MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PROFESSIONAL EDUCATION
NEWSLETTER

SPRING 2011

IN BRIEF

Advanced Study Program

In an effort to increase awareness and eventually registration in the Advanced Study Program, we will be hosting a series of Virtual Information Sessions via Webex so that interested prospects from around the world can learn more about the specifics of the program. For more information about these information sessions, please see the Coming Up section of this newsletter.

Career Reengineering Program

This summer, the Career Reengineering Program will celebrate the completion of its fifth year with a combined certificate ceremony and reunion bringing together many of the 50 graduates of the program. We plan to use this milestone as an opportunity to catch up with our alumni and to find out more about what they are doing today and to better understand the long term effects of this program.

Short Programs

Registration is open for all of our short summer courses to be held on the MIT campus. In addition to returning old favorites, we have a selection of new courses on manufacturing, energy/transportation, sustainability, lean enterprise and innovation. Manufacturing programs include Modern Manufacturing Systems and Technology; and Flow Chemistry: Continuous Synthesis and Purification of Pharmaceuticals. New offerings in transportation include courses on urban mobility and future vehicular transportation. We are also offering Sustainability: Principles and Practice as well as Energy, Sustainability and Life Cycle Assessment. Finally, courses of interest to a more general audience include Principles of Enterprise Transformation and Radical Innovation.

DEAR FRIENDS,

I am particularly excited about the stories in this newsletter as they help illustrate the impact MIT Professional Education programs have on our individual and corporate clients around the world. They also illustrate how both the faculty involved in the programs and MIT gain by engaging with international clients and their real world issues and challenges. In the faculty spotlight section, we feature Professor Ed Crawley, who has used creative methods to teach systems engineering courses to industry professionals for many years. Professor Crawley was recently honored with the country's most prestigious engineering education award for his "innovative style of teaching."

Bhaskar Pant.
Photo by Stuart Darsch

Through our courses and global corporate engagements, we educate well over a thousand professionals each year. But that number is dwarfed by the tens of thousands of IT professionals we impact each year through MIT-developed certificate training programs and MIT faculty lectures delivered at Accenture locations in India and around the world.

On a much smaller scale, but no less influential, is our individualized Career Reengineering Program (CRP that has, after only a few years, transformed the career paths of several enrollees.) One example is a determined Abdoulaye Fofana from Liberia, whose story of rising from a war-torn country, being educated in Russia, enduring personal tragedy, enrolling in our CRP program, and then landing a great job at a major company in the U.S., is touching, impressive, and true to our mission.

I invite you to read these articles and more, including the story about the short course on Crisis Management that we introduced last year, which business continuity attendees from across the globe described as an "eye opener." The course will be offered again this summer when it will be even more relevant in light of recent crises in different parts of the world. As always, we would welcome your comments and feedback on the newsletter.

Best Regards,

Bhaskar Pant

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

SYSTEMS ENGINEERING, ARCHITECTURE, AND LIFECYCLE DESIGN:
PRINCIPLES, MODELS, TOOLS, AND APPLICATIONS
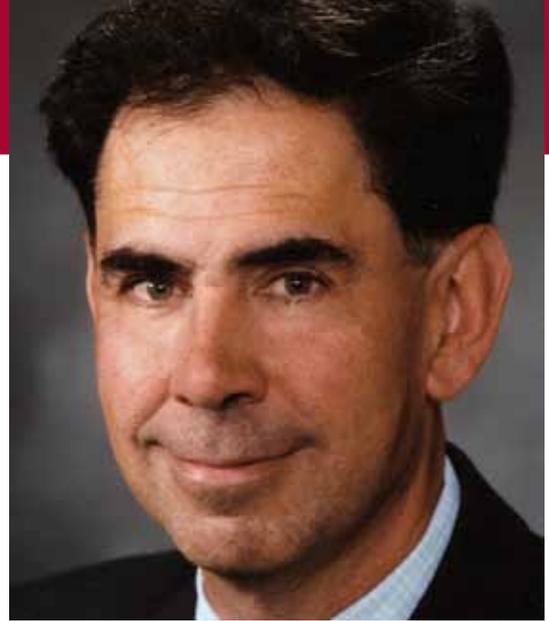
Edward F. Crawley; Ford Professor of Engineering at MIT Professor of Aeronautics and Astronautics and of Engineering Systems.

