MIT | PROFESSIONAL EDUCATION

FALL EDITION NEWSLETTER

Revised Version

"MIT BEYOND FOOD" TAIWAN

Departmental collaboration within MIT advances Institute's mission

MIT Professional Education and MIT Bootcamps (Office of Digital Learning) have joined forces to help entrepreneurs who want to tackle the world's greatest food challenges. The innovative collaboration, dubbed "Beyond Food," was sparked by an inquiry Professional Education (MIT PE) received from the Hao-Shi Foundation in Taiwan last fall. This new entrepreneurship-cultivating organization helping food startups was looking to partner with MIT to implement an international program that would help bring education and innovation to Taiwan in an effort to overcome food-related challenges in Taiwan and beyond.

"Hao-Shi wanted to provide entrepreneurs and business professionals in Taiwan and around the world with the training, knowledge and mentorship necessary to address the complex challenges surrounding food innovation," said Bhaskar Pant, Executive Director of MIT Professional Education. "That dovetailed beautifully with MIT's expertise and mission to build a better society and successfully meet the challenges of the 21st century."

"Getting physical interactions like today in the class brings back memories and I get to reenact the environment when I was a student at MIT."

MIT PE turned to MIT Bootcamps to collaborate and jointly develop a series of international entrepreneurship "Bootcamps" and professional courses focused on three key areas: environmental and social sustainability in agriculture and food production; traceability and transparency in the supply chain; and nutrition.

Phase one of the program involved a Taiwan-exclusive two-day mini Bootcamp for 180 individuals, which took place last May. One participant, Wayne Tang, described the experience as valuable and thought-provoking.

"The event was great. Although free, faculty of MIT shared a lot of information and provided us with a new way of thinking about innovation. I used to think innovation was just about technology used to form a new service. However, MIT introduced a variety of cases where a founder with cutting-edge technology failed due to lack of market

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FALL 2017

Photo by Stuart Darsch

Dear Friends:

We have just come out of a busy and exciting 2017 season of summer courses, which attracted a record number of 1535 enrollees from over 65 countries. One of the chief attractions this year was our Professional Certificate Program in Innovation and Technology, which encouraged participants from around the world to stay on and take multiple courses in order to satisfy the requirements of the certificate.

Our pioneering Digital Programs ended the 2017 academic year having registered over 28,000 professionals from more than 150 countries over three years. Digital Programs featured courses in several high-demand topics such as big data, cybersecurity, data science, and internet of things.

In this edition, we feature MIT Professor Thomas Heldt, one of our contributing faculty members who leads the Short Programs course, Quantitative Cardiorespiratory Physiology and Clinical Applications for Engineers. Thomas speaks about his attraction to teaching and interacting with a diverse set of industry professionals from around the world. We also profile two female technical professionals who share their experiences in attending our professional programs.

Finally, you will read about two of our programs conducted outside the US as part of our global outreach effort, one in the UAE, sponsored by the Prime Minister's Office, encouraging senior government officials to engage in innovation, crossing gender and hierarchical barriers; and the other in Taiwan for members of the food industry to meet the challenges of providing clean and nutritious food through innovative practices. In both countries, Prof. Sanjay Sarma, Vice President of Open Learning at MIT, taught a customized version of his summer Short Programs course, Radical Innovation, and in both cases the course was received with great enthusiasm and participation.

I invite you to read these stories and more as we begin the 2017-18 season when we will launch yet another new initiative: Digital Plus Programs, the introduction of blended and hybrid learning programs for professionals. Stay tuned!

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MIT BEYOND FOOD CONTINUED

insight," said Tang, who is now applying to the MIT Sloan MBA program.

The next part, phase two of the program, took place in August. MIT Vice President of Open Learning Professor Sanjay Sarma traveled to Taipei to deliver a course drawing content from his summer Professional Education course, Radical Innovation. This time, the audience consisted of C-level executives and business professionals from the Taiwan food industry looking to understand different ways to drive innovation and grow new, innovative products and services within their organizations.

