MIT Sloan faculty tackle the problems of an ailing system
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Innovation at work

12 Race against the machine
Will great advances in computing and technology render the American worker irrelevant? In a selection from their new digital book, Professor Erik Brynjolfsson and principal research scientist Andrew McAfee argue that all is not lost. Innovation and entrepreneurship, they write, can lead to countless new industries, ideas, and jobs.

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14 Fixing health care: MIT Sloan faculty tackle the problems of an ailing system
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20 Fixing health care: A Q&A with Professor Retsef Levi
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On the cover
More than 20 MIT Sloan faculty conduct research with an aim to improve health care delivery. Pictured are Associate Professor Retsef Levi, Professor Ernst Berndt, Senior Lecturer Anjali Sastry, Associate Professor Joseph Doyle, Associate Professor Vivek Farias, and Professor Dimitris Bertsimas.
Connecting across the worldwide community

DEAR ALUMNI,

In the Spring 2012 issue of the MIT Sloan Alumni Magazine, I am delighted to bring you stories of innovation and collaboration in health care delivery around the world. Our alumni, faculty, and students are leading initiatives to solve an increasingly pressing problem, and this important work is supported by the strength of the School’s global community. This year, I have seen firsthand how the mission-driven work of MIT Sloan alumni reinforces the School’s impact worldwide.

For example, School events this year have seen record attendance. The number of alumni gatherings worldwide has tripled since May 2011, up to 69 in total. The breadth and diversity of alumni events are inspiring, from a 300-person gathering in Cambridge, MA, to a five-person meeting in Thailand. In every case, the scope and vibrancy of alumni activities have generated a global conversation about the mission of MIT Sloan in the world, and how it can be advanced.

Many of these events provided you the opportunity to meet and talk with David Schmittlein, John C Head III Dean of the School, who traveled from continent to continent to get to know many of you. Throughout the world’s regions, Dean Schmittlein made it a point to share his vision for the School, while learning of your particular interests and commitment to the future of MIT Sloan. These events will only continue apace: We look forward to welcoming you at the next gathering in your region.

In addition to the excitement and enjoyment of social events that welcome alumni, students, and friends of the School, the impact of MIT Sloan’s global alumni network can also be felt in the daily life of the School and the work of its faculty and students. For example, Julie Chang, MBA ’02, (see page 9) experienced the power of the alumni network firsthand in 2010, when she began a consulting project in Morocco. The CEO of OCP, the client company, was an MIT Sloan alumnus who took a special interest in Chang’s work in sustainability. The project flourished, OCP executives visited the campus through the Industrial Liaison Program (ILP), and collaborative ties between the company and Kendall Square multiplied. Today, OCP is slated to join the 2012 roster of participants in the Sustainable Business Lab (S-Lab).

Reunion Weekend is an opportunity to reinforce these alumni ties, of friendship and professional collaboration, as well as to renew your connection to the School. Further, it enables you to reconnect with old friends and classmates, while learning more about the latest innovations and collaborations going on at MIT Sloan. We will welcome hundreds of alumni back to campus on June 7–10; and we hope that if your class is in a Reunion year, you will join us. Reunion activities will feature presentations by faculty on their latest research, including professors whose innovative work in health care is featured in this issue of the magazine.

As the health care initiative demonstrates, the School’s impact in the world can only be brought to life through the generous support of alumni and friends. This year, we have the ambitious goal of raising $3.1 million for the MIT Sloan Annual Fund. Your support, through unrestricted giving, has a tremendous effect on the life of the School, the opportunities we make available to students, and MIT Sloan’s future impact on the world. Please take a moment today to make a gift to the Annual Fund using the envelope enclosed in this magazine.

As upcoming alumni events approach, I look forward to welcoming you back to campus or meeting you where you live. You are an essential part of our community, and your engagement and commitment to MIT Sloan are deeply appreciated. I hope you will enjoy this edition of the MIT Sloan Alumni Magazine and the window it provides into what is happening on campus today, and every day, as we tackle today’s greatest management challenges.

Best regards,

Kristina Gulick Schaefer
Associate Dean, External Relations
Health, innovation, and global impact

DEAR ALUMNI AND FRIENDS OF THE MIT SLOAN SCHOOL OF MANAGEMENT,

In the five years since I have joined the School, I am continually struck by the depth of commitment, throughout the entire MIT Sloan community, to aligning our work with core values and a sense of mission. MIT Sloan exists to create knowledge with lasting impact and to translate those cutting-edge management ideas into global practice. When I meet alumni and friends around the world, and work with our faculty here on campus, I see that commitment demonstrated every day.

One of the ways in which the School is addressing the world’s most pressing problems, with the rigorous and multidisciplinary approach that characterizes MIT Sloan endeavors, is through a burgeoning initiative dedicated to health care. This Spring 2012 issue of the MIT Sloan Alumni Magazine highlights faculty research, student activity, and industry partnerships in health care, and the ways in which this work is positively impacting a vast, complex, and global field.

Within this health care initiative, MIT and MIT Sloan faculty are conducting significant research, in collaboration with industry leaders from a multitude of sectors, both private and nonprofit, to anticipate solutions for one of the world’s most pressing problems. Health care quality, affordability, and accessibility are issues that affect each of us directly and personally. The School’s commitment to research-based action and impact in the world aligns closely with the MIT mission to work wisely, creatively, and effectively for the betterment of humankind, and with the MIT Sloan mission to develop principled, innovative leaders who improve the world and to generate ideas that advance management practice.

MIT Sloan is uniquely positioned to bring lasting change to U.S. and global health care delivery, with our historic expertise in a number of functional areas, from Entrepreneurship to Systems Dynamics to Operations. As discussed further in this magazine, faculty are building significant relationships with the clinical and administrative staff of world-renowned teaching hospitals in Boston to analyze the quality, efficiency, and incentive structures of patient care. Faculty members are also exploring ways to reshape and streamline health care delivery across the globe. For the MIT Sloan research community, these partnerships represent an avenue to direct impact on organizations whose ideas and practices change, and better, the world.

In the area of curricular innovation, MIT Sloan’s high-touch, customized educational programs are an integral part of this initiative. Global Health Delivery Lab, one of the School’s signature action learning courses, puts students at the front lines of health care delivery in five Sub-Saharan African nations and India. On campus and at project sites, students grapple with the hands-on challenges of health care delivery in resource-constrained settings, using the classroom to research and plan, then reflect on and share their learning with others. These educational programs allow the School to develop creative and experienced leaders who are equipped to understand and tackle the world’s greatest challenges.

The work on health care being done at MIT Sloan and by School community members worldwide is increasingly valuable. With our commitment to sustainable management solutions that stand the test of time, principled and dynamic leadership that solves the world’s problems, and data-driven analysis that generates innovative management knowledge, I believe that our potential for positive impact is unparalleled. The creativity and responsiveness of the School as it grapples with these challenging issues are made possible in part by the generous philanthropic support of MIT Sloan alumni and friends. I hope that as you read, you will find the work highlighted here as captivating as I do, and that you will be reminded of the many important ways that MIT Sloan is in the world, for the world.

Sincerely,

David C. Schmittlein
John C Head III Dean

David Schmittlein
John C Head III Dean

Spring 2012  MIT Sloan 3
Andrea Ippolito, SDM ’11

- Advising U.S. Joint Chiefs of Staff on behavioral health services for servicemen and women, as part of the MIT Lean Advancement Initiative.
- Initiated Boston Scientific’s Communities of Excellence program to encourage collaboration in research and development.
- Serving as co-chair of the 2012 MIT Sloan BioInnovations Conference.

Ippolito believes that when science meets management theory, big problems can be solved.

Last year, Andrea Ippolito was a member of an MIT research team that visited the Pentagon to meet with now-retired Admiral Mike Mullen, then chairman of the Joint Chiefs of Staff.

The MIT team was part of the Institute’s Lean Advancement Initiative, which connects students and researchers with organizations looking for systems thinking to improve efficiency and solve complex problems.

The Pentagon had a complex situation: Its leaders wanted to do a better job of providing behavioral health services to servicemen and women, as well as their families.

“Admiral Mullen charged us with evaluating the current behavioral health system of care and developing recommendations to help the military better manage post-traumatic stress and related conditions,” Ippolito said. “One area that we looked at is how can we better use technology to provide better continuity of care? A huge issue is access to care. Stigma is also an issue.”

Ippolito and the team traveled to military bases to meet military leaders and service members. She also interviewed behavioral health professionals and assessed barriers to quality and timely care to service members overseas and their families back home.

“A lot of times when you tackle these large-scale problems, you talk to the leaders,” she said. “I think where we can gain the most value is in talking to providers and service members at the execution level.”

The team’s final recommendations will likely include some element of telehealth, the idea of providing services remotely by using technology. “Often the problem is there are providers available, just not in that location,” Ippolito said. “It’s leveraging that. Especially with behavioral health, it’s all about talking.”

