FACULTY SPOTLIGHT

DR. MARKUS BUEHLER

MIT's Civil and Environmental Engineering Department Head

"The MIT way" is how Dr. Markus Buehler defines a quality he cherishes in the school he came to 13 years ago and where he now serves as the head of the Civil and Environmental Engineering Department. It is a spirit of innovation and collaboration that crosses departmental lines.

"A sort of chaotic self-organization of ideas is what makes us so successful," he says, and he believes important collaborations among colleagues from different disciplines are born out of chance encounters in the laboratory, the cafeteria, along the Infinite Corridor or virtually anywhere on the sprawling Cambridge campus.

His own interdisciplinary work includes groundbreaking laboratory efforts to simulate materials found in nature, such as silk, bone or wood by designing, as he puts it, "new materials you haven't seen before."

Trained as a chemical engineer, then a material scientist at Stuttgart University, he ultimately became interested in why things break.

"If we can make something as strong as steel synthetically out of sugars, proteins, anything that's abundant in nature—materials coming out of this process will tend to be much more resilient to failure," he says.

The spirit of cross-discipline exploration has made him greatly appreciate interaction with industry professionals who come to campus to attend his class through MIT Professional Education.

"These people get it," he says. "They know that to get ahead in the market, they need to solve problems in the fastest, most efficient and collaborative way possible. You don't get a prize for only working with mathematicians. You get a prize for getting the best solution. This also provides context for the work I do."

And what Buehler does—research to strengthen complex materials—is close to the heart of many Professional Education enrollees.

"Materials are important for many different industries," he says, "including medicine, civil engineering, mechanical design, government agencies and the military. And these people bring really interesting viewpoints, because many of them have problems with materials very far away from the problems we solve in academia."

Conversely, Buehler says MIT has important tools to offer these professionals, such as expertise in Machine Learning and Artificial Intelligence. "These are penetrating many different disciplines relevant to them, including computer science, chemistry, mathematics, even biology."

MIT Professional Education short programs and custom courses draw professionals from around the world. "The more diverse, the better," says Buehler. They usually come from different ends of the same industry or profession, such as health care or manufacturing. He encourages them to bring to class problems they've faced in their workplaces.

"Let's say they want to create a new steel that can be processed at lower temperature but have a higher yield strength and not corrode as easily. I try to tie that into the fundamental skills, techniques and solutions we've developed in the lab."

He also tries to make the courses interactive.

"I put them in teams and if there's chemistry between them you can see them having a lot of fun. They get to go outside their comfort zone a little bit. Everyone brings different dimensions. My own thinking is expanded through this contact, too. And this always informs the next day of teaching. I tell graduate students or undergraduates about meeting somebody from industry who was interested in a problem we'd just discussed and how they could apply things they'd just learned to that very problem. This is really powerful for those students to hear."

"Professional Education," he says, "is where we can actually bring all these ideas together."

DIGITAL PLUS PROGRAMS

MIT Professional Education Launches Online Course in Spanish

This October, MIT Professional Education Digital Plus Programs collaborated with the Spanish-American educational technology company, Global Alumni, to launch its first highly interactive and collaborative online course taught fully in Spanish.

The course is a translated version, re-engineered with relevant cultural context from the popular online course "Leadership and Innovation for Technology Professionals," taught by David Niño, Senior Lecturer of the Bernard M. Gordon-MIT Engineering Leadership Program. It focuses on empowering technical leaders across all industries and sectors with self-awareness and creativity to drive innovation within their teams and organizations.

The new course enables MIT Professional Education to more pointedly reach professionals across the Spanish-speaking world where, according to the international workforce consulting firm Manpower Group, nearly 50 percent of technology companies are struggling to find candidates with the requisite job skills to compete in today's digital economy.

"As part of our global outreach effort, we are pleased to be able to offer innovative e-learning solutions in Spanish to technical professionals in Spanish-speaking economies, bringing critical knowledge to them in new frontier areas," said MIT Professional Education Executive Director Bhaskar Pant.

Digital Plus Program Director Clara Piloto adds, "Participants are led through a learning journey of self-reflection and creative problem solving, culminating with the creation of inspiring and motivating vision statements that drive innovation processes across teams and organizations."

For more information on the course, visit digitalplus.mit.edu

INTERNATIONAL PROGRAMS

MIT Professional Education Expands Learning Opportunities in Asia

Courses in Shenzhen, Hong Kong, and Taipei meet Asia's growing demand for leadership and innovation.