"It is great MIT Professional Education is bringing courses to other countries. As an MIT alum, I try to take webinars and reach back to the school for resources as often as I can. However, it's difficult being abroad to really engage fully. Getting physical interactions like today in the class brings back memories and I get to reenact the environment when I was a student at MIT," says Steve Ma, CEO of Nutritec.

Following Professor Sarma's course, a longer, more intense, innovator-focused Bootcamp will be held in Taiwan in September. This time, a select group of more than 50 entrepreneurs from around the world will attend the week-long event to learn and practice innovation frameworks and venture leadership skills taught at MIT, be mentored by MIT-trained food and agriculture entrepreneurs, and meet potential cofounders to start for-profit and non-profit ventures in food and agriculture. Multiple ongoing ventures have been formed at previous MIT Bootcamps.

The Taiwan project is actually the first time MIT Bootcamps joined hands with another MIT department, and Vimala Palaniswamy, head of MIT Bootcamps at the Office of Digital Learning, said it was a valuable experience for all parties for many reasons.

"It allowed MIT to expand the breadth and depth of our entrepreneurship offerings in a particular region, and enabled MIT Bootcamps to develop a presence in Taiwan, a country where we did not have a large footprint previously," said Palaniswamy. "MIT Bootcamps is relatively young, but MIT Professional Education has been around for years. We've learned a lot and increased our networks internally by working with them. We look forward to working with them again in the future."

PROF. THOMAS HELDT

Medical Engineering Professor Finds Rewards in Teaching Industry Professionals

Thomas Heldt is an Associate Professor in the Institute for Medical Engineering and Science and the Department of Electrical Engineering & Computer Science at MIT. He joined MIT in 2013 and has been teaching quantitative physiology to undergraduate and graduate students alongside Professor Roger Mark ever since. But three years ago, the duo – along with Prof. George Verghese – decided to add a new course to their repertoire – this time, aimed at industry professionals.

"Through my various research projects, I was interacting directly with software and hardware engineers, and I noticed that the kind of material we teach students in our undergraduate and graduate classes would benefit professional engineers as well – especially the ones who work at the intersection of technology and healthcare," said Heldt.

That's when Heldt decided to engage with MIT Professional Education to launch the Short Program (SP) course: Quantitative Cardiorespiratory Physiology and Clinical Applications for Engineers. Now, each summer, engineers travel to MIT from Malaysia, Japan, Argentina, and various other countries around the world to attend the one-week class. Some are employed by large medical device or technology corporations. Others work at smaller start-ups or are looking to make a career change. Regardless of their background, Heldt says he always finds it to be a great experience.

"Most of the people who come have spent years in industry, so it's interesting to learn about the different applications they are interested in and thinking about," said Heldt. "I also enjoy teaching professionals because of the questions they ask. They seem to come from a slightly different perspective, and are usually focused on solving very specific problems that they are facing in their own work."

Content for the SP course is essentially the same as undergraduate and graduate courses – only tailored, condensed, and practical.

"I think the most exciting thing is seeing real-world medical data of a lot of conditions, some of them really rare – it's hard to see them anywhere else – and trying to understand them from both aspects," said a biomedical engineer from Analog Devices.

What Heldt usually teaches over the course of a month or two in graduate and undergraduate courses, he says he covers in a matter of days in the professional education course. The density with which information is being transferred makes for an intense experience for students, but Heldt says he is always astonished by their level of participation.

"This isn't just a week away from the office. We teach from 8:30 in the morning until 5:30 in the afternoon, and even in the breaks people are going to the board trying to gain clarification. That lasts up until the very last day. As an educator, it's extremely rewarding," said Heldt.