“This is the MTV confessional generation,” she said. “Talking to a video camera—they’re comfortable with it.” Some servicemen and women said they find it easier to speak with behavioral health providers over video teleconference, because it provides the distance they need to discuss personal issues comfortably.

Ippolito also expects the team’s recommendations will include suggestions to accelerate the military’s credentialing process for behavioral health professionals.

A scientist by training, Ippolito earned a master’s degree in biomedical engineering from Cornell University. She began her career at Boston Scientific, where she worked on early-stage research and development.

Soon after starting at Boston Scientific, she and her manager initiated the company’s Communities of Excellence program, which developed a collaboration network across the company to reduce inefficiencies in research and development.

So in 2009, when Ippolito read an article in The New York Times about MIT and MIT Sloan initiatives to reduce the time and cost required to develop new drugs, she began to think about how her bioengineering background could help her lead efforts to improve health care delivery.

The article led her to MIT Professor Deborah Nightingale who, in turn, led her to MIT’s System Design and Management program. The program, a joint venture of MIT Sloan and MIT’s School of Engineering, prepares students to solve large and complex systems problems. It is, Ippolito paraphrased, “for those who want to lead engineering, not leave engineering.”

She is a manager at Topera Medical, a Boston-area startup developing a system to help identify the electrical source of cardiac arrhythmias. As a problem-solver, a scientist, and a leader, Ippolito believes that when science meets management theory, big problems can be solved.

“This is the MTV confessional generation,” said Ippolito, who was a director of the inaugural MIT $100K ACCELERATE Contest. “We’ve done it with aerospace industries. We’ve done it with everything else. Now let’s bring it to health care.”

Note: SDM refers to their students by entrance date. Andrea will graduate on June 8, 2012.
With knowledge and data, a smarter world will divide work between computers and humans, search engine executive chairman says.

A “global mind” comprising humans and computers offers huge opportunities for informed decision-making, democratization of information, and worldwide problem solving, Google Executive Chairman Eric Schmidt said at MIT Sloan last November.

Schmidt said the rapid accumulation of data will push people to find better ways to solve global problems, with newer and faster technology to back them up.

“The world will organize into things that people are good at and things that computers are good at,” Schmidt said. “Think of them as aids. They’re our best friends, our best help. They know where we’ve been, and they’ll make suggestions for where we go.”

Schmidt said such a human–computer relationship would ultimately be positive for society, except in the case of “robotics and war.” He said fears of computers becoming too powerful or too intelligent are overstated. Instead, he said, people will harness the power of collective information to make better decisions, whether in business, politics, or their personal lives.

Throughout his talk, titled “The Future of the Global Mind,” delivered at Wong Auditorium, Schmidt committed himself to the idea that evolution of and access to technology will benefit humanity.

“Technology is not really about hardware and software anymore,” Schmidt said. “It’s really about the mining and use of this enormous volume of data” in order to “make the world a better place.”

That same accumulation of data can provide technological advancements that once appeared only in science fiction.

For example, cars may one day be able to drive themselves better than a human could, Schmidt said. Google has been testing a self-driving car in Nevada and California, a project that is bolstered by an accumulation of collective information, including significant mapping data.

“To me, what you want to do is find a way to let this play out between the virtual world and the physical world,” he said.

“Ultimately, I think society will get there. It will be messy, but we’ll get there.”

Schmidt pointed to the Arab Spring revolutions as an example of forward movement springing from shared information and access to technology, saying the combination of planning on Facebook, executing through Twitter, and recording events on YouTube created a “user-empowerment model” that led to successful uprisings.

The increasing speed of knowledge sharing may be the most significant technological development since the invention of electricity, Schmidt said. At 2,000 tweets per second and 48 hours of YouTube uploads per minute, the world, he argued, is getting smarter. And the thirst for new information is overwhelming: On a daily basis, 16 percent of Google searches are new search terms, he noted.

“You’re never lonely. You’re never bored,” Schmidt said. “You can know everything.”

Schmidt’s talk marked the fifth anniversary of the MIT Center for Collective Intelligence and was part of the MIT Sloan Dean’s Innovative Leader Series.
The 2011 MIT Sloan Teaching Awards included recognition for Michael M. Koerner (1949) Professor of Entrepreneurship Antoinette Schoar and Professor Nelson P. Repenning, who each received the Jamieson Prize for Excellence in Teaching, funded by Burgess Jamieson, MIT SB ’52, to honor educational innovation and excellence. Assistant Professor Adrien Verdelhan was named the MIT Sloan School Teacher of the Year for 15.401 (Finance Theory I). George Eastman Professor of Management Science Arnold Barnett received the Outstanding Teacher Award for 15.068 (Statistical Consulting).

Assistant Professor Damon Centola’s paper, “The Spread of Behavior in an Online Social Network Experiment,” won two awards from the American Sociological Association, including the 2011 prize for Best Article from the association’s Mathematical Sociology section and the Leo A. Goodman Award for Outstanding Contribution to Sociological Methodology, given by the Methodology section. The paper was published in Science.

W. Maurice Young (1961) Career Development Professor of Management Emilio Castilla won the 2011 prize for Outstanding Publication in Organizational Behavior, awarded by the Organizational Behavior division of the Academy of Management for “The Paradox of Meritocracy in Organizations,” published in Administrative Science Quarterly. Castilla received the award with co-author Stephen Benard, assistant professor at Indiana University Bloomington.

Patrick J. McGovern (1959) Professor of Management Andreas Schulz received the Humboldt Research Award, granted by the Alexander von Humboldt Foundation. The award honors Andreas’ work in discrete optimization, cutting across disciplines that include applied mathematics, theoretical computer science, and operations research.

Senior Associate Dean Alan White received a Lifetime Achievement Award for his service to the International University Consortium for Executive Education. White was cited for hosting the organizational meeting at MIT during which the consortium was founded in 1972. The consortium now includes more than 100 universities around the world.

William F. Pounds Professor in Management Roberto Fernandez won the 2011 Frank E. Perkins Award for Excellence in Graduate Advising. The MIT award is given to a faculty member who, while serving as a graduate student advisor, demonstrates unusually strong compassion and dedication toward students.
MIT Sloan, Harvard, and IBM Watson spar in Jeopardy!

Sports categories and buzzer stymie MIT Sloan

The answer was so easy that a crowd of students in Harvard Business School’s Burden Auditorium erupted in cheers; a few were out of their seats.

“In the movie Cast Away, Wilson is a nonspeaking one of these,” said fill-in Jeopardy! host Todd Alan Crain.

This was the Daily Double question the Harvard team couldn’t miss at the mock game show match last fall that pitted MIT Sloan School of Management students against both Harvard Business School students and Watson, IBM’s artificial intelligence supercomputer. The show was part of a day’s worth of events concerning the employment and economic implications of continuous advances in computing.

Watson, under development since 2006 by a team of more than 20, is best known for its defeat last year of Jeopardy! champions Ken Jennings and Brad Rutter.

The question, by the way, was “What is a volleyball?” and the Harvard team nailed it, driving its score to $22,400 and pulling ahead of the supercomputer.

The MIT Sloan team lagged behind, and Watson would eventually overtake Harvard for the win. Final scores for the match were $53,601 for Watson, $42,399 for Harvard, and $100 for MIT Sloan.

“We happen to be really bad at sports,” said R.J. Andrews, MBA ’13, one of the three MIT Sloan students selected to compete against Harvard and Watson. “And there were at least two sports categories.”

A big early loss for the MIT Sloan team was a Daily Double, in which the team incorrectly guessed Dennis Rodman as the winner of the first NBA Sportsmanship Award. (The correct answer was Joe Dumars.)

The team did grab a hometown sports question, associating Manny Ramirez with the 2004 World Series-winning Boston Red Sox. And they took the last question of Double Jeopardy! by asking “What are Obama’s Llamas?” for the clue “Barack’s ambient pack animals.”

But the MIT Sloan team dropped Final Jeopardy! while the Harvard team answered correctly without wagering enough to beat Watson, which also answered correctly. The clue, in “Americana,” was: “Finding the spot for this memorial caused its creator to say, ‘America will march along that skyline.’ ” The correct response was: “What is Mount Rushmore?” The MIT team guessed that it was a Wright Brothers memorial.

The loss was tough, but understandable. Though MIT missed a few key answers, the team suffered mostly from the race to hit their buzzer. Andrews and company did not have as many opportunities to score as Watson and Harvard did.

“It depends on the buzzer,” Gautham Iyer, MBA ’12, said before the competition. “It totally depends on that buzzer.”

The Jeopardy! match was the capstone to the Race Against the Machine Symposium, held the same day at the MIT Media Lab.

The symposium featured a keynote talk from IBM Fellow David Ferrucci, Watson’s principal investigator. Panel discussions considered where technology will go in the coming decades and how it will affect employment.

