Billions of Prices

Working with one professor, STS enables colossal collection of prices worldwide

By Amy MacMillan

It’s been called the “most ambitious data collection project at MIT,” and Sloan Economics Professor Roberto Rigobon is at the helm.

In the “Billion Prices Project,” Roberto is collecting prices on every product from nearly every retail sector. Roberto and his team are downloading and archiving 400,000 records from 40 countries including everything from food and furniture to detergent and electronics from the web daily. And, they will not stop there. The goal is to collect prices from every country in the world – and the aim is to get 40 million prices a day.

This information will be validated, analyzed, and then disseminated (once the information is five years old) so economists can gauge inflation rates, examine pricing trends, and dissect issues such as price behavior and “stickiness.”

Roberto and a former MIT Sloan student, Alberto Cavallo, MBA '05, began the project two years ago, when Alberto discovered a way to download and organize price data from public web pages. He downloaded a description of the item, the price, and information about whether it was on sale or not. Alberto asked Roberto for advice when he noticed that one country – Argentina – was not truthful about its actual inflation rate. According to Roberto, the government had manipulated the statistics and reported a much lower inflation rate to the public. Alberto told Roberto, “Why don’t we just create an index for Argentina?” After they downloaded information from a couple of the supermarkets in Argentina, they created a web page (www.inflacionverdadera.com) to track the results.

After that success, the pair collected prices from other countries including Chile and Brazil. “It started escalating,” Roberto remembered. The thousands of daily prices were downloaded on to personal computers, but soon Roberto’s own machine was overloaded and he purchased an additional computer just to check his e-mail.

Continued on page 2
As their needs escalated, Roberto approached Anita Horn, System Analyst in Sloan Technology Services, and asked for 10 more computers for his project. Anita told him, “Roberto, there might be a better way to do this.” Anita put the professor in contact with Mark Riedesel, Associate Director, Infrastructure, Operations, and Security and Chay Casso, SB ’00, Windows Server Administrator in STS.

After Roberto described the project to Mark and Chay, they decided it was ideal for using VMware software, which makes server virtualization possible. VMware allows one larger computer to run what appear to be several different servers on the same piece of hardware. Instead of a “one server, one application” model, the software can run multiple virtual machines at once, enabling a project such as Roberto’s to run smoothly without using up too much hardware and space, thereby saving an enormous amount of money.

Roberto’s project is hosted on three secure Dell servers – each with 16 gigabytes of memory – located at the central MIT Information & Services Technology (IS&T) facility in W91. The servers host 19 separate virtual machines to do the web scraping, or the downloading of prices from websites. “So, instead of buying 19 separate machines, we were able to buy three machines, and it looks like we are running 19 different machines,” Mark explained.

As Chay recalled, “When Roberto came to us, he said he expected to be collecting an enormous amount of data over the next few years. So we wanted to set up a structure which could easily be extended as his needs grow over time… as it’s currently set up, we could host about 60 (virtual) machines.” And, if necessary, additional pieces of hardware can be added in the future. A team of 10 undergraduate students from various local universities are assisting Roberto in doing the programming and web scraping. Chay devised a central database so that all of the data is in one place and is easily accessible to Roberto.

Roberto, who is extremely enthusiastic about the project, said Chay and Mark “significantly changed the scope of the project…from an economics point of view, I would have been happy with four countries. Four countries is enough to write a paper…but now it has become a process in which we are getting daily prices from 60 retailers in 40 countries. They figured out how to scale this project to infinity. What they did is incredible.”

Infinity may be a slight exaggeration, but Roberto aims to download 60 percent of the items consumed in every country. The only prices he cannot collect are health services, education, utilities, and financial services. “There are some services that collecting the daily information from will not improve our understanding of how the markets work,” he explained.

For the moment, Roberto has randomly chosen the countries based on what languages his student colleagues speak. “The local web pages are written in local languages, so I need local speakers. If I have an R.A. from Turkey, and he speaks Turkish, I tell him, ‘You connect to Turkey.’” Other countries he’s connecting to include Romania, Zimbabwe, United States, and China.

According to Roberto, no one has ever done a project of this scope before. Researchers have often taken one item – such as coffee – and downloaded and analyzed the pricing data for six months. He continued, “In the past, researchers had monthly data, but not daily data. What we are doing is taking every item from every country from every supermarket and retailer that we can…H&M, Ann Taylor, Wal-Mart, Costco, Amazon…name the retailer and I probably have it.”