Heldt says he hopes that by taking the Short Programs class, engineers will gain a deeper understanding of the physiology of the cardiovascular and respiratory systems, and that an improved understanding will in turn result in better healthcare technologies and products. He also feels MIT has a lot to contribute when it comes to applying engineering and science knowledge to healthcare – not just by teaching students who come to MIT, but by educating those who are trying to solve healthcare problems in industry. He sees healthcare-related SP courses as an opportunity to help spark the next wave of medical innovation. ✦
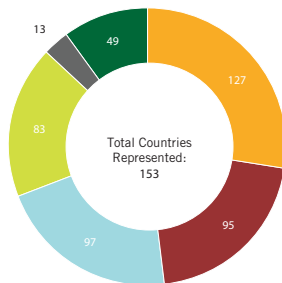
DIGITAL PROGRAMS

## SERVED 28,000 PROFESSIONALS FROM OVER 150 COUNTRIES SINCE 2014

PROGRAM ENROLLMENTS

319
7,522
2,936
3,579
2,915
11,387
Total Participants: 28,658
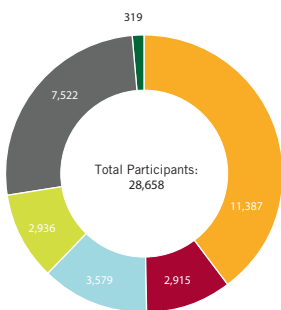
PROGRAM ENROLLMENTS BY COUNTRY

13
49
83
127
97
95
Total Countries Represented: 153

As the end of the first half of 2017 marks the successful completion of MIT Professional Education's "digital only" courses, we would like to take a brief look back on our many accomplishments over the past three years. Digital Programs was first launched in 2014 in collaboration with edX and the MIT Office of Digital Learning. Since then, Digital Programs has had a total enrollment of over 28,000 professionals in 153 countries.

Moving forward, MIT Professional Education is busy charting yet another new direction for MIT to disseminate knowledge to professionals by launching Digital Plus Programs, a blended program offering that combines both digital and in-classroom instruction We want to thank each one of you for your support and collaboration in helping us put Digital Programs for professionals from MIT on the global stage with such great success! ✦

- Tackling the challenges of Big Data (1-10)
- Cybersecurity (1-5)
- Internet of Things - IOT (1-4)
- Data Science: From Data to Insights (1-3)
- Architecture and Systems Engineering (1-4)
- Entrepreneurial Negotiations (1)
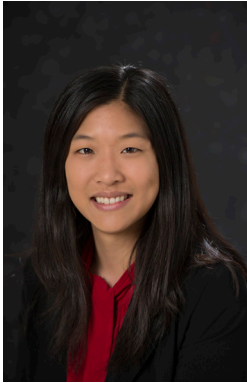
TINA CHEN
Associate Staff, MIT Lincoln Laboratory

SHORT PROGRAMS STUDENT

What courses have you taken from Professional Education and why?
I've taken three Short Programs courses through MIT Professional Education: two radar courses and a machine learning course. I enjoyed the first radar course a lot and there were so many interesting topics available that I went back for more! In the future, I hope to be able to continue taking courses relevant to my career and interests.

Why did you choose MIT?
I had heard great things about Short Programs from coworkers – the courses are taught well and the format worked a lot better for my schedule than a more traditional semester-long course.

What would you say were the top three most valuable takeaways from your experience in taking these courses?
The condensed schedule of Short Programs was very helpful. Each day, the lecturers were able to constantly build upon what was taught in previous days and a lot of material was covered by the end of the week. Even if some topics were covered more briefly than others, it was still informative to see an introduction to more advanced topics and note areas to explore further. I also learned about interesting and fun research being conducted by the course and lab instructors, as well as other researchers at MIT.

Additionally, I enjoyed meeting other program participants from all over the world through the courses. Everyone came in with a different background and perspective, and it was interesting to see how other people intended to apply the material we were learning. I also learned things about other universities, companies, industries, and countries from the other students during breaks and discussions.

Did what you learn in these courses help you in your career or help your organization?
The courses definitely broadened my basic knowledge base in these topics. For example, the hands-on lab component of the radar courses helped reinforce concepts from the lectures. MIT Lincoln Laboratory has such a rich history with radar technology that it is important to have an understanding of both the hardware and software pieces of a radar system.