The symposium and Jeopardy! match were both companion pieces to mark the release of Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy, a new book by MIT Sloan’s Erik Brynjolfsson, the Schussel Family Professor of Management Science, and Andrew McAfee, a principal research scientist at MIT Sloan’s Center for Digital Business.
Martin (1958) Trust Center for MIT Entrepreneurship dedicated

Newly named and redesigned center to foster entrepreneurship at the School and around the world

Last fall, MIT celebrated the dedication of the Martin (1958) Trust Center for MIT Entrepreneurship, which provides students and faculty across the Institute with programs and space to transform their ideas into new business ventures. The Martin Trust Center, which is located in the Muckley Building (E40), is named for Martin Trust, SM ’58, an entrepreneur, business leader, and philanthropist.

The Trust Family Foundation donated $10 million in support of construction costs and ongoing programming at the center. These programs include: expanded classes on entrepreneurship to reach broader MIT audiences, platforms for student experimentation, opportunities and networking exposure, as well as projects designed to drive entrepreneurship in greater Cambridge and around the world.

“Invention, innovation, and entrepreneurship are the oxygen of a thriving economy,” said MIT President Susan Hockfield. “By making possible this marvelous new space, Martin Trust and his family are opening new doors of possibility and growth for MIT’s aspiring entrepreneurs. The Martin Trust Center for MIT Entrepreneurship will give them the skills and confidence to launch, lead, and scale up the new enterprises our economy urgently needs.”

Martin Trust, a visionary entrepreneur, is the founder and president of Brandot International, an investment firm that focuses on joint-venture partnerships with apparel and textile companies. He started his first business, Mast Industries, in 1970 with a modest $1,000. In 1978, his company—a contract manufacturer, importer, and distributor of clothing—merged with The Limited Stores, now Limited Brands. Trust has served as an advisor to both the U.S. Department of Commerce and the Trade Advisory Committee on Africa. He is a board member of Virtusa, the information technology services company, and a past board member of Staples.

“MIT is rich in people who have ideas and who are willing to take the risk of starting a business,” Trust said. “My hope is that the center becomes a beacon for those young people, and a place where students can learn from others who have done entrepreneurial work and have been successful at taking an idea and turning it into a business.”

David Schmittlein, John C Head III Dean, called the new Martin Trust Center “the heart and home of entrepreneurship” at the Institute.

“The Martin Trust Center gives us the people, the programs, and the place where our alumni, faculty, and students can invent the future,” Schmittlein said.

The Martin Trust Center supports all five schools at MIT. The center’s activities and services bridge academic disciplines, and its programs are available to entrepreneurs across the Institute, including undergraduate and graduate students and faculty.

The structure of the Martin Trust Center encourages creativity, collaboration, and the sharing of skills and ideas. Many interior walls are made of glass, allowing students to see what is going on around them. Hallways and conference rooms are coated with IdeaPaint, allowing people to write and sketch on them as if they were dry erase boards. There are a large number of partitioned spaces and work areas with easily moveable furniture that can be reconfigured for impromptu brainstorming sessions.

MIT students start companies at a prolific rate. According to a study conducted by Edward Roberts, David Sarnoff Professor of Management of Technology and founder and chair of the Martin Trust Center, there are 25,600 companies in existence founded by living MIT alumni that employ about 3.3 million people worldwide. Those companies generate annual revenues of $2 trillion, producing the equivalent of the 11th-largest economy in the world.

“That’s an accomplishment that 20 years of our entrepreneurship programs at MIT have very strongly helped to encourage,” Roberts said. “Now we have a new beginning in the Martin Trust Center. It poses a new challenge: What do we do for encores? I believe the future holds the possibility of dramatic increases of what we have accomplished thus far.”
OCP in Morocco:  
The MIT Sloan Network in action

**JULIE CHANG, MBA '02**, a principal at environmental consulting firm Ecology and Environment (E & E), saw the strength and the impact of the MIT Sloan network in 2010 when she began a project helping Moroccan mining company OCP evaluate clean technologies for its operations.

The first network connection was OCP CEO Mostafa Terrab, MIT SM '82, MIT PhD '90. In addition to Chang, the E & E consulting team also included Ed Nevis, a former MIT Sloan faculty member and director of the MIT Program for Senior Executives, who passed away in 2011.

As the project progressed, connections between the company and MIT Sloan deepened. In the fall of 2010, Nevis arranged for Taha Balafrej, OCP’s director of Sustainable Development, to tour the MIT campus through the Industrial Liaison Program. During the tour, Balafrej met Jason Jay, PhD '10, a lecturer at MIT Sloan who coordinates the Sloan Sustainability Research Group.

Within months, OCP began partnering with MIT Sloan, including participating in the MIT Sloan Sustainability Internship program; sponsoring MIT Sloan’s 2011 Sustainability Summit; and participating in the Leading Sustainable Systems (L-Lab), where MIT Sloan students helped investigate ways of supporting sustainable economic development in the areas around OCP’s operations. The 2012 MIT L-Lab utilized systems thinking to help OCP’s Sustainability department analyze where and in what manner the company can intervene and promote economic and social development.

Now, with OCP slated to participate in the Sustainable Business Lab (S-Lab) in 2012, and potentially work to support research at MIT on topics such as sustainable societies, the relationship between the company and MIT Sloan is poised to flourish. It is exactly the kind of ever-evolving partnership that MIT Sloan is known for, said Chang. “We are inclusive,” she said. “We want to open doors—we want to make connections.”

If you have an interesting story of how the MIT Sloan alumni network benefited you, email editor@sloan.mit.edu and share it with us.
Unrestricted giving to the MIT Sloan Annual Fund supports:

• **Student conferences**, including the MIT Sloan BioInnovations Conference (p. 4)

• **Campus visits from industry leaders**, including the Dean’s Innovative Leader Series (p. 5)

• **Alumni gatherings and activities**, like Sloan Stories and Alumni Weekend (p. 9)

• **Programs connecting students and alumni**, such as the MIT Sloan Leadership Lab (p. 9)

• **MIT Sloan centers**, including seed funding for the Center for Management of Engineering and Healthcare Systems (p. 20)

... and much more.

Join these alumni leaders by giving to the MIT Sloan Annual Fund:

Give online: [http://giving.mit.edu/sloangift](http://giving.mit.edu/sloangift)
Thank you for supporting the MIT Sloan Annual Fund!
how can we implement a “race with machines” strategy? The solution is organizational innovation: co-inventing new organizational structures, processes, and business models that leverage ever-advancing technology and human skills. Joseph Schumpeter, the economist, described this as a process of “creative destruction” and gave entrepreneurs the central role in the development and propagation of the necessary innovations. Entrepreneurs reap rich rewards because what they do, when they do it well, is both incredibly valuable and far too rare.

To put it another way, the stagnation of medium wages and polarization of job growth is an opportunity for creative entrepreneurs. They can develop new business models that combine the swelling numbers of mid-skilled workers with ever-cheaper technology to create value. There has never been a worse time to be competing with machines, but there has never been a better time to be a talented entrepreneur.

Entrepreneurial energy in America’s tech sector drove the most visible reinvention of the economy. Google, Facebook, Apple, and Amazon, among others, have created hundreds of billions of dollars in shareholder value by creating whole new product categories, ecosystems, and even industries. New platforms leverage technology to create marketplaces that address the employment crisis by bringing together machines and human skills in new and unexpected ways:

- eBay and Amazon Marketplace spurred over 600,000 people to earn their livings by dreaming up new, improved, or simply different or cheaper products for a worldwide customer base. The Long Tail of new products offered enormous consumer value and is a rapidly growing segment of the economy.

Since the Industrial Revolution, workers have feared replacement and impoverishment at the hands of machines. But history’s major technological advancements have only led to a frantic uptick in industry that introduced a bevy of new employment opportunities.

Yet a new revolution, powered by computers and networks, is happening so quickly that economies have little time to adjust. The implications for labor and employment are unnerving.

The crisis and a potential remedy are considered in Race Against The Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy, a new digital book by Schussel Family Professor of Management Science Erik Brynjolfsson, PhD ’91, and Andrew McAfee, LFM ’90, SM ’90, MIT SB ’89, MIT SB ’88, principal research scientist at the MIT Center for Digital Business.

Brynjolfsson and McAfee explain the drastic economic consequences of accelerating technology, both in terms of employment and wealth distribution. But the authors are self-described “digital optimists.” They believe humans may not need to race against the machines. Instead, they write, we should learn to race with the machines. In this excerpt, they argue that technological advancements present exciting new opportunities for innovation and entrepreneurship. All in the name of humankind.

New digital businesses are often recombinations, or mash-ups, of previous ones. For example, a student in one of our classes at MIT created a simple Facebook application for sharing photos. Although he had little formal training in programming, he created a robust and professional-looking app in a few days using standard tools. Within a year he had over one million users. This was possible because his innovation leveraged the Facebook user base, which in turn leveraged the broader World Wide Web, which in turn leveraged the Internet protocols, which in turn leveraged the cheap computers of Moore’s Law and many other innovations. He could not have created value for his million users without the existence of these prior innovations. Because the process of innovation often relies heavily on the combining and recombining of previous innovations, the broader and deeper the pool of accessible ideas and individuals, the more opportunities there are for innovation.

