well-known among Ferrari folk, having chaired the Ferrari Owner's Group, whose charity rallies raise money for such groups as the Make-A-Wish Foundation and Blue Planet Network, an organization dedicated to increasing safe drinking water around the world.

While his business took root, his family flourished. Ruth-Ellen is an executive for Stericycle, a medical waste management company, heading up the product recall business and call centers. The couple has been married 29 years and has four daughters, ages 28, 25, 24 and 19.

Looking back, Abdulmassih says he has always been good at adapting to circumstances. He was born and raised in war-torn Beirut, Lebanon. He came to the U.S. for college and spent a semester studying English before coming to UML; friends attending the university had recommended it.

"I arrived at UMass Lowell from a different community, and it was challenging to get used to everything," he says. "UML gave me discipline and opened the doors for me to join the workforce. I felt very confident when I started my first engineering job, and felt that the education I got in Lowell prepared me well."

He says his career path was partly planned and partly the result of forces beyond his control. "Life will not meet you halfway," he says. "If you want to achieve your goals, you need to go all the way. Never give up and always go the extra mile, because if you don't, someone else will, and you will be left behind." **UML**

Tony Abdulmassih '85, '87 poses with his Ferrari F430.

FACULTY SUCCESSES

■ Prof. **Carol Barry** (plastics engineering) has been named a fellow of the Society of Plastics Engineers.

■ Prof. **Oliver Ibe** (electrical and computer engineering) has been named a fellow of the National Academy of Inventors. He is the holder of 10 patents, mainly in the areas of computer networks and telecommunications.

■ Prof. **Kavitha Chandra** (electrical and computer engineering) has been named associate dean for undergraduate studies in the Francis College of Engineering. A National Science Foundation (NSF) CAREER award winner and expert in communications networks, she joined the faculty in 1996, after working at AT&T Bell Laboratories.

■ Prof. **Joey Mead** (plastics engineering) was named the 2017 Distinguished University Professor, the highest distinction for a faculty member at UMass Lowell. Mead joined the university in 1996 as managing director of the Institute for Plastics Innovation, after having spent 10 years as a materials engineer for the U.S. Army Research Laboratory in Watertown, Mass.

■ **Mead** also won the George Stafford Whitby Award for Distinguished Teaching and Research from the Rubber Division of the American Chemical Society (ACS).

■ Asst. Prof. **Zhu Mao** (mechanical engineering) was awarded an Air Force Young Investigator Program (YIP) award for his research, "Multi-layer surrogate modeling via Bayesian approach and non-contact full-field measurements."

■ Assoc. Prof. **Dalila Megherbi** (electrical and computer engineering) is serving as general co-chair of the 2018 IEEE International Conference on Computational Intelligence & Virtual Environments for Measurement Systems and Applications, which will be held June 12-14 in Ottawa.

STUDENT SUCCESSES

■ Sixty-seven students and **Ibe** were inducted into the Tau Beta Pi engineering honor society last fall. Twenty more students and Dean **Joseph Hartman** (Francis College of Engineering) will be inducted this spring.

■ Plastics engineering graduate student **Zhiyu Xia** won second place in the ACS Cellulose and Renewable Materials Division's Graduate Student Award competition, which is funded by the Eastman Chemical Company. He was advised by Prof. **Ramaswamy Nagarajan** (plastics engineering).

■ **Ioannis Smanis**, a doctoral student working with Prof. **Yan Luo** (electrical and computer engineering), was awarded a \$5,000 scholarship by the Gerondelis Foundation.

■ **Ruchira Tabassum**, a graduate student working with Asst. Prof. **Joyita Dutta** (electrical and computer engineering), won a 2018 Bradley-Alavi Student

Fellowship, courtesy of the Education and Research Foundation for Nuclear Medicine and Molecular Imaging.

■ Recent plastics engineering graduate **Stephanie Ternullo** was awarded a Thermoforming Division Memorial Scholarship by the Thermoforming Division of the Society of Plastics Engineers.

■ **Michael Doane**, a chemical engineering major, was one of the winners of the 2017 American Institute of Chemical Engineers (AIChE) ScaleUp Sponsors Essay Contest. The award, sponsored by Honeywell-UOP, included a stipend to attend that year's AIChE Annual Student Conference held in October in Minneapolis.

■ Civil engineering graduate student **Connor Sullivan** won second place in the Michael E. Miller Student Competition, held during the 33rd Annual International Conference on Soils, Sediments, Water and Energy in October at UMass Amherst. He was advised by Prof. **Pradeep Kurup** (civil and environmental engineering).

■ Undergraduate student **Courtney Simard** was selected as one of the American Society of Civil Engineers (ASCE) "New Faces of Civil Engineering – College Edition" for 2018.

■ Plastics engineering student **Caitlin Janielis** was interviewed in "Performance Plastics," the flagship publication of the International Association of Plastics Distribution (IAPD), for her participation in the IAPD's Women in Plastics Educational Workshop.

■ Civil engineering undergraduate **Rachel Miller** was a contestant in the "Miss Massachusetts" pageant held recently in Lowell.