In May and June of 2018, MIT Professional Education hosted a short course, "Leading Innovative Teams," in Shenzhen, China; Hong Kong; and Taipei, Taiwan.

The course was led by Dr. David Niño, Senior Lecturer at the Bernard M. Gordon MIT Engineering Leadership Program, and designed to help executives from diverse fields of work bridge the gap between innovation and leadership while maximizing the impact of both.

Nearly 150 people across the three cities participated in the courses, from C-suite executives and Chinese government officials to grad students and entrepreneurs. While most participants were from China, approximately 20 percent hailed from countries such as India, Singapore, Belgium, Ireland, Israel, and the United States.

In China, where global economic influence continues to expand, "Management skills are something that a lot of people here still need to learn," said participant Kristoff Vanbergh. "People believe here that you're born with the talent to lead, but I believe someone can be taught to become a good manager."

Huiping Yan, Chief Financial Officer of ZTO Express, one of China's largest express delivery companies, said "Education and training by MIT, a leading institute in innovation and cutting-edge technology, is what really interested me. We need to reinvent and reshape the way we do business, and going forward, how technology and innovation is going to propel us even further in gaining further competitive advantage in the market."

The course is popular both at MIT and abroad in part because of is its recognition of cultural differences. For example, in China, where "saving face" is a cultural norm and failure often has only negative connotations, Niño encouraged participants to consider instances where failures and mistakes lead to new opportunities for innovation and propel momentum towards that next great big step for an organization.

A discussion of environmental impact and social responsibility prompted Huiping Yan to consider the unintended consequences of her rapidly growing company. "[We need to think about] the environmental impact of the volume of packages and plastic. Do we use biodegradable materials? What can we do to address those issues with the growth of our business? We need to ask ourselves as business leaders."

Beyond bringing MIT's technical leadership and innovation insights to the Asia region, Niño also introduced participants to MIT's emphasis on hands-on learning style, where participants engage in case-based exercises and regularly engage in lively and interactive discussions.

"We're lucky there's such a diverse group," said participant Kristoff Vanbergh about the variety of participants in the course. "The course would be different if they were all Chinese, but since there's a diversity of young people, older more experienced people, foreigners, locals, government people; they approach the same thing and formulate the same issue, but see the problem differently. It creates a dynamic interaction."

http://internationalprograms.mit.edu

PROFESSIONAL EDUCATION

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PROFESSIONAL EDUCATION

professional.mit.edu

FALL EDITION NEWSLETTER

'WEATHERING THE STORM' THROUGH COMMUNITY AND MUSIC

This year's MIT Summer Philharmonic Orchestra concert took on Beethoven's "Pastoral Symphony" and Stravinsky's "Rite of Spring".

To mark the end of MIT Professional Education's summer season of courses, on July 27th, a capacity audience of over 1200 people filled up MIT's Kresge Auditorium to attend one of Cambridge, Massachusetts' most anticipated events, the MIT Summer Philharmonic Orchestra's (MITSPO) annual performance. Now in its 22nd year, Conductor George Ogata '92 in consultation with MIT Professional Education Executive Director, Bhaskar Pant, chose the theme, "Weathering the Storm," in response to the significant political upheavals taking place in the US and around the world. The selected accompaniments, according to Ogata, "immediately and logically followed:" Beethoven's Pastoral Symphony, which contains one of the most famous musical depictions of a storm in the fourth movement, and for the highlight of the concert, Stravinsky's "The Rite of Spring," a piece that was considered so avante-garde in its time, it incited a metaphorical storm of public fury when it first debuted in Paris in 1913.

"When musicians first started working on "The Rite of Spring," they were baffled and probably full of fear: this was a new language in classical music," said Ogata. "'Rite' is famous for being a furiously complex piece, and I can safely say this was the most difficult piece I had ever conducted. MITSPO worked tenaciously on this piece, putting it together with aplomb and courage, and the result of their hard work was one of the most stunning performances I've ever been a part of."

Ogata's assessment of MITSPO's performance this year was an opinion shared by many. "It was absolutely lovely. The effort of [everyone], including the members of the MIT Summer Philharmonic Orchestra, led to a brilliant result," raved one concert-goer.

"The concert was incredible," said the mother of a MITSPO bassoon player, "but I'm sure you could see and hear that from the notes played and the multiple standing ovations!"

