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—at 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 sabatical, 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 real industrial problems in Dortmund to writing research papers with colleagues in Edinburgh. And the foreign travel was 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 universities around the world. This issue highlights some of the programs that are currently underway and the student and faculty exchanges, research and other entrepreneurial enterprises that the college offers for both our students and faculty, as well as highlighting engagements with our partner universities around the world.

Sincerely,

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

www.uml.edu/engineering

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ON THE COVER
Bill Weisbuurt is committed to enhancing the quality of education of its students through international partnerships, collaborations and exchange programs, both at home and abroad. He oversees the Office of International Education at the University of Massachusetts Lowell and serves on the boards of several international student organizations.

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

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 committed individual.”

Ensom was one of three Francis College 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 an exchange fellow 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 exchange and research collaboration in areas such as nuclear engineering, advanced manufacturing and cybersecurity. This spring semester, two undergraduates from the Francis College of Engineering—Anna Souza in mechanical engineering and Brianna Fahrendorf in computer engineering—are studying at CTU.

Engineering to Engines

Tony Abdulmassih:
From Engineering to Entrepreneurship

A World of Opportunities for MK and Shuling Raheja

A World of Opportunities for MK and Shuling Raheja

During his studies at the Czech Technical University in Prague, Gregory Ensom ’17 came to know all about electrical engineering at CTU, and about the culture and customs of a nation different than our own.

A World of Opportunities for MK and Shuling Raheja

A World of Opportunities for MK and Shuling Raheja
ENGINEERING SOLUTIONS SPRING 2018

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 50 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 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. Raděk Štoda of the Czech Technical University. CNCC will host the fellows at Chateau Štirín 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 ABACCC), Profs. Ermeli John R. White and Gilbert J. Brown (both of chemical engineering), Radiation Safety Director Steven Gray and UML Research Reactor Director Leo Bobek. Retired U.S. Navy Rear Admiral Clarke Orzalli, who served in the 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. 
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

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 students annually in plastics, chemical and mechanical engineering, industrial engineering, project management and entrepreneurship.

"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 UMass’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—there are tremendous untapped opportunities," says Kazmer.

"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.

"We hope to have a pipeline of graduate students coming to UMass Lowell after finishing their undergraduate studies at PIU," says Kazmer.

"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 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."
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 Doduk 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 saving 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 academic activities.

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, Doduk 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.

“Tehila, Hanna 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 Weitzenmann and Eyal Cohen,” says Mead, who was named the 2017 UMass Lowell Distinguished University Professor.

“Tehila Nahum is a role model, someone who is driven by curiosity and determination to excel in her work. She has contributed to the nanomanufacturing program and has helped to strengthen our ties with Israel. With the help of the Pernick Fund, her work is reaching new heights,” says Pernick.

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 formulation engineer at Adaptive Surface Technologies, Inc. (formerly SLIPS Technologies and now named U.S. 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.

Nahum, third from left, poses with UMass Lowell Profs. Carol Barry and Joey Mead and Shenkar College Profs. Hanna Doduk 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.
TAIWAN INTERNSHIP PROGRAM GIVES STUDENTS A TASTE OF GLOBAL ENGINEERING

Chemical engineering major Ashley Tran came to UMass Lowell with specific goals—nämely, 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.

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“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 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 Chenjui 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 Taiwan 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.
GLOBALIZATION
A DRIVING FORCE 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 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.”

“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.”

Nitin Billir 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 Billir, a Billerica, Mass., native who now works as a product test engineer at GE Healthcare in Woburn.

“Being a student in another country was a very positive experience for me,” says Billir, 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.”

Francis College of Engineering students can bask in history at Berlin’s Brandenburg Gate (top left) and the natural beauty of the mountains in Germany.
STUDENTS TACKLE CIVIL ENGINEERING CHALLENGES IN HAITI

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

students tackle civil engineering challenges in haiti

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

International Experience: Haiti

Civil and environmental engineering student Owen Apul digs a hole to test the permeability of the soil around them.

The 12 seniors spent the fall semester learning everything they could about septic systems, from how to conduct percolation and soil tests with hard tools—a shovel, a ruler and a sifter—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.

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

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.

I wanted to get even more involved—and I thought I could actually do something that’s actually going to be used.”

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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.