NEW RESEARCH AWARDS

■ UMass Lowell has extended its cooperative agreement with the U.S. Army Natick Soldier Research, Development and Engineering Center. The list of projects funded and faculty researchers include:

> "New curved sapphire-based materials for transparent armor" by Asst. Prof. **Javier Vera-Sorroche** and Prof. **David Kazmer** (plastics engineering)

> "Understanding the impact properties of transparent polymers" by Assoc. Prof. **Daniel Schmidt** (plastics engineering) and Assoc. Prof. **Emmanuelle Reynaud** (mechanical engineering)

> "Data analytics and impact modeling-based benchmarking of combat helmets for mitigation of TBI and mTBI" by Asst. Profs. **Murat Inalpolat** and **Scott Stapleton** as well as **Patrick Drane** (all with mechanical engineering)

> "A smart sensing system for early detection of damage in helmets and body armor" by Prof. **Xingwei Wang** (electrical and computer engineering), **Nagarajan** and **Kurup**

> "Multilayer elastomer laminates for chemical protective clothing" by **Mead** and Assoc. Prof. **Christopher Hansen** (mechanical engineering)

> "Icephobic and omniphobic coatings for warfighter protection" by **Mead** and **Barry**

> "Durable flame-retardant coating through surface functionalization" by **Nagarajan** and Prof. **Jayant Kumar** (physics)

> "New thermoplastic materials using microcrystalline cellulose" by **Kazmer** and **Vera-Sorroche**

> "Novel micellar systems for lightweight multifunctional protection" by Assoc. Prof. **Nese Orbey** (chemical engineering), **Nagarajan** and **Kumar**

> "Novel thermoresponsive fibers for lightweight smart thermal insulation" by **Reynaud** and Assoc. Prof. **Hongwei Sun** (mechanical engineering)

> "Novel high-performance moisture and oxygen barrier thin films for flexible electronics," by **Kumar**, Asst. Prof. **Manos Gkikas** (chemistry) and **Nagarajan**

> "Extended-life photovoltaic backsheet" by **Kumar** and **Nagarajan**

> "Lightweight metasurface with optical scattering and rectifying nanostructures" by Prof. **Alkim Akyurtlu** (electrical and computer engineering)

■ **Chandra** and Prof. **Vinod Vokkarane** (electrical and computer engineering) were awarded a grant for "Command & control display equipment (CCDE) requirements" by the Air Force Research Laboratory (AFRL) with the National Security Information Associates.

■ Prof. **Craig Armiento** (electrical and computer engineering) and **Akyurtlu** were awarded a grant for "Additive manufacturing of a conformal, wideband array for attributable airborne platforms" through the AFRL's SBIR program with S12 Technologies, Inc.

■ **Akyurtlu** and **Armiento** were also awarded a grant for "Multimaterial 3-D printing of electronics and structures" by the AFRL, in partnership with Raytheon through the America Makes Manufacturing USA Initiative.

■ **Nagarajan** was awarded a grant for "Flame-retardant nylon" through the U.S. Army SBIR program with Triton Systems.

■ **Hansen** was awarded a grant for "RES: EV: Development of self-healing elastomer for medical simulation" by the U.S. Army Medical Research SBIR program with Triton Systems.

■ Assoc. Prof. **Hualiang Zhang** (electrical and computer engineering) was awarded a grant for "Large-scale, reconfigurable and multifunctional 2.5-D conformal optics" by the Defense Advanced Research Projects Agency (DARPA) in collaboration with MIT.

■ Prof. Emeritus **Peter Avitabile** (mechanical engineering) was awarded a grant for "Updated reduced-order modeling development for forced response predictions" by the U.S. Department of Energy (DOE) through Sandia National Laboratory.

■ Assoc. Prof. **Sukesh Aghara** (nuclear engineering) was awarded a grant for "Nuclear nonproliferation and safeguards" by the DOE through Brookhaven National Laboratory.

■ **Mead** and **Barry** were awarded a grant for "Compounding of polymers" by the DOE's SBIR program with Triton Systems.

■ Assoc. Prof. **Seongkyu Yoon** (chemical engineering) was awarded a grant for "Monoclonal antibody supply with drug product characterization" by the U.S. Food and Drug Administration.

■ **Yoon** was also awarded grants for "AMBIC reference cell, product, media, feeds" and "RCR: Improving process understanding through genome scale models and metabolomics" from the NSF.

■ **Kurup** was awarded a grant for "Arsenic Sensor Challenge – Stage I" by the U.S. Department of Interior.

■ **Kurup**, Prof. **David Ryan** (chemistry) and **Nagarajan** were awarded a grant for "A versatile E-Tongue for in-situ detection of heavy metals in water and sediments" by the NSF.

■ Assoc. Prof. **Chronis Stamatiadis**, Prof. Emeritus **Nathan Gartner**, Asst. Prof. **Danjue Chen** and Assoc. Prof. **Yuanchang Xie** (all with civil and environmental engineering) were awarded a grant for "Strategic planning for connected and automated vehicles in Massachusetts" by the Massachusetts Department of Transportation.

■ **Luo**, Assoc. Prof. **Yu Cao** (computer science) and Research Asst. Prof. **Peilong Li** (electrical and computer engineering) were awarded a grant for "SECTOR: Building a secure and compliant cyberinfrastructure for translational research" by the NSF.

■ **Zhang** was awarded "RCR: Collaborative Research: Three-dimensional laser holographic nanopatterning using metamaterial phase masks" by the NSF.

UNIVERSITY AND COLLEGE NOTES

■ UMass Lowell was ranked No. 4 in the list of the "2017 Top 100 Women-led Businesses in Massachusetts" created by The Commonwealth Institute and Boston Globe Magazine. The ranking included companies, colleges and nonprofits.

■ Nonspec was selected as one of the winners of the \$50,000 prize from the 2017 MassChallenge Boston Awards. The startup company's team, which was named the "Campus-wide Difference-Maker" in 2013, designs and manufactures affordable prosthetic devices for children worldwide. Co-founders Erin Keaney and Jonathan Perez de Alderete are graduates of the college.

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Tuesday, May 8

5 P.M., RECEPTION
6:30 P.M., DINNER

Rosen Centre Hotel, Orlando, Fla.
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