We are in no danger of running out of new combinations to try. Even if technology froze today, we have more possible ways of configuring the different applications, machines, tasks, and distribution channels to create new processes and products than we could ever exhaust.

Here’s a simple proof: Suppose the people in a small company write down their work tasks—one task per card. If there were only 52 tasks in the company, as many as in a standard deck of cards, then there would be 52! different ways to arrange these tasks. Combinatorial explosion is one of the few mathematical functions that outgrows an exponential trend. And that means that combinatorial innovation is the best way for human ingenuity to stay in the race with Moore’s Law.

Most of the combinations may be no better than what we already have, but some surely will be, and a few will be “home runs” that are vast improvements. The trick is finding the ones that make a positive difference. Parallel experimentation by millions of entrepreneurs is the best and fastest way to do that. As Thomas Edison once said when trying to find the right combination of materials for a working lightbulb: “I have not failed. I’ve just found 10,000 ways that won’t work.” Multiply that by 10 million entrepreneurs and you can begin to see the scale of the economy’s innovation potential. Most of this potential remains untapped.

As technology makes it possible for more people to start enterprises on a national or even global scale, more people will be in the position to earn superstar compensation. While winner-take-all economics can lead to vastly disproportionate rewards to the top performer in each market, the key is that there is no automatic ceiling to the number of different markets that can be created. In principle, tens of millions of people could each be a leading performer—even a top expert—in tens of millions of distinct, value-creating fields. Think of them as micro-experts for macro-markets. Technology scholar Thomas Malone, Patrick J. McGovern (1959) Professor of Management at MIT Sloan, calls this the age of hyperspecialization. Digital technologies make it possible to scale that expertise so that we all benefit from those talents and creativity.

• Apple’s App Store and Google’s Android Marketplace make it easy for people with ideas for mobile applications to create and distribute them.
• Threadless lets people create and sell designs for T-shirts.
• Amazon’s Mechanical Turk makes it easy to find cheap labor to do a breathtaking array of simple, well-defined tasks.
• Kickstarter flips this model on its head and helps designers and creative artists find sponsors for their projects.
• Heartland Robotics provides cheap robots-in-a-box that make it possible for small businesses to quickly set up their own highly automated factory, dramatically reducing the costs and increasing the flexibility of manufacturing.

Collectively, these new businesses directly create millions of new jobs. Some of them also create platforms for thousands of other entrepreneurs. None of them may ever create billion-dollar businesses themselves, but collectively they can do more to create jobs and wealth than even the most successful single venture.

As the great theoretist of markets Friedrich Hayek noted, some of the most valuable knowledge in an economy is dispersed among individuals.

It is the knowledge of the particular circumstances of time and place.... To know of and put to use a machine not fully employed, or somebody’s skill which could be better utilized, or to be aware of a surplus stock which can be drawn upon during an interruption of supplies, is socially quite as useful as the knowledge of better alternative techniques. And the shipper who earns his living from using otherwise empty or half-filled journeys of tramp-steamers, or the estate agent whose whole knowledge is almost exclusively of temporary opportunities, or the arbitrageur who gains from local differences of commodity prices, are all performing eminently useful functions based on special knowledge of circumstances of the fleeting moment not known to others.

Fortunately, digital technologies create enormous opportunities for individuals to use their unique and dispersed knowledge for the benefit of the whole economy. As a result, technology enables more and more opportunities for what Google chief economist Hal Varian, MIT SB ’69, calls “micromultinationals”—businesses with fewer than a dozen employees that sell to customers worldwide and often draw on worldwide supplier and partner networks. While the archetypal 20th-century multinational was one of a small number of mega-firms with huge fixed costs and thousands of employees, the coming century will give birth to thousands of small multinationals with low fixed costs and a small number of employees each. Both models can conceivably employ similar numbers of people overall, but the latter one is likely to be more flexible.

But are there enough opportunities for all these entrepreneurs? Are we running out of innovations?

When businesses are based on bits instead of atoms, then each new product adds to the set of building blocks available to the next entrepreneur instead of depleting the stock of ideas the way minerals or farmlands are depleted in the physical world. New digital businesses are often recombinations, or mash-ups, of previous ones. For example, a student in one of our classes at MIT created a simple Facebook application for sharing photos. Although he had little formal training in programming, he created...
More than 20 faculty members and their students at MIT Sloan seek to improve the ways we care about ourselves as individuals and one another, as we rethink our society’s health care systems.

Here are five examples of real-world engagement and a commitment to solving the world’s most complex problem—health care.

- A much-needed new vaccine arrives in a developing nation.
- Elsewhere on the same continent, groups of MIT Sloan students work the front lines of health care delivery.
- At home in the United States, two professors seek a better, fairer way to distribute the nation’s finite supply of kidneys available for transplant.
- In Florida, another professor asks if spending more on emergency care results in better care.
- And in Boston, across the Longfellow Bridge from Kendall Square, doctors team with MIT Sloan faculty and students to reduce waits for surgery in one of the nation’s premier hospitals.
In the waits that surround surgery, a relief

Waiting at the hospital is bad enough. Waiting for surgery—and after surgery—is a taxing experience with the potential for medical consequences, and a familiar one for many Americans.

But at Massachusetts General Hospital (MGH), those waits are getting shorter, thanks to a strategic partnership between the hospital and MIT Sloan.

In November of last year, surgery units at MGH implemented a new scheduling system that loosened the bottlenecks of patients waiting to enter surgery, in the operating theater after surgery, and in the important Post-Anesthetic Care Unit, where patients are closely monitored immediately after leaving the operating theater.

Since implementation, MGH has halved the number of patients facing long waits to enter surgery. And the hospital has freed up about 4 percent of beds reserved for post-surgery patients—all without new resources or a reduction in caseload.

“As much as 4 percent sounds like a very modest impact, it boils down to the science of queuing systems,” said Retsef Levi, the J. Spencer Standish (1945) Professor of Management. “If the system is highly utilized—as it is at MGH—even a small difference can have a significant positive impact on how long patients are waiting.”

Prior to the changes, the scheduling process for surgery at MGH was rife with inefficiency—and mirrored a problem experienced by hospitals across the country.

Collaborating with Levi and a team of MIT students from the Leaders for Global Operations (LGO) program, as well as post-doctoral fellows, MGH designed two improvements to scheduling.

In the past, the scheduling of elective surgeries resulted in unbalanced bed occupancy levels, peaking in the middle of the week and causing longer waits for both non-elective surgeries and patients waiting for a hospital bed after surgery.

So the group used integer programming to improve efficiency in the hospital’s block scheduling system for operating rooms (OR), smoothing the bed census over the week and reducing occupancy by 4 percent.

The team also reserved some operating room blocks as “open” and allowed central OR administration to determine when non-elective surgeries would be scheduled. That made better use of operating rooms and reduced by half the number of patients with unreasonable waits to enter surgery.

“We found that with a modest number of open blocks, we could reduce the patient waitlist substantially,” Levi said. “We already see a major decrease. The average wait for urgent cases went down by a whole hour.”

But the new schedule threw off surgeons’ long-established work schedules, meaning that change required buy-in from hospital leadership and support from surgeons.

“This was a burning platform that resonated with every single one of our surgeons,” said Dr. Peter F. Dunn, executive medical director of Perioperative Services at MGH. “They struggle to get their patients into the OR in a timely manner. The end product with this system is a positive result for surgeons and our patients.”

“More than 40 percent of surgeons changed their schedules, which is unheard of,” Levi said.

Unlike routine consulting to implement known best practices, MIT Sloan’s work with MGH is seeking innovative solutions to problems experienced by hospitals across the United States. Levi also worked with the hospital to improve wait times in its Pre-Admission Testing Area, where patients receive comprehensive exams before surgery. That work—completed with Kelsey McCarty, MBA ’10; Leo Espindle, LGO ’11; Andres Garro, LGO ’11; Devon Price, LGO ’11; and Jérémie Gallien of London Business School—was summarized in a teaching case and won the New Case Writer award from the European Case Clearing House.

Levi and Dunn, along with MGH President Peter L. Slavin, MD, have presented the results of the scheduling improvements at the Association of American Medical Colleges and the Institute of Medicine.

“What we hope to do,” said Dunn, “is take our lessons learned and help apply them in those institutions that don’t have what we have afforded to us.”

—Zach Church
In the past four years, MIT Sloan’s Global Health Delivery Lab (ghdLAB) has covered a good deal of ground—tens of thousands of miles, in fact.

With some 40 projects completed on African and Indian soil, and another set of student teams overseas in March 2012, MIT Sloan Senior Lecturer Anjali Sastry said ghdLAB has embarked on an interesting look at its impact so far. The goal? To assess the benefits, including performance improvements and lessons learned, gained by partnering organizations that have worked with students on the front lines of health care delivery—from Kenya to South Africa to India.