As someone with a background that falls on the software and algorithm development side, I appreciated the firsthand assembly of a basic radar as an introduction to radar hardware and system design. And in the machine learning course, all of the examples that were discussed highlighted the wide variety of parameters that could be adjusted to fit the specifics of your own application and strategies for getting the best results.

What would you say is the value of taking a professional development course in general?
Professional development courses are a great way to expand on a topic that you want to learn more about. Through the courses I've taken, I have learned quite a few very applicable concepts in a very organized fashion and in a fun setting.

CASSI MILLER

Performance Engineer, GE Aviation, Advanced Engine Systems

ADVANCED STUDY PROGRAM STUDENT

National Origin: USA
Current Location: Somerville, MA
Industry: Aircraft Engine Design
Educational Background: BS Aeronautical and Mechanical Engineering, Clarkson University, 2013

What factors brought you to the Advanced Study Program?
I learned about the ASP through a GE Aviation leadership program that offers new hires the opportunity to take graduate-level classes at several Boston-area universities. I was drawn to MIT's unique class offerings and ASP's option of part-time enrollment. By taking one class per semester, I continued my career while also gaining a new set of skills. I have a special interest in combining my background in aircraft engine design with my interest in environmental studies, and have used my time at MIT to take classes focused on aircraft emissions, new technology, and the resulting environmental effects.

What's different about your professional life post-ASP?
Prior to enrolling in ASP, I really didn't know much about my industry's environmental impacts. Learning so much from my classes, and my interactions with students and faculty at the Laboratory for Aviation and the Environment, has led me to apply for full-time graduate studies next fall, so that I can do research and contribute to the future of aviation. Identifying a focus area that I'm genuinely passionate about has been a huge boost professionally. There are hundreds of jobs within GE Aviation, and my ASP experience has clarified for me which ones I want to pursue.

UNITED IN LEARNING IN DUBAI

The political leaders of Dubai in the United Arab Emirates (UAE) have an indefatigable belief in the promise of innovation. So when this future-focused city decided they needed help building their own culture of innovation, they came straight to MIT Professional Education.

"We are shifting the mindset of our government employees toward how to think outside of the box," said Najwan Al Midfa from the Ministry of Cabinet Affairs and Future, which enacts the strategy and vision of the UAE. "Honestly, we see that as the MIT way of thinking."

Al Midfa, a Special Projects Manager for the Mohammed Bin Rashid Center for Government Innovation, credits a recent series of two-day innovation workshops led by MIT faculty with influencing high-profile attendees, including cabinet ministers, chief innovation officers, undersecretaries, and others. "Officials are saying they want to spread MIT's culture within their entities," said Al Midfa. Such an effort advances the UAE's broader push for creative solutions to urgent challenges involving energy and environment.

"The workshops cultivated a spirit of innovation on many levels," said Bhaskar Pant, Executive Director of MIT Professional Education. "The UAE Prime Minister's Office, which extended the invitation, also suggested participants work together across traditional hierarchy and gender barriers, he says. The UAE government knows crossing such boundaries will allow for more innovative results. They wanted to use the MIT reputation – its clout – to make that kind of collaboration easier."

MIT faculty traveled to Dubai to teach forms of innovative thinking, not necessarily to address cultural issues. The workshops involved a cross-section of people, male and female, exchanging ideas and working jointly on projects. "The UAE is being very progressive," said Pant, who teaches intercultural communications to MIT engineering students and other community members. "You've got tremendous hierarchy across the Middle East, especially in the government. The UAE is saying, 'Well, we're going to be different.'"

CONNECTING MINDS

Spreading a culture of innovation is paramount in Dubai; the UAE intends to become one of the most innovative governments in the world. Initiatives include the Dubai 2021 Plan, an ambitious project aimed to raise Dubai's profile as a top international city for business, culture, tourism, and government, as well as to reinforce its position as a pivotal hub in the global economy and a hotbed for innovation.

Dubai also won its bid to host the World Expo in 2020 with a theme of "Connecting Minds, Creating the Future," to recognize the collaboration needed across cultures, nations, and regions in order to generate sustainable solutions to global challenges. It has attracted top international startups to tackle critical problems, and leads a nationwide event – UAE Innovation Week – that celebrates innovation as an everyday activity to be embraced by men and women in every segment of society.