When professionals sign up for MIT Professional Education's Short Programs in the summer, they get more than experts in subject areas—they get innovative teachers. In fact, Professor Edward Crawley, who will teach this summer's Systems Engineering, Architecture and Lifecycle Design course, just received the nation's most prestigious engineering education prize.

This award, the Bernard M. Gordon Prize for Innovation in Engineering and Technology Education, honors Crawley's years of inventing new educational programs. Since he specializes in systems architecture, he naturally applied systems methodology to the problem of defining excellence in engineering education. He and colleagues developed a framework that maps out a dozen dimensions that lead to improvements in teaching and learning—and then put them into practice.

Crawley points to active learning in the classroom as one of the dimensions. Through the 1960-80s, chalk and talk was considered good teaching, he says. "We learned that when you stand and talk to people showing them viewgraphs, then education is mostly manipulating symbols. People don't learn very well that way. What you should do in person is to engage their mind more actively than taking notes. Especially with professional learners, they would much rather learn a chunk of information and then try to apply it to a meaningful example in their actual work practice."

Based on research and his own experience, Crawley changed his teaching style. Instead of extensive lectures, now in the summer course he talks for, say, 20 minutes, then the students take the concept and apply it to a specific situation. They select an engineering problem to work on so the class becomes a project-based learning exercise.
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Crawley's teaching insights come from co-

CALL TO ACTION

Systems Engineering, Architecture, and Lifecycle Design: Principles, Models, Tools, and Applications, July 25, 2011

Learn more and register at: shortprograms.mit.edu/6.18

RESEARCH INTERESTS

Crawley's early research centered on structural dynamics, aeroelasticity, and the development of actively controlled and intelligent structures. His recent work has focused on the domain of the architecture and design of complex systems.

MIT SERVICE

Teaching since 1980

Founding co-director, System Design and Management Program, 1996

Founding co-director, Conceive, Design, Implement, Operate (CDIO), 2000

Executive Director of the Cambridge–MIT Institute, 2003-06

Director, Bernard M. Gordon-MIT Engineering Leadership Program, 2007-present

EDUCATION

ScD MIT, Aerospace Structures, 1981

SM MIT, Aeronautics and Astronautics, 1978

SB MIT, Aeronautics and Astronautics, 1976

PUBLIC SERVICE

Chair, NASA Technology and Commercialization Advisory Committee

NASA Public Service Medal

Presidential Advisory Committee on the Space Station Redesign, 1993

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FACULTY SPOTLIGHT

SYSTEMS ENGINEERING, ARCHITECTURE, AND LIFECYCLE DESIGN:

PRINCIPLES, MODELS, TOOLS, AND APPLICATIONS

founding the System Design and Management program, a joint engineering-management master's degree, and Conceive, Design, Implement, Operate (CDIO), a systematic program that provided a framework to benchmark the most effective practices in engineering education. His newest effort is heading the Bernard M. Gordon-MIT Engineering Leadership Program, an effort to help engineering students develop management skills.

Crawley has won numerous awards for teaching and for his research on aerospace systems including active structural control. He is the author of many journal publications and co-author of two books. He was awarded the AIAA Structures, Structural Dynamics, and Materials Award and the ASME Adaptive Structures Medal. He is a fellow of the AIAA and the Royal Aeronautical Society (UK), and a member of three national academies of engineering. He has founded several companies and serves on the boards of Orbital Sciences Corporation and numerous entrepreneurial enterprises.

In the public sphere, he evaluated options for future space explorations for the White House and NASA on the Augustine Commission. For industry, he has investigated a central question: How to do you design an offshore oil exploration project without knowing how much oil there is and where it is? Crawley has also taught in the BP Projects and Engineering Academy, a joint program of MIT Professional Education and Sloan Executive Education, designed for company engineering executives and managers.

When Crawley isn't wrestling with large-scale problems, you might find him soaring in a glider. An avid pilot, he often spends hours aloft, gliding over Vermont up to Canada and back again. "I've gone five-six hours at a time—it's very quiet and very cognitive. You are constantly assessing what the conditions are and where you can go next." ◥

◢ *PERSONAL INTERESTS*

Active pilot specializing in gliders

Northeast Regional Soaring champion in 1990, 1995, and 2005

Distinguished Eagle Scout Award of the Boy Scouts of America, 2004

◢ *LEARN MORE ABOUT PROFESSOR CRAWLEY*

"The Next Giant Leaps in Space Exploration," 2009 MIT World video: http://mitworld.mit.edu/speaker/view/1163