MIT Sloan’s rich experience with action learning inspired Sastry to design ghdLAB in 2008. The current study could help fill a void in the research on action learning in management education.

“We are going back to every project to ask how we helped. Did we impose any costs? Are we seeing benefits spilling over to other areas? What about continuity? Are people building on the work that we did?” said Sastry. “We’re gathering firsthand data and conducting systematic interviews. Early indications reveal more positive effects than we had realized.”

“Across the United States and globally, business schools are engaging in more project-based action learning, but we need to better document what makes it effective,” said Sastry. “I think that we can align seeking to deliver the most effective help to our partners with delivering the best learning experience for our students. When ghdLAB students bring to bear the best of their MIT Sloan toolkit to tackle problems collaboratively, I think our contributions can go beyond volunteering. Our study will help us to say, ‘Here’s where we made an impact.’”

As is the case with other action learning courses at MIT Sloan that combine classroom learning with an intensive on-site experience, ghdLAB is much coveted—80 students recently applied for 36 seats. What sets ghdLAB apart is its focus on the challenges of health care delivery in developing nations. Student teams tackle the barriers and constraints facing both for-profit and non-profit enterprises in increasing scale, scope, and quality of care.

Projects have taken on process improvement, business model innovation, marketing, and strategic planning in varied settings. Recently, student teams worked with a Kenyan slum clinic to increase utilization of its health care services, an HIV-prevention initiative in South Africa to build a research function within their monitoring and evaluation department, and a community nursing outreach program in India to improve pre- and post-natal care in the community.

“With ghdLAB, the issues are thrown into sharp focus because needs are so extreme,” said Sastry. “Low-resource settings offer us an opportunity to work with different models and to explore important questions, such as: How can you do more with less? Can for-profit business provide social goods for the lowest-income populations? How do we share what we have learned? And how can the right management tools and approaches be brought to the front lines of health care?”

“People have argued that we need a field of health care delivery studies that investigates needed innovations, explores sustainability and scale, and looks at the entire patient experience,” said Sastry, who discusses this idea and presents student experiences in a video collection on TechTV (start with http://techtv.mit.edu/videos/14635-ghdlab-in-the-world-for-the-world).

“Health care delivery poses challenges that every country is confronting,” Sastry emphasizes.

“These are global issues. By working in different settings, not only do students get amazing learning experiences, but we also get a chance to return to the classroom to distill, share, and contrast our learning,” said Sastry. “And, as our impact assessment is revealing, when we focus on how to learn from experience and deliver practical improvements, benefits extend far beyond the project—for both students and partners.”

—Mary Tamer
It is a sad and cynical assumption to consider: There is no guaranteed material benefit to developing and manufacturing drugs and vaccines for the third world.

But a new economic model developed by—among others—Professor Ernst Berndt, the Louis E. Sley Professor in Applied Economics, intends to provide that guarantee.

The Advanced Market Commitment (AMC) model seeks to speed the development of drugs and vaccines for the third world by using philanthropic dollars and a guaranteed price to stoke production. If drug manufacturers are guaranteed a worthwhile price through donor funding, Berndt believes they will pursue the development and manufacturing capacity expansion of critical drugs.

A pilot program is under way with pneumococcal vaccines, which fight infections that kill more than 800,000 children under the age of five every year. More than 80 percent of those deaths occur in countries eligible for assistance from the AMC pilot, according to an article Berndt and colleagues published in *Health Affairs* last year.

“‘It’s highly prevalent,’” Berndt said. “A lot of kids die from it in the third world.”

The model works like this: A consortium of donors (in this case, five donor countries—Italy, the United Kingdom, Canada, the Russian Federation, Norway—and the Bill and Melinda Gates Foundation) fronts enough funds to allow a project administrator (the GAVI Alliance working with the World Bank) to offer drug companies a set price to develop a finite amount of a new vaccine or drug. Under the model, the first units delivered command a higher price, offering a greater reward for initial manufacturing and a marginal cost for later sales.

The donated funds cover upfront development and additional manufacturing capacity costs, enabling third-world countries to pay a predetermined marginal drug cost from the start.

This advance commitment model has taken hold. In December 2011, Pfizer and GlaxoSmithKline each announced its commitment to supply up to a total of 480 million doses of pneumococcal vaccines Prevnar-13 and Synflorix through 2023, building on their original March 2010 commitment to supply up to 300 million doses under GAVI. In late 2011, GAVI announced it would be introducing the pneumococcal vaccines into an additional 18 countries, bringing the total number of countries supported through the AMC to 37.

“What we hope we can do in several years is to quantify the reduction in infant mortality,” Berndt said. “And how much did we spend? So we know cost per life saved. We are already beginning to evaluate how much more rapidly the diffusion of the vaccine to developing country markets is, as compared with a traditional R&D model.”

The pilot was launched in 2009 and will last until at least 2023. But Berndt has determined a few early lessons. The AMC model requires a sustained donor commitment to GAVI to support early R&D, he said.

Some level of trust is also required. The model creates a legally binding promise that the program administrator will pay a certain price for drugs or vaccines—so long as the demand exists. Drug manufacturers are taking a risk on that demand appearing.

“Industry has to take some risk here,” Berndt said. “One of our goals was to ensure that the risks industry takes are similar to those they take under first-world drug market conditions.”

But even with some risk and some uncertainty, Berndt is optimistic the model can bring affordable drugs to market in the third world more quickly than in the past.

“I think we’ll know a lot more in the coming year,” he said. “As far as I can tell, it’s the first collaboration of its kind. The potential payoff is so great. Industry can play a vital role. Mutually beneficial transactions are possible.”

—Zach Church
When it pays to spend on health care

When someone is rushed to an emergency room with heart problems, does it matter how much money the hospital spends on that patient?

It may seem logical that high-end medical care would lead to better results for patients. But economists and policy specialists have debated the question extensively, and uncovering a clear answer has proven difficult.

Now an innovative study by Joseph Doyle, Alfred Henry (1929) and Jean Morrison Hayes Career Development Professor, shows that hospitals that spend more money to treat people who enter their emergency rooms are indeed successful in lowering the mortality rates of those patients.

“More intensive and expensive treatment leads to better outcomes,” said Doyle, whose study examined tens of thousands of cases in which out-of-state visitors were admitted to emergency rooms in the state of Florida over a span of several years.

Among other findings, Doyle discovered that an increase of about $4,000 per patient in hospital expenditures led to a 1.4 percent decrease in the mortality rate. The results were published in American Economic Journal: Applied Economics.

Uncertainty over the effectiveness of medical spending stems, in large part, from the fact that health care providers in some regions of the United States spend considerably more on their patients than providers in other regions do, yet some studies have shown that patients in higher-spending areas do not necessarily have a lower mortality rate than those in lower-spending areas.

But other economists have found data suggesting that additional spending does make a difference; hospitals that spend more money while producing similar outcomes may simply be dealing with sicker patients.

Doyle studied the problem by looking at emergency room visits of people visiting Florida, an approach that reduces the impact of local patient variation on medical spending.

The study examined nearly 37,000 hospitalizations from 1996 to 2003. Doyle analyzed patient data by ZIP code, age, and even seasonality of visit to ensure he was studying demographically similar tourists being treated throughout Florida.

Florida has significant “variation in how areas treat patients after heart attacks,” Doyle said. “Florida looks like a microcosm of the U.S., with high-spending and low-spending areas. And the per-capita income of an area is not correlated very well with [hospital] spending.” In Fort Lauderdale, for example, hospitals spend 30 percent more on heart patients than they do in nearby affluent West Palm Beach.

Therefore, the variation in results that Doyle found does not stem from the prior health of patients, but from the level of care itself. Specifically, the greater expenses—and benefits—in heart treatment seem to come from a broader application of intensive care unit (ICU) tools and having more medical personnel on hand.

“The higher-spending hospitals use more ICU services, and they have higher staff-to-patient ratios, so they use more labor,” Doyle said. “And that’s expensive.”

Overall, a 50 percent increase in what Doyle calls a hospital’s “spending intensity” allows it to reduce mortality rates due to heart problems to about 26 percent below the mean. He said that identifying the precise medical technologies that provide the greatest additional benefit per dollar spent remains a work in progress—and will require ongoing analysis as new technologies are introduced.

“There are smart ways to spend money and ineffective ways to spend money,” he said. “And we’re still trying to figure out which are which, as much as possible.”

—Peter Dizikes, MIT News

For a look at health care from the perspective of former chairman and CEO of Aetna, Ronald A Williams, SF ’84, see page 28.
ewer than 20,000 kidneys are available for transplant in the United States each year, yet more than 80,000 people are waiting for a kidney transplant.

A new method for determining who receives a transplant, developed by MIT Sloan faculty and a former student, can increase the years of life gained by recipients by 8 to 10 percent. And it does so without undermining the fairness criterion that is a central part of the kidney allocation process.