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FROM THE EXECUTIVE DIRECTOR

In this fall edition of the newsletter, we get an opportunity to review our record-breaking summer season, which attracted over 1800 professionals from more than 90 countries to attend one or more of our courses on the MIT campus. It both amazes and humbles us to know that so many learners around the world put faith in our courses to deliver knowledge to them in specialized areas, to catapult them to new levels of professional achievement.

You will hear from one of our summer students, Felipe Varon, who has launched a "flying car" company following his learning experience at MIT. We feature an interview with one of our Advanced Study Program students who speaks of what she has gained through attending regular, full semester courses at MIT. You will hear also from one of our prominent faculty instructors, Civil and Environmental Engineering Department Head, Markus Buehler, who explains why he loves teaching for Professional Education, and what he learns from highly experienced industry professionals in his class.

While we celebrate global diversity among professionals who attend our courses on campus, we also reach out to those who can't easily come to MIT, and offer them courses closer to where they live, as part of our global outreach mission. You will read about our expanding presence in Asia with examples of regionally relevant courses offered in Shenzen, China, Hong Kong and Taipei. Mindful of serving non-English speaking audiences as well, we address the Spanish-speaking world with our inaugural blended online course on innovation and leadership offered wholly in Spanish.

Finally, you will read about our joyful celebration at the end of the summer courses season with a stellar performance of the MIT Summer Philharmonic Orchestra, which MIT Professional Education has sponsored ever since the orchestra's inception by an MIT alum more than 20 years ago.

Enjoy!

Bhaskar Pant
Executive Director
MIT Professional Education
bpant@mit.edu

...continued from cover

"George Ogata and his orchestra have to be commended for bringing us an extraordinarily rousing performance of Stravinsky's "Rite of Spring" that people are still talking about," said Bhaskar Pant, adding, "We at Professional Education are proud to be associated with such a high-caliber, MIT alum-led annual event as a service to the community around us."

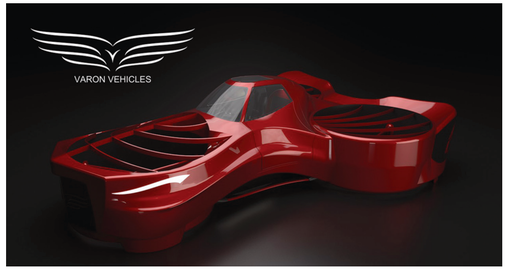
MITSPO has been sponsored by MIT Professional Education every year since it was first founded by Ogata in 1995. The concert was originally organized as a way for musicians within the MIT and Greater Boston community to continue practicing and playing music during the summer months, which are essentially the "off season" in the classical world.

"I love the family that MITSPO provides. For 22 seasons, MITSPO has been among the warmest group of people—loyal and positive—I've ever met in my life," said Ogata. "They are dedicated to their craft, passionate in their approach and execution. They make me want to excel myself. Plus, I get to make music at the highest level with these experienced musicians."

Among those in the orchestra this year were Justin Solomon, X-Consortium Career Development Assistant Professor of Electrical Engineering & Computer Science, who first performed with MITSPO as a high school intern at MIT. When he returned to MIT as a faculty member and learned that MITSPO still existed, he immediately signed up to play again. "George Ogata continues to choose challenging music for MITSPO, and preparing to play Stravinsky this year was still a challenge even after over a decade of additional practicing under my belt!" said Solomon. "But one of the great qualities of playing in a symphony like MITSPO is the unifying aspect: High school students, professors, community members, and others all share the same experience of playing a great piece of music."

SHORT PROGRAMS

"AS A CHILD, I DREAMED ABOUT FLYING," SAYS ELECTRICAL ENGINEER FELIPE VARON, A GRADUATE OF MIT PROFESSIONAL EDUCATION'S PROFESSIONAL CERTIFICATE PROGRAM IN INNOVATION AND TECHNOLOGY.



One Student's Dream of Flying Cars is Taking Off

What kid doesn't dream about fabulous flying machines? He envisioned a flying car.

And now a prototype is making test flights in his native Colombia.

"But I don't want just a cool toy," he says. "I want something with social impact to help people and cities. Something people can use today, not in some future time."

Varon says MIT Professional Education provided the knowledge, training and ideas he needed to upscale his invention in size, power and capability, and for financing, marketing and mass producing it. In 2018, he completed Professional Education's Professional Certificate Program in Innovation and Technology; his courses included "Beyond Smart Cities," "Radical Innovation," "Mastering Innovation & Design-Thinking" and "Precision Engineering Principles for Mechanical Design."