"Future of Human Spaceflight: The Augustine Report," a 2009 TechTV video: http://techtv.mit.edu/videos/4840-the-future-of-human-space-flight-the-augustine-report-and-its-implications

"10 Tips for Success for Engineering Students," 2009, U.S. News & World Report: http://www.usnews.com/education/blogs/professors-guide/2009/12/02/10-tips-for-success-for-engineering-students-

PROFESSIONAL EDUCATION

ACCENTURE AND MIT GAIN IN INDIA
VIA CUSTOM EDUCATION PROGRAM
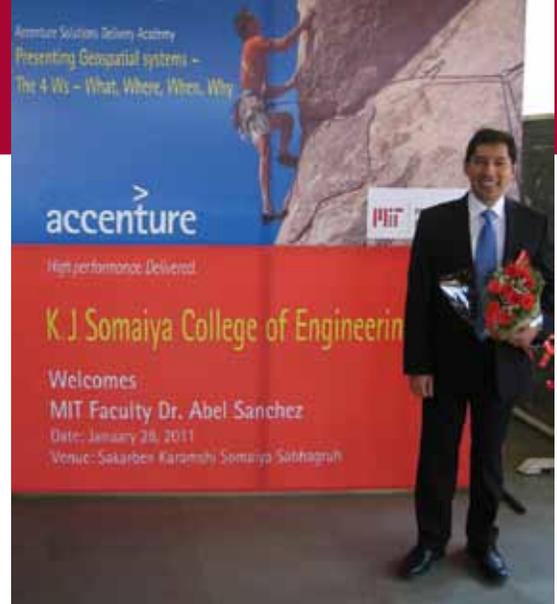
Accenture is facing a tremendous challenge—hiring tens of thousands of talented new staff members fast, and in India alone the global management consulting and IT firm is experiencing record growth. The company is finding a strong ally in its five-year relationship with MIT Professional Education and the collaboration with the Accenture Solutions Delivery Academy (ASDA). As part of the collaboration, Accenture is drawing on the MIT faculty coming to lecture at company locations to reach out to top Indian universities—and thus boosting its recruitment opportunities.

Accenture's ability to plan and execute large-scale training is evident in ASDA. More than 30,000 employees in 40 countries have participated in the information technology training and certification program, co-developed with MIT, since 2007. MIT faculty work with the company to develop curriculum and exams leading to certification in more than a dozen topics such as software engineering fundamentals and application testing. These faculty members also deliver lectures at Accenture sites worldwide and a growing video library makes these talks available online to employees.

In 2010, MIT Professor John R. Williams, director of the MIT Geospatial Data Center, was scheduled to give a lecture on Smart Grid Technology to Accenture staff in Mumbai, India. The local recruiting team asked if he could also speak to students and potential recruits at K.J. Somaiya University which is also in Mumbai. Professor Williams delivered that talk to more than 500 students and faculty, and was extremely well received.

Impact of the University Talks

"As part of our collaboration, what Professor Williams did had a huge impact on Accenture's ability to recruit top people from the university," says Professional Education Associate Director Dawna Levenson '83, SM '84, who is responsible for the Accenture program. "The number of people interested in working for Accenture shot up." Based on this experience, Accenture wants to build relationships with more of India's top universities with the help of MIT. Students benefit even if they do not take jobs at Accenture. They hear about new research from the world's leading technology university and that can help them advance their own thinking about applications for India.

In January, Williams and his colleague, Abel Sanchez SM '98, PhD '03, executive director of the MIT Geospatial Data Center, traveled to India on separate tours to deliver talks at Accenture sites and five universities. The subject was their joint work on a global tracking system using RFID tags, mobile tracking, and other technologies. The talks, titled the "4Ws: What, Where, When, Why," described their system, which allows individual items to be tagged at a production center, then tracked to point of sale—and beyond. Drug counterfeiting, for example is a multi-billion dollar industry that may account for some 40 percent of medications sold worldwide. Their system could identify fraudulent and potentially dangerous drugs and, in the case of legitimate drug recalls, patients could be located quickly.
(Continued on next page)

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ACCENTURE AND MIT GAIN IN INDIA

VIA CUSTOM EDUCATION PROGRAM

The MIT faculty lecture topics are sophisticated but are pertinent to India's development, says Sanchez. "I had one student in India say to me, these ideas are great but we are a poor country and we don't have that kind of infrastructure. I said think about a mobile platform for services and applications—India could outpace anybody because cell phone service is cheap and they are adding some 10 million devices a month."