Developed by Dimitris Bertsimas, the Boeing Leaders for Global Operations Professor of Management; Vivek Farias, the Robert N. Noyce Career Development Professor; and Nikolaos Trichakis, PhD ’11, the method focuses on the desired outcome—a fair distribution of transplants based on age, race, blood type, illness, and other factors. It also creates a formula for allocation that best matches that outcome while maximizing efficiency.

Until now, selecting who receives a kidney has been determined by a scoring rule that prioritized patients based on their time on dialysis. That rule worked, but was not efficient. A proposed new scoring rule focuses on achieving a fair and equitable distribution of kidneys. Using their method, however, the professors set out to find an equation that not only resulted in the same fair distribution of kidneys achieved by the proposed new rule, but also maximized the number of extra years lived by recipients.

It worked, with an 8 percent bump in life years. In real terms, that’s about 2,000 extra years of life distributed among recipients.

What is considered “fair” is, of course, subject to periodic reevaluation. But the beauty of the new method, the professors said, is that it can be easily adjusted to the changing definitions of fairness. The federal committee tasked with determining who goes where on the kidney waitlist could come up with any desired result—directing more transplants to teenagers or diabetics, for example—and the tool would almost instantly determine the best new scoring rule to start with.

“Let’s say in the future there are new requirements, new ethical regulations,” Bertsimas said. “Our system is built to accommodate these ideas.”

“Our aspiration is that the system, because of its flexibility and because it is outcome driven, will become the key tool to design and evaluate future kidney allocation proposals,” he said.

Any proposed allocation scheme requires that potential kidney recipients are ranked based on a number of factors, such as wait time, transplant-ready matches, patients with extensive pain, age, and prior donors. On the other side of the equation, kidneys must be distributed in a fair manner relative to race, age, blood type, and other factors.

Working backward, the professors’ method uses recipient and waitlist data to determine the allocation rule that gives the greatest outcome in life years, while matching the fairness requirements agreed upon by the federal Kidney Transplantation Committee.

“There is no methodology, prior to our work, that maximizes the outcome while fulfilling fairness requirements,” Bertsimas said.

And it’s fast. No more hit or miss, testing rules one by one to find the best fit. The desired answer comes first, and the method determines the best rule to get there.

“What we’ve done is take that entire process and reduce it to a number of hours,” Farias said.

While still a proposal, there is some likelihood that the method will be put into use. Farias recently joined the scientific advisory committee of the Scientific Registry of Transplant Recipients, the non-profit group charged with managing the kidney waitlist. As medical realities rapidly change, the need for a flexible tool to fairly and efficiently allocate donor kidneys becomes only more urgent.

“In the arsenal of policymakers,” Farias said, “it is a powerful tool.”

—Zach Church
Health care in the United States is—and here’s an understatement—a complex challenge.

A fractured network of providers, insurers, government entities, and vendors of medical drugs, equipment, and technology operates with little collaboration or systems-level coordination. This often leads to spiraling costs, poor care, and bureaucratic tangles.

Retsef Levi, the J. Spencer Standish (1945) Professor of Management, thinks there is a better way. At MIT Sloan, he is forming the Center for Management of Engineering and Healthcare Systems.

Why does this center need to exist?

“If you look at health care costs in the U.S. over the last 50 years you see, with few exceptions, that costs increase. Last year, they amounted to over 17 percent of GDP. That’s over $2.9 trillion annually. And compared to other developed countries, the U.S. is not ahead of the curve. It is estimated that every year 100,000 people die in hospitals in the U.S. from avoidable medical errors, and that at least 30 percent of spending on health care is waste due to overuse, underuse, and misuse of resources.

“Two approaches to ‘fix’ the health care industry have emerged over the years, a market incentive approach that views the problem as simply an incentive problem driven by the current payment schemes used in the health care industry, and a ‘lean approach’ that views the problem as simply a process re-engineering problem.

“What is missing is the recognition that the challenge of fixing the health care industry is, in essence, a complex management problem. Delivery problem of health care delivery organizations, and not enough attention has been spent considering the capabilities these institutions need to develop to deliver more cost-efficient, higher-quality care. This is where the MIT Sloan approach comes from. We will focus on the organizations and systems that deliver care, and we want to develop a multidisciplinary approach to study them and then propose different ways and develop new analytical tools to structure them and operate them. This includes finances, HR policies, analytical tools, operations and system design, and so forth.

“This is where I think that the center will bring a new message that does not replace, but rather complements, other approaches.”

What partnerships do you expect to develop for this collaboration?

“MIT Sloan has long-term partnerships with many academic medical centers in the Boston area, including some of the most prestigious hospitals in the world. These partnerships have already resulted in large-scale implementations with tangible results. We also have connections with drug and biomedical companies, as well as insurers and payers.

“Direct collaboration with health care providers and other players is critical. They will have to transform their missions and the way they do business. We will see more distributed networks of institutions that will manage the health of specified populations in a proactive way. In addition, they will need new and different types of employees, and will need to educate existing employees on new business models. In both cases, I think MIT—and MIT Sloan in particular—can help in a fundamental way.

“We are envisioning a new model of funded research. Unlike traditional models in which external organizations provide financial support to fund the research work of faculty and students, we will build collaborative teams that engage different players in the industry—hospitals and health care delivery systems, insurance companies, pharmaceutical and biomedical companies, patients—to create new frameworks and tools that could be applied immediately in the field.

“There are over 20 faculty members at MIT Sloan working on health care-related research, and more across the Institute. And they span all the academic groups at the School. The opportunities for strategic collaborations are enormous.”
MIT Sloan Reunion ’12
Time to register! June 7–10

MIT Sloan welcomes alumni from all graduate programs back to campus for Reunion 2012.

Activities include:
• Class-specific gatherings and events
• Back to the Classroom sessions with MIT Sloan faculty
• Alumni-developed workshops
• Family-friendly activities

Register online at: http://mitsloan.mit.edu/alumni/reunion.php

Registration closes on May 31.

Participate in your class gift: https://giving.mit.edu/sloangift

We look forward to seeing you in Cambridge!
Retirement means different things for different people, and for Christopher McLeod, SM ’79, stepping away from six years as president and CEO of 454 Life Sciences will hardly close the door on a fascinating career.

“When you are head of the organization in the way I approach it, it is an all-consuming passion,” said McLeod, whose relationship with the company began with its founding more than 11 years ago. “I want to be able to step back and invest and advise earlier-stage companies. It’s time to share my advice, but not necessarily be the one on the firing line. I’ve always been most excited with the early-stage companies, and I like to take a concept and turn it into a business.”

Focused on “high-throughput DNA sequencing,” the work of 454 Life Sciences has simplified the process of reading genetic code, paving the way for medical and pharmaceutical breakthroughs. In addition, the technology has led to more than 1,000 peer-reviewed research publications in several areas of study, including drug development, cancer and infectious diseases, immunogenetics, environmental ecology, and agriculture, to name a few.

As McLeod explained, the rapid decline in the cost of defining the sequence of DNA comes with its own challenges, as the generation of genetic information is currently outpacing the ability to analyze it.

“So the question is, how do we analyze this data and turn it into practical applications?” said McLeod. “That’s where the data management challenges are, to take this information and use it to understand, for example, why do only some people respond to certain drugs? Understanding what in the genetic code of a person contributes to their disease can lead to personalized health care.”

McLeod uses the example of the Roche-developed Zelboraf, a drug “working miracles” for people with malignant melanoma, which claimed the life of his father at the age of 60. By using genetic markers traced to one specific gene, Zelboraf, which was approved by the U.S. Food and Drug Administration in August 2011, has seen a high success rate for patients harboring this deadly form of skin cancer.

“That is why it is so motivational to be here and see the impact of the work you are doing on people,” said McLeod. “Inexpensive DNA sequencing and other new biotechnologies are leading to tremendous discoveries in the life sciences. I look forward to working with other innovators on ways to apply this knowledge in many different areas.”
Although Ronald A. Williams retired from Aetna after a successful nine-year run—as president beginning in 2002, as chairman and CEO from 2006 to 2010, and as chairman from 2010 to 2011—he is quick to add that he has not “retired from life.”

“There’s great confusion about that,” said Williams with a laugh. “I retired from Aetna … but I am actively involved in the business community in a variety of ways. I serve on the boards of American Express, Boeing, and Johnson & Johnson, and I’m also working with a private equity firm, Clayton, Dubilier & Rice, as an operating advisor to them. I also chair a company called Emergency Medical Services Corporation, a staffing outsourcing business that places physicians in emergency rooms, anesthesiologists in operating rooms, and there’s another division that makes them the largest provider of emergency transportation in the country.”

Williams arrived at Aetna, one of the nation’s leading providers of health care-based insurance and employee benefits, in 2001 at a time of financial challenge. The company had just realized a loss of $365 million, and a period of corporate diagnosis was needed to determine how to fix the problems. Chief among them? Aetna was compiling data, but was not effectively using it to diagnose and then treat the issues identified as impacting business.