“MK 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/Plastics 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 in polymer science and plastics engineering at UMass Lowell. Working all of her life, I thought it was the right time to change roles,” says Shuling. “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.”

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.

“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 CBVision, 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, who today over-sees 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 Symfony 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 associ- ate 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?”
Alumni Focus

Alum Finds Success Transitioning from Engineering to Engines

ery 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 years of education, mostly in the areas of computer networks and automation, at the company’s College of Engineering, a National Science Foundation (NSF) Computer Networking Center of Excellence. Abdulmassih eventually was managing director of the Institute for Plastic Materials, which he joined in 1987, as a two-year materials engineer for the U.S. Army Research Laboratory in Watertown.

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 the ground up. 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 a few years, Abdulmassih’s car repair business was on the verge of closing. Yet he didn’t give up. And the company’s team found a way to survive. “It’s always challenging to get money for such groups as the Make-A-Wish Foundation and Blue Planet Network, 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.

His timing was off, but he learned valuable lessons about running a business—and, as a result, his business thrived.

STUDENT SUCCESSES

Sixty-seven students and 11 faculty members were inducted into the Tau Beta Pi engineering honor society last spring. Two students received the Donald Joseph Harman (1923-1979) College of Engineering Award to support full-time graduate study at Stoycke, a medical waste management company, heading up the recyclable plastic business at the company’s San Francisco facility and his 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. to study mechanical engineering, but instead attended the university he had recommended it.

“An engineering system from a different country, 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.” It was very difficult when I started my first engineering job, and felt that the education I got in Saudi Arabia paid off. He says his career path was partly planned and partly the result of forces beyond his control. “Life will not always fit your goals,” he says. “If you want to reach an educational goal, 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.”

College Highlights

STUDENT SUCCESSES

■ Prof. Abdulmassih (mechanical engineering) has been named a fellow of the Society of Manufacturing Engineers.

■ Prof. Oliver (the electrical and computer engineering) has been named a fellow of the National Academy of Inventors, a new honor that, in the words of the academy, “recognizes its core mission of promoting invention. The academy currently has 1,000 members in the areas of computer networks and automation. It had projects connected to the Golden State power company PG&E, Disney and the Schlage lock company.

■ The startup company’s team, which was named “New Faces of Civil Engineering – 2017” by the American Society of Civil Engineers (ASCE), was selected as one of the 2017 Massachusetts “Top 100 Businesses in Massachusetts” by the Massachusetts Innovation and Development Division (MIDD) and the Massachusetts Technology Park (MTP). The award is sponsored by the U.S. Department of Energy (DOE) through Sandia National Laboratories.

■ Assoc. Prof. Qin Liu (plastics engineering) was awarded a grant for “Flame-retardant nylon” through the U.S. Army Research Laboratory (ARL) with the National Security Agency (NSA) as principal investigator. The award, sponsored by Hon.

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■ Assoc. Prof. Sedat Agbara (mechanical engineering) was awarded a grant for “Understanding the impact properties of metal foams” by Assoc. Prof. David Schmidt (mechanical engineering).

■ Assoc. Prof. Xingwei Wang received the 2017 MassChallenge Boston Awards. The ranking included “A smart sensing system for early detection of heart disease” by Alkim Akyurtlu and Prof. Kavitha Chandra (mechanical and aerospace engineering).

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■ Assoc. Prof. Zakha Algham (mechanical engineering) was awarded a grant for “A smart sensing system for early detection of heart disease” by Alkim Akyurtlu and Prof. Kavitha Chandra (mechanical and aerospace engineering).

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Connect with friends, former classmates and current and retired faculty and staff during NPE2018: The Plastics Show. Honor the past and look forward to the future of Plastics Engineering at UMass Lowell during this reception and dinner.

Tuesday, May 8
5 P.M., RECEPTION
6:30 P.M., DINNER
Rosen Centre Hotel, Orlando, Fla.
$50 per person
Sponsorship opportunities are available!

PLASTICS 4.0
A UMASS LOWELL ALUMNI & FRIENDS RECEPTION AND DINNER AT NPE2018: THE PLASTICS SHOW
TUESDAY, MAY 8, ORLANDO, FLA.

To register or for more information on sponsorship opportunities, go to alumni.uml.edu/npe2018.