The Accenture staff and Indian faculty and students are impressive, Williams and Sanchez agree. MIT co- developed certificate programs and lectures can help Accenture attract and retain top employees. In India in particular, with large numbers of English-speaking university graduates and global companies seeking top employees, MIT can provide an edge.

Rajan Vaish, an associate software engineer at Accenture Technology Labs in Bangalore, blogged about William's 4Ws talk—and the opportunity to talk to the MIT professor after the lecture. "With my related work during One Laptop per Child and Open StreetMap Foundation, I could connect his related research with my experience," wrote Vaish, "we also discussed…my application…which was featured in the MIT TR [Technology Review] April '10 issue."

Lessons on a Large Scale

"It's been a great education for us at MIT," says Williams. "We have learned a lot about their large-scale systems. Accenture has very good delivery methods—they have learned to develop processes and collect feedback." Clear software development protocols, for example, help new employees become productive quickly and facilitate Accenture's practice of bidding out parts of large projects to offices in India, China, and Argentina and then integrating the whole. The scale of Accenture's productivity struck Sanchez: "They write about a million lines of code a day and only NASA has ever written that much. It's unbelievable."

Williams says the MIT-Accenture relationship benefits his work and it doesn't take a lot of time. "I spend a week about twice year and it is an inspiration thing. India has tremendous potential—the scale of business is expanding. They have first-tier cities like Bangalore and Mumbai expanding rapidly and now they are moving jobs out to second-tier cities. With IT, you can do that easily. India has a lot of problems but it is an awakening giant."

What's next for Williams and Sanchez? They are working on a collaborative agreement with Amity University in New Delhi to conduct research on cyber security issues. And Sanchez is working on two other geospatial projects that may be tested in India. His Food Provenance project, which tracks food from the grower to the purchaser, could help Indian farmers and customers, and an oral rehydration project, which uses a cell phone app to match sick children and nearby rehydration supplies, may be tested in India. ◥

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HELPING BUSINESSES SURVIVE CATASTROPHES

SHORT PROGRAM TEACHES CRISIS MANAGEMENT AND BUSINESS CONTINUITY SKILLS

Steve Goldman SM '78 got an early taste of disaster mis-management just after he had earned his master's degree in nuclear engineering at MIT. The 1979 Three-Mile Island accident, a partial core meltdown at a nuclear power plant in Pennsylvania, was surrounded by confused communications and alarm gripped America and the world. The company and the nation were unprepared for this crisis. Unprepared is the key word, Goldman says.

"A lot of corporations are in denial—they think disaster can't happen here," says Goldman. "In nuclear engineering, we saw it happen to someone who was not prepared and we learned from it."

Goldman has put that learning to work as a consultant in business continuity, crisis management, disaster recovery, and crisis communications. The idea for the 2010 Professional Education Short Program, Crisis Management and Business Continuity, ignited when a staff member from the MIT Environment, Health, and Safety office (EHS) attended one of Goldman's workshops. The idea for the summer course quickly won approval from EHS head Bill VanSchalkwyk and Professor Richard Larson '65, SM '67, PhD '69, who both taught sessions in the course. Enrollment for the three and one-half day course filled quickly and a four and one-half day course, expanded to give speakers more time, will be offered this summer.

New Situations Require New Structures

"Whatever a company does, generate electricity or develop new bioproducts, their organizational structure is set up to do that. They are not set up to deal with a crisis," says Goldman. "When you have a crisis, you need specific processes and procedures to bring the organization back to where you want it to be—or perhaps to even better shape."

The summer course prepared participants to create their own emergency plans so they can act quickly and effectively. Speakers came from the Federal Emergency Management Agency, the FBI, Intel, Oracle, the Cambridge Fire Department, and ABC News. Sessions dealt with how to keep businesses functioning, set up emergency command centers, train staff, communicate, and lead during disruptive events such as workplace violence, cyber terrorism, pandemics, and natural disasters.

The final exercise was a simulation of a multi-incident crisis. As the recent incidents in Japan illustrate, natural disasters such as an earthquake and a tsunami can spawn extreme situations such as the partial meltdown of nuclear reactors. In the simulation, students took on the roles of federal, local, and corporate responders as well as the news media so they experienced the needs of each group. For example, the best way to avoid panic is to get accurate information to the media quickly. In today's 24-hour news cycle, a clear statement of the facts and next steps should be in the media's hands in about 30 minutes. Without a clear response plan and delineated lines of responsibility, most companies would need hours, if not days, to prepare such a statement.