“We had to begin using IT as a competitive strategy,” said Williams. “We spent a great deal of time and effort doing that, and it served the company very well. It paved the way for the company to be an industry leader and to operate in today’s world, and the minute we began to get the data we began to understand what we needed to do. It probably took us about two years to break out of our old patterns and, in my last full year, Aetna earned $1.6 billion.”

Williams has also been focused on health care reform, writing numerous pieces for The Wall Street Journal, The Washington Post, the Financial Times, and others.

“The health care system has some very substantial challenges, one of which was we did not have a way for all of our citizens to get access to health care, with the exception of Massachusetts,” said Williams. “But beyond access, we have to address the fundamental issue of affordability of health care services. I tried to focus the debate on the need to reform the broader health care system … but I think we missed an opportunity to have a more meaningful impact by addressing the quality of health care and the affordability of health care. Some of the things I would have suggested, and did suggest, were to really focus on having a public multi-stakeholder dialog on how we reform our health care payment system so it pays for value and outcomes versus level of activity. When we pay for activity, we get activity. I would have focused on the systems much more and on how do we focus systems, and make sure institutions are rewarded for improving health care.”

“It’s all about prevention,” said Williams, “but physicians are paid to treat you after you are sick versus keeping people healthy.”

Last March, Williams was appointed by President Obama to one of 11 spots on the Management Advisory Board, which meets monthly to develop workable strategies for the Senior Executive Service (SES) corps of the federal government.

“I see excellent opportunity and leverage,” said Williams. “It’s all about bringing best practices from the business community in to the government; and while there are a lot of differences, I have been impressed by the people at the senior-most levels who have significant experience in the private sector.”

Ronald A. Williams, SF ’84
Retired Chairman & CEO, Aetna

- During his tenure at Aetna, FORTUNE magazine named the company the most admired in the insurance and managed care industry.
- Appointed in March 2011 to serve on President Obama’s Management Advisory Board.
- Serves on the boards of Save the Children and the National Academy Foundation.

“It’s all about bringing best practices from the business community in to the government.”
When the education reform bill, No Child Left Behind, became law in 2002, it set the stage for data-driven reform in the nation’s 14,000 school districts. Five years earlier, Jonathan D. Harber, MBA ’90, and Denis P. Doyle fortuitously co-founded SchoolNet, Inc., a company focused on helping school systems achieve greater educational outcomes through the myriad uses of data and technology.

Today, SchoolNet, which was acquired by Pearson in April 2011, has its Instructional Improvement System (IIS) software at work in more than one-third of the country’s largest urban districts, collectively educating more than 5 million K–12 students, providing a link between data analysis and reporting, formative assessment, curriculum management, and more. With Harber now at the helm as CEO of Pearson K–12 Technology, he is setting the stage for continued innovations designed to improve teacher effectiveness and student achievement.

“There are different types of assessments for different purposes, and the way we have approached the market is by working with superintendents and school leaders and showing how you can use the data in diagnostic ways to have midcourse corrections to improve achievement,” said Harber. “If you think about the medical field, there is someone at the hospital level looking at how many patients a doctor sees and how well they performed, but what is more important is what kinds of tools the doctor has to diagnose and offer remediation.”

“In the past, before technology, teachers were flying blind,” Harber continued. “There may be 30 kids in a classroom, and you can be confident there is a bell curve and some students know a lesson and some don’t, and some are in the middle, without the teacher actually knowing who is where. The notion of teachers having real-time data on kids, where you can then base lessons on personalized instruction … you essentially get to a world where you are crafting the education to each mastery path.”

Harber’s roots in the collection and dissemination of data date back to his days at MIT Sloan, where he devoted much of his time to the MIT Media Lab, wrote a thesis on education technology, and built a multimedia environment for business school case studies. A founding chair of the MIT Sloan Entrepreneurship Club, Harber’s focus turned to the context of education and global competitiveness, along with domestic civil rights, after starting several successful companies and partnering with SchoolNet co-founder Doyle.

“It seemed like a lot of the work we had been doing prior to SchoolNet was helping the top 10 percent,” said Harber. “We realized that urban school systems needed so much help, and improving these systems was the only way to achieve scale in improvement. If you look at the statistics—one-third of kids are dropping out of high school, and in urban areas it’s 50 percent—your chances of meaningful employment get slimmer and slimmer.”

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“In the past, before technology, teachers were flying blind,” Harber continued. “There may be 30 kids in a classroom, and you can be confident there is a bell curve and some students know a lesson and some don’t, and some are in the middle, without the teacher actually knowing who is where. The notion of teachers having real-time data on kids, where you can then base lessons on personalized instruction … you essentially get to a world where you are crafting the education to each mastery path.”

Harber’s roots in the collection and dissemination of data date back to his days at MIT Sloan, where he devoted much of his time to the MIT Media Lab, wrote a thesis on education technology, and built a multimedia environment for business school case studies. A founding chair of the MIT Sloan Entrepreneurship Club, Harber’s focus turned to the context of education and global competitiveness, along with domestic civil rights, after starting several successful companies and partnering with SchoolNet co-founder Doyle.

“It seemed like a lot of the work we had been doing prior to SchoolNet was helping the top 10 percent,” said Harber. “We realized that urban school systems needed so much help, and improving these systems was the only way to achieve scale in improvement. If you look at the statistics—one-third of kids are dropping out of high school, and in urban areas it’s 50 percent—your chances of meaningful employment get slimmer and slimmer.”

“We realized that urban school systems needed so much help, and improving these systems was the only way to achieve scale in improvement.”

Jonathan D. Harber, MBA ’90
CEO, Pearson K–12 Technology

• Former CEO and co-founder of SchoolNet, Inc.
• Former chairman and co-founder of NewKidCo, the first company to develop children’s educational games on PlayStation® and Nintendo N64.
• Former CEO and co-founder of Diva, publisher of VideoShop multimedia authoring software.

“We realized that urban school systems needed so much help, and improving these systems was the only way to achieve scale in improvement.”

When the education reform bill, No Child Left Behind, became law in 2002, it set the stage for data-driven reform in the nation’s 14,000 school districts. Five years earlier, Jonathan D. Harber, MBA ’90, and Denis P. Doyle fortuitously co-founded SchoolNet, Inc., a company focused on helping school systems achieve greater educational outcomes through the myriad uses of data and technology.

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“We realized that urban school systems needed so much help, and improving these systems was the only way to achieve scale in improvement.”
Elizabeth Golluscio, MBA ’01

Vice President of Marketing, Smartling

- Leads marketing at cloud-based website translation company Smartling; clients include foursquare, IMVU, SurveyMonkey, and Scribd.
- Works with MIT Entrepreneurship Lab teams and MIT alumni/student externship program.
- Married to Elio Narciso, MBA ’01.

“In both my personal and professional circles right now, language is the foundation for growth and opportunity.”

Elizabeth Golluscio’s children are trilingual. They live in Manhattan and speak English. Their father is Italian, and they attend a bilingual private school. They speak Spanish with their babysitter.

This is today’s world: Speaking one language is sufficient, but never seems like enough.

“I feel like everybody I know, if they don’t speak another language, they’re really serious about finding the time to learn another language,” Golluscio said.

But until they do, there’s Smartling, where Golluscio helps clients like foursquare and SurveyMonkey build instant, dynamic translations for their websites and mobile apps.

Golluscio joined Smartling in June after using the service to build a German website at another startup. Frustrated with the old style of website translation—little more than translating content and inserting that copy on a new site—she needed language sites that could keep up with almost daily changes to her English website.

“Sites immediately get out of sync with the English,” Golluscio said. “So this is really about finding a way to insert the translation workflow into a Web 2.0 business model for Web marketing.”

Smartling responds to constant changes in website code, content, and features by providing tools for translators to easily convert new pieces of content. Changes to client websites are automatically detected by Smartling, which updates the translation platform. When a user requests, say, the Spanish version of foursquare, they are redirected to Smartling servers, which matches translated strings to the original English page and sends back a Spanish version.

“We’re very, very quickly hitting the English page and matching it to the stored Spanish translation, and sending it back to that browser,” Golluscio said.

With such linguistic diversity in her life (Golluscio cited the number of international students at MIT Sloan—today about 40 percent—as a reason she chose the School), Golluscio saw the potential for Smartling’s service as users around the world seek access to new web applications.

“In both my personal and professional circles right now, language is the foundation for growth and opportunity,” she said.

Those circles include an MIT Entrepreneurship Lab team working for Smartling, which is composed of students from France, Japan, and Russia.

“The team is superb,” Golluscio said. “I can feel that all of them are really excited about our project. All of them speak, if not fluently, proficiently at least one or two other languages. Smartling just resonates so strongly with them personally.”

The MIT Entrepreneurship Lab is a course that pairs groups of students with startups for targeted business consulting. Golluscio’s team at Smartling is the second with which she has worked. The group will present the results of their project to Smartling’s CEO and board.