Once the data has been collected, the research possibilities for economists...
Continued from page 2

are endless. “I have several questions that I think are very interesting,” Roberto said. Green products are a hot topic right now, and by using this data, he may be able to compute a premium that different countries are willing to pay for green products. “We all talk about ‘green,’ but ‘green’ is expensive. How much are you willing to give up for ‘green’? No one knows the answer. We have a sense that Northern Europe is ‘greener’ than Southern Europe. We think we know…but I want to compute that. I’m going to construct an index for ‘green,’ and that to me, is an amazingly exciting project.”

He’s currently in the mode of finding money for the project, and has applied to the National Science Foundation (NSF) for a grant. “MIT support for this has been infinite, and [Dean Schmittlein] has been very supportive,” he said.

Roberto also had to consult with a legal team because although he’s downloading public information, many retailers are hesitant to provide such detailed, comparative pricing information, because it could competitively hurt them. As a compromise, Roberto has sworn to retailers that he’s merely collecting the data for research purposes, and has promised not to publicly release the data for at least five years. As an additional precaution, the students working on the project with him do not have access to all of the pricing data. He wants to avoid a situation where retailers attempt to exclude his IP address from connecting to their websites. “There are ways around that,” he explained. “But the best way is to tell them up front.”

Mark and Chay have been impressed with how Roberto has taken advantage of the new software technology. “It’s good to see our work being used to generate research that we can see. A lot of the work we do is abstract. Sometimes, it’s difficult to see results in real time, so this has been wonderful,” Chay said.

Roberto – who teaches four sections of Applied Macro and International Economics – estimated that he spends about eight hours a day on the Billion Prices Project, and he has no intention of ever stopping. “I’m going to retire [doing this project]. I’m finishing up all of my other projects and not starting anything else. I think this is so valuable.”

Mark Riedesel (l) and Chay Casso of STS
Bob McDonald, COO of Procter & Gamble

**Procter & Gamble’s COO to Discuss “Values-Based Leadership” Tomorrow**

On Tuesday, March 3 at 12:00 p.m. in Wong Auditorium, the MIT Sloan community will welcome Bob McDonald, Chief Operating Officer at Procter & Gamble, to speak on “Values-Based Leadership” as part of the Dean’s Innovative Leader Series. Lunch will be available beginning at 11:30 a.m. in Ting Foyer, and as usual, we ask that people arrive early if possible to have time to eat before the presentation begins at noon.

Bob McDonald has been described as an “inspirational leader” and is known for his ability to energize organizations and drive business results by taking a personal interest in the development and success of the people he leads. As Chief Operating Officer of The Procter & Gamble Company, the world’s #1 maker of household products, he oversees all global operations and corporate functions including on-the-ground operations in more than 80 countries. With the executive officers for Global Operations, Human Resources, R&D, Product Supply, External Relations, Information Technology, Marketing, Strategic Planning, and Customer Business Development all reporting to him, he’s helping to make sure that the company’s “values are not just hollow words displayed on the wall or posted on the website, but are actually lived out every day.”

Bob entered the United States Military Academy at West Point in 1971, finishing 13th in his class and then went on to serve as an Army captain in the 82nd Airborne. “At West Point I learned that the character of a leader is their most important attribute. Character is putting the needs of the organization above your own,” he says. “Living up to this ideal of character requires courage, determination, integrity, and self-discipline. You must live by your word and actions, and know that is the most powerful demonstration of leadership.” In 1980 Bob joined consumer products giant Procter & Gamble in the U.S. marketing division and began working his way up the corporate ladder. He spent two decades rising through P&G’s Laundry & Cleaning Products division and was named President-Northeast Asia in 1999. In 2004, he returned to the states after 14 years abroad, and was appointed Vice Chairman, Global Operations. Bob assumed his current role as Chief Operating Officer in July 2007.

In 2007, Bob’s efforts were recognized with the inaugural Leadership Excellence Award from the Stockdale Center for Ethical Leadership at the U.S. Naval Academy and *Harvard Business Review*. The award recognizes top executives of U.S.-based companies who consistently exemplify a commitment to personal integrity, business success, and fellow employees.