"I doubt there are many countries where leaders are as well-informed or change-oriented," said Sanjay Sarma, Vice President for Open Learning at MIT. In 2016, he and Pant signed the agreement with the UAE that launched the MIT innovation series in Dubai.

Sarma, who also leads the Office of Digital Learning at MIT and is a Professor of Mechanical Engineering, led the first workshop, Radical Innovation. He added that government leaders impressed him as progressive, knowledgeable, and engaged. Men and women discussed concepts creatively, applied them to real examples, and absorbed how to use modern organizational and experimental principles.

Next in the series, Federico Casalegno, Associate Professor of the Practice and Founder and Director of the MIT Mobile Experience Lab, focused on design thinking. Government officials worked together on teams and created disruptive ideas with new media and cutting-edge technologies, he says. One team designed a distributed-connected system that leveraged the internet of things and artificial intelligence to enable working mothers to balance dual responsibilities of children and career. Another created a digital system with distributed sensors to optimize renewable energy production and consumption.

"We had a creative-thinking environment. Everyone was active. Women, in particular, were able to bring their own know-how and international experience into the design thinking process," said Casalegno. "I think the mix of people within the teams was one of the successful parts of it."

BREAKS RECORDS IN 2017

This summer not only saw a record enrollments in Short Programs, but an interesting and diverse variety of demographics among our participants.

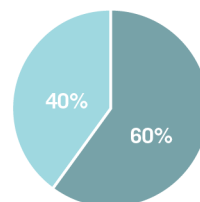Here are a few stats and figures from this year.

1,535
PARTICIPANTS THIS YEAR

1. Mexico
2. Brazil
3. Canada
4. United Arab Emirates
5. Saudi Arabia

TOP COUNTRIES

TOP 5 ATTENDED COURSES

1. **Crisis Management** led by Richard Larson & Steve Goldman
2. **Machine Learning for Big Data and Text Processing** led by Regina Barzilay & Tommi Jaakkola
3. **Fermentation Technology** led by Daniel Wang and Kristala Prather
4. **Additive Manufacturing** led by John Hart
5. **Mastering Innovation and Design Thinking** led by Joel Schindall & Blade Kotelly

CERTIFICATES

Professional Certificate in Innovation and Technology

63 new participants for 2017

28 participants graduating

65 countries represented

Nationality

- International 40%
- U.S. 60%

UNITED IN LEARNING CONTINUED

THE PUBLIC GOOD

MIT faculty member, David Niño, led a final workshop on the challenges involved in leading strategic innovations. Like his colleagues, Niño was focused on his subject area – and not on cross-gender collaboration. It happened anyway.

"One of the senior female leaders approached me the first day and said, 'Are you going to mix us together for group exercises? The men and the women?'" said Niño, Senior Lecturer in the Gordon-MIT Engineering Leadership Program.

In the seminars, he noticed, women sat on one side of the conference room, and men on the other. The dress was traditional with women wearing long black robes with a hijab and men in long white robes with headscarves. "I was planning to mix everyone together as I usually do," Niño told the woman. "Is that violating a cultural norm?" he asked.

"No," she said, "It would be welcome."

"The discussion was very rich and engaging to begin with, and even more so when they moved into mixed groups to work on projects," Niño said. In one instance, participants role-played a scenario in which a public official with new data on city pollution levels must determine potential causes and develop creative solutions to this problem. One group came up with a set of solutions, and the other group critiqued them. "The energy in the room was amazing. They really came alive," he said.

Niño noted that while MIT offers expertise in innovation, the extended relationship will enable learning to go both ways. In fact, he learned during his workshop that a climate summit with top UAE leaders was happening in the same building – and they were approaching an air pollution issue with the same collaborative and innovative approach he was currently teaching.

"As global citizens, we all have a shared stake in developing creative solutions to problems such as climate change, and I would love to see us mutually share our experiences and learn from one another."