Improving Disaster Response

The title of Larson's 2005 book, *How Can We Improve Disaster Response?,* captures one goal of the course. Larson, the Mitsui Professor in the Engineering Systems, admits he is sometimes called Dr. Disaster. "Over my entire career, I have had an interest in planning for and responding to disasters and low-probability, high-consequence events," says Larson.

His work with pandemics was widely quoted in the press during the flu outbreaks in the past decade. Through a dynamic mathematical model, he and his colleagues demonstrated that the influenza death toll could be slashed by actions individuals could take themselves—avoiding social contacts and improving hygiene practices such as frequent hand washing. "We can show that hygiene and social changes have as much impart as vaccination," he says.

Case studies, operations research tools, and expert advisors helped participants complete the course with a fresh approach to crisis planning. "The biggest contribution we make to people who come to campus for a short period of time is to get them to think about problems differently—from different angles and altitudes," Larson says. ◥

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NATIVE OF WAR-TORN AFRICAN COUNTRY REENGINEERS HIS CAREER

ABDOULAYE FOFANA'S JOURNEY FROM WAR-TORN LIBERIA TO MIT ILLUSTRATES THE LIFE-CHANGING OPPORTUNITIES THE CAREER REENGINEERING PROGRAM AFFORDS

Abdoulaye Fofana. *Photo by Stuart Darsch*

COMING UP

Advanced Study Program

➤ Virtual Information Sessions — June 21 (archives also available)

➤ On campus Information Sessions — June 7

➤ Details/RSVP at advancedstudy.mit.edu

Career Reengineering Program

➤ Information sessions — June 9, June 23, July 12

➤ Details/RSVP at career-reengineering.mit.edu

Short Programs

➤ Courses run 2-5 days from June 8 – August 5

➤ Details/ registration at shortprograms.mit.edu

Growing up in an impoverished country, Fofana believed that education was the key to a better future. When he finished high school in Liberia, he was fortunate to win a prestigious scholarship to attend college in Russia. He packed his things and moved far away from his friends, his family, his home, and his language.

To learn Russian, Fofana enrolled in the St. Petersburg Polytechnic Institute and then studied management information systems at the St. Petersburg State University of Engineering and Economics. When he finished his master's degree in 1995, Liberia was engulfed in a civil war that tragically took his parents lives. Fofana could not return home nor could he stay in Russia because economic conditions made finding a job impossible. Fortunately American friends arranged for him to come to the U.S. and join them in New York state.

In America, Fofana applied for and won political asylum and, in time, became a citizen. He honed his skills through area IT organizations until he landed a job at a financial consulting start up. After a few years, the company was forced to scale back operations and Fofana lost his job. That's when he found the MIT Career Reengineering Program (CRP).

CRP attracts mid-career science and technology professionals who plan to re-enter the workforce, refresh their skills to stay relevant, or shift fields of concentration. Fofana wanted to upgrade his skills and rebrand himself by adding an MIT credential.

In the year-long CRP program, fellows usually take one MIT class in the fall but Fofana wanted more. "During orientation, professors presented exciting topics that made me think, so I chose two classes, not one, to help broaden my background into an emerging field." He took Biomedical Computing and Database, Internet, and Systems Integration Technologies to help him prepare for a new career in the biomedical field focusing on large-scale clinical database design and modeling.

"Choose your course wisely," he advises. "Find a course related to your skill set and background, so you can use your prior experience in a new field."

The CRP experience includes career and personal development workshops and the fellows enjoy access to MIT lectures, conferences, events, and libraries plus their own student lounge. "I made some great friends who I know will stay in my life," says Fofana.

In January, Fofana gained valuable experience working as an intern for Globespan Capital Partners, a venture capital firm specializing in information technology. At a spring job fair on campus, he learned about promising openings and soon landed a job as a technology product manager in Oracle's Health Science Global Business Unit. In this role, Fofana will help Oracle develop strategies to integrate health and life sciences and he expects the opportunity to lead to long-term career growth at Oracle.

"You need to explore your path," he says. "If you know what you want, pursue it. I did." ◣

For more information on our programs, visit
http://professionaleducation.mit.edu

MIT Professional Education
Massachusetts Institute of Technology
77 Massachusetts Avenue, 35-433
Cambridge, MA 02139