A flying car was the subject of his 2006 graduate thesis at the Universidad Externo de Colombia. "I put together this machine," he says. "I knew a motor and propellers could make it fly, kind of like a table with four legs."

That describes a drone. The skies were already full of them. But Varon took drone technology to the next level, founded Varon Vehicles Corporation with two partners and built a prototype flying car to travel in its own lane at low altitudes, safely clear of both land-bound and aeronautic traffic.

So, what does it look like?

Well, like a shiny red two-seated blend of a Batmobile and Agent 007's Aston Martin, entirely electric, with neither wheels nor wings, and Varon's company logo—a multi-layered "V"—on the hood. It has the sheen of power and luxury, which belies the high-flying altruistic purposes Varon and his partners foresee for their low-flying dream pod.

"We're not focused on designing and building and trying to sell flying cars," Varon says. "It would be for a service. And if I can get away with it, I would like the service to be free. "

He says it could go where traffic and congestion are a problem or there's a lack of public transportation.

"In developing countries, you have areas with low accessibility, low quality of life," he says. "Nutritious food and other things can't get to those in need. It would take an hour and a half to reach them. A flying car would take only 17 to 20 minutes."

Varon and his partners had a soft-launch for the prototype in Colombia and received good feedback. He says he's been invited to fly it in European countries and is in conversation with aeronautical regulatory authorities there. He hopes to approach the Federal Aviation Administration in the US. He's looking at a possible test site in Texas.

"We've tried to identify a market niche within an industry that hasn't even appeared yet," Varon says. As he speaks, he proudly shows pictures of the prototype with its two gray upholstered seat-belted seats, dashboard and steering wheel. "It's very simple," he says. "It doesn't have any dials, buttons or strange pilot stuff. It steers just like a car. We're trying to make it drivable by anybody. A computer does all the work."

He's searching for a clean power source. "We're clean at the point where we charge," he says, "but what happens behind the grid?" He envisions sharing assets with a hydro-electric power entity. "We don't want to have an environmental impact," he says. "We want to have a favorable social and economic impact, even providing jobs. We're going to have a fleet of cars, so we're going to need a fleet of drivers."

So that boyhood dream is taking off. He credits his experience at MIT Professional Education for giving it lift.

shortprograms.mit.edu

advancedstudy.mit.edu

ADVANCED STUDY PROGRAM BY THE NUMBERS SPRING SEMESTER 2018:

The Advanced Study Program makes it possible for qualified candidates to be part of the MIT student community as part-time or full-time students. A snapshot view of just one semester provides a glimpse of this incredible opportunity.

MIT staff participating in ASP

FALL 2017	SPRING 2017	FALL 2018	SPRING 2018
46	60	48	46

2000+ Number of MIT undergraduate and graduate level classes offered by MIT that ASP students can attend

TOP 5 Most popular departments where ASP fellow take classes

1. MECHANICAL ENGINEERING
2. ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
3. MATHEMATICS
4. BRAIN AND COGNITIVE SCIENCES
5. CHEMICAL ENGINEERING

CANDY WONG

ADVANCED STUDY PROGRAM STUDENT

Title: Program Manager
Company: Microsoft
National Origin: Canada
Current Location: Cambridge, MA
Industry: Technology/Computer Software
Educational Background: BASc in Systems Design Engineering, University of Waterloo
ASP Classes: MAS.665/15.375 - Development Ventures (Fall 2016)

What factors brought you to the Advanced Study Program?

Product design is central to my job, and one of the prevailing challenges is building better understanding of customer needs. I wanted to immerse myself in a diverse group of people, learn to see problems through different lenses, and become a more inclusive problem solver. MIT was a great fit for gaining insights into delivering solutions for target users, and exposure to problem-solving methods used in other companies and industries. The ASP's flexibility let me study while working full-time, and because MIT classrooms and student centers are walking distance from my office, it was easy to weave lectures and group work time into my schedule.

What's different about your professional life post-ASP?

One of the most helpful things has been how ASP has enabled me to participate in the MIT community. I found it to be very supportive and full of strong, innovative thinkers who are welcoming of anyone who is inspired to make a difference. In addition to my class work, I've had the opportunity to work on a non-profit venture and participate in business competitions. As a result, I've developed skills in pitching ideas, brainstorming, and collaborating with teammates from varied backgrounds, and I've been able to bring that mindset back to my current job.