“I want them to know their work is going to be valued and recognized at the highest level of the company,” she said.

Golluscio maintains other professional connections with MIT Sloan. She uses the Institute’s student/alumni externship program to hire students for short-term projects. She tapped her MIT Sloan network for initial customer research at Smartling, and she served on her class committee for Alumni Weekend 2011.

“This year was great for me, reconnecting to MIT Sloan in so many ways,” she said.
**IN MEMORIAM**

With deep sadness, the MIT Sloan School of Management reports the recent passing of fellow alumni.

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<td>1975</td>
<td>Ms. Jennifer Koop</td>
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**MIT Sloan was saddened to learn recently of the passing of the following alumni.**

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In 1979, Gustavo Pierini was an accomplished 21-year-old engineering student in Buenos Aires when a local private foundation decided to send him on his first trip to the United States. The monthlong journey included visits to the White House, the United Nations, and several college campuses, including MIT.

“There is no better place for an engineer to study than MIT, and when I saw MIT, I knew I wanted to be there,” said Pierini. “That trip was an amazing experience. It was a turning point in my life … and I knew I wanted to return one day for graduate school.”

But first he distinguished himself as a student in Argentina, graduating at the top of his class and earning the coveted ELMA Prize for his academic achievements. “In all of the stages of my life, I tried to excel,” he said. “In everything I do, I aim to be the first. Sometimes I end up second, but I aim to be the first.” Pierini did return to MIT for graduate school, thanks in no small part to scholarships, aid from a local company, and being named a Fulbright Scholar, all of which helped cover part of his tuition, as the cost was otherwise prohibitive on his $7,200 salary. He and his former wife both worked during their two years in Cambridge to make his matriculation possible, and Pierini remembers well the help he received along the way to pursue his educational dream. Despite the challenge of working while going to school, Pierini was also named as the Henry Ford II Scholar, an award that is granted to a second-year student who shows “unusual academic achievement and professional promise.”

As a result of both his gratitude and a strong sense of social responsibility, Pierini has established a fellowship through a substantial gift that supports multiple graduate students from Argentina and Brazil as they work toward earning degrees at MIT Sloan. In addition, at the dedication of E62 last May, Pierini donated three study rooms to honor members of his family: his children, Carla, Franco, and Giorgia; his mother, Luisa Levin Pierini; and his wife, Valeria Pierini. A fourth study room is named for his thriving company in São Paulo, Brazil, Gradus Management Consultants, which Pierini founded 15 years ago to support the management of large companies through post-merger integrations, organizational redesign, turnaround programs, and logistics and commercial strategy.

“What happened in my life didn’t happen by chance—it was built,” said Pierini, who formerly held positions at Esso Petrolera, McKinsey & Company, and a large private equity firm. “What I do is I work a lot, and the more I work, the luckier I become. In my life I’ve had three jobs and then I started my own shop. We celebrated 15 years on Monday, October 17, 2011. We do our work, and we deliver what we promise.”

Pierini has also delivered on promises made to the organizations that supported his successful journey, including the foundation in Argentina that first sent him to the United States, a trip he now sponsors on an
annual basis. He has also made provisions locally for scholarships, seminars, and even facilities for institutions that have touched his life, as a means of recognizing “what others did for me.”

“I knew I had to start giving back, and that is exactly what I want to do for other people, to make their dreams come true,” said Pierini. “With the fellowship, I am providing one per year for perpetuity, so there is enough funding to allow either one student to be paid for the two years or two students to pay for one year of tuition. I prefer the second option, because today there is a loan market. When I went to study in 1985, that didn’t exist and in the United States it was only for Americans; so what I want to do is exactly what happened for me. I didn’t need 100 percent of my tuition. I needed just a part of it. What I wanted to give was enough money to break the threshold between going to MIT or a second-tier institution.

“I want to give back to the world, and [through the fellowship] I am giving back more, with interest,” he said. “I have to give back more than I received.”

As co-director of MIT Sloan’s MarketLab, Lamees Hamada, MBA ’12, has brought the highest-caliber companies to MIT Sloan—Google, G.E. Energy, Reebok, NPR, and Novartis. And under her direction, MarketLab saw an increase in applications in 2011.

Hamada received an MIT Sloan diversity fellowship in 2010. Funded fellowships are a crucial ingredient in maintaining MIT Sloan’s culture of diverse, talented, and accomplished learners.

Hamada came to MIT Sloan to focus on Healthcare Kaizen marketing. She has proven herself a leader and an innovator at the School. Her presence in the MIT Sloan community has helped shape the School’s future.

Fellowships like the one Hamada received inspire students to achieve beyond what they might have considered possible, she said.

“You feel that someone has invested in you,” she said. “So you want to give back.”

Hamada’s leadership of MarketLab is an example. Her efforts to bring in major companies were an attempt both to attract more students and to strengthen MarketLab. Starting in Fall 2012, MarketLab will be rolled into the curriculum as an action learning component of the School’s new MBA track, Enterprise Management.

As vice president of marketing for the School’s Healthcare Club, she helped bring Chris Viehbacher, CEO of Sanofi, as keynote speaker of the 2012 MIT Sloan BioInnovations Conference.

“When people have been generous with their money, you don’t want to deliver something average,” she said. “You want to exceed their expectations and do something that would be amazing. Everyone wants to see that we have gone above and beyond, and I think that is a huge benefit of fellowships—that it encourages students to do more.”

Experiences like Hamada’s show how important funded fellowships are to the School, said Rod Garcia, senior director of admissions. He encourages alumni to consider contributing.

“We are limited in funds compared to our peer schools,” Garcia said. “The funds that we have are designated to only a few members of the class, and we know from our surveys that one of the major reasons people turn down our offers is because they have bigger fellowship awards at other schools.”

This need grows larger each year as the number of programs at the School continues to increase.

“These awards do make a difference to the people who receive them,” he said. “They do become contributors. They do realize that a part of the reason why they got the fellowship is because we recognize their potential and professional promise—and they do give back in terms of activities and organizing events, taking leadership positions, and making the lives of the students happier and fuller while they are here.”
With leading alumni, a global community

MIT Sloan is a school of real-world engagement, an agent of global impact. That’s significant ground to cover, but thankfully the School has a worldwide network of distinguished and connected alumni.

Dean David Schmittlein created the MIT Sloan Executive Boards to help guide the School’s programming and engagement around the world. The board members represent some of the MIT Sloan community’s best qualities: knowledge, collaboration, and the cultivation of global partnerships.

MIT Sloan Alumni Magazine spoke with four of these leaders about their engagement with and support of the School.

**MARCELO LARRAGUIBEL, SM ’89**
Partner, Virtus Partners
Latin American Executive Board

“The dean invited me to be part of this board, and I reconnected in that way, even though I have done a lot of recruiting at MIT as a consultant. I also proposed to the School that we develop a CEO summit to discuss the key topics discussed among leaders in Chile. We invited the top 35 CEOs and company owners in the country. It’s great that the School is connecting much more with emerging markets. I think that the Dean’s idea to connect with all of these countries on the board is a great way to make connections, not only bringing people to study at MIT, but also connecting with the leaders here.”

**MARY PUMA, SM ’81**
Chairman and CEO, Axcelis Technologies, Inc.
North American Executive Board

“MIT Sloan provided me with a great career foundation. Getting involved and giving back in terms of time—on the executive board and my reunion committee—and money—with both the annual fund and capital campaigns—is very rewarding. My husband, Eivind Lange, SM ’81, and I give to allow the School to grow and flourish. We have a lot of confidence in Dean Schmittlein and his team and their ability to take the School to new heights. The students coming out of MIT Sloan are the business leaders of tomorrow. We want them to have the best academic opportunities possible.”

**PAUL YANG, MIT SM ’92**
President and CEO, China Development Financial Holding Corporation
Asian Executive Board

“For me professionally, as my company continues to grow in this region, we need talent, and I think MIT Sloan is a great source of that talent. My being able to participate in forming ideas and opinions that will lead to decisions made by the School—especially in regard to this region—will make sure students coming out of the MIT-China Management Education Project will be ready and proficient to capture the opportunities that are developing in Asia. That’s part of being in the MIT family at large.”

**EMMANUEL MACEDA, SM ’89**
Chairman, Asia-Pacific, Bain & Company
North American Executive Board

“On the executive board, I get to spend time with people who have a passion for MIT Sloan. We feel like we can make a difference, and appreciate the opportunity to provide advice, guidance, or even just reactions to the School’s agenda. My firm is one of the top hirers of MIT Sloan graduates, so this is also a way to invest in a very important strategic partner. I’ve given to both the annual fund and the capital campaign. This is an institution that took me in, developed my skills, and helped me achieve my professional goals. It’s a reasonable—and should be an expected—norm that we give back to the places that nurtured us.”

MIT Sloan Alumni Magazine
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MIT Sloan faculty tackle the problems of an ailing system