“Everyone I have ever met wants to succeed,” says McDonald. “A leader’s job is to catch people succeeding and help them build on that success.” Fundamental to this passion to the growth of individuals is his belief that everyone should “choose the harder right instead of the easier wrong.”

Please join us tomorrow, March 3 as this principled, innovative leader shares his perspective on “values-based leadership.”

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**Quote of the Week**

“It is better to be prepared for an opportunity and not have one than to have an opportunity and not be prepared.”

—Whitney M. Young, Jr.
Faculty Honored

Paul Osterman’s new book, “The Truth About Middle Managers,” received a very thoughtful and positive review in the *Wall Street Journal* last week.

First LGBT C-Function to be Held

The first LGBT C-Function will be held this Thursday night. Walker Memorial will be lit up and ready to celebrate with live performances, food, and a DJ playing your favorite anthems.

Win one of two free airline tickets to the Caribbean or anywhere in North America, just by attending. (Compliments of American Airlines)

Save the date – Thursday March 5, Walker Memorial. Make sure you wear your disco ball button around campus to show your support!

MIT’s Campus as a Learning Laboratory – Get Plugged In

*By Jason Jay, MIT Sloan PhD Candidate*

We do not have to look too hard around MIT’s campus to see that it provides a microcosm of the global challenges of energy, environment, and sustainability. We spend $61.8 million per year for energy from fossil fuels. This, in combination with official air travel and campus transportation and commuting, brings our greenhouse gas emissions to around 286,000 metric tons of CO₂ equivalent every year. We are among the top 10 emitters in Cambridge, and among the biggest university emitters – with all of their campuses, Harvard only totals 192,000 MT CO₂e. We have an aging stock of buildings and infrastructure, with an estimated $1 billion of deferred maintenance, much of which has implications for energy and water efficiency of our operations. We use 404 million gallons of water, and produce 336 million gallons of sewage annually. Our dining systems, relying heavily on food trucks and take-out restaurants, produce excessive amounts of packaging that help contribute to the 14 million pounds of trash we produce every year. We do not have clear standards or commitments to green purchasing, such as for sustainably produced food or recycled content of paper.

All of this resource use does have a purpose – it supports world class education in our classrooms, life in our community, and ground breaking research in our laboratories and centers. Furthermore, thanks to the MIT Energy Initiative and the emerging MIT Environment Initiative, an increasing amount of these Institute activities are going to solve the global
challenges. We are inventing new approaches for solar electricity generation, biofuel catalysis, waste water treatment, and global sensing networks to detect environmental change, energy policy, and management techniques for sustainability. MIT is positioned to provide leadership at a global level through our technical expertise.

There are, however, critical opportunities for leadership being missed. All too often, students’ engagement with these global problems comes in the form of problem sets, papers, and theses that collect dust on our hard drives, or prototypes that sit in a closet once the course is done. How often do we actually put our ideas into practice, in a tangible, visible way? How often do we get to flex not just our technical muscles, but our capacity for collaboration, persuasion, and leadership to make real change? Working on campus energy, environment, and sustainability problems provides an opportunity to do just that.

Over the past several years, we have seen an explosion in student engagement in greening MIT. A group of undergraduates developed MIT Biodiesel, a system to convert waste oil from dining services into fuel for campus vehicles, on MIT and our peer campuses in Boston. Closing the Loop has carried out the basic research on behavior change opportunities on campus that is now providing the backbone of the new Greening MIT community campaign. A group of masters students created a course for themselves in which they articulated a transportation plan for MIT, which was the foundation for the new Mobility Pass program. The Dorm Electricity Competition, now in its third year, has produced as much as 30 percent reduction in electricity use in undergraduate dorms. Groups working on thermoelectric devices and solar powered air conditioning systems are using campus buildings as a testing ground for cutting edge technology.

These efforts have three things in common. First, they help develop the leadership capacities of our students, whether from the sciences, engineering, policy, management, or humanities. If we want our policy and technological innovations to have global impact, we have to learn how to promote organizational and systemic change. Second, these efforts help our campus be a microcosm of global solutions, not just global problems, giving MIT the “walk the talk” integrity it takes to be a player in policy discussions around the world.

Perhaps most importantly, campus projects provide tremendous satisfaction and learning for the students involved, who get to blur the lines between the formal and informal curriculum of MIT. We spend our time on the p-sets and the papers, presentations and all the busy work. What happens to these assignments? Where do they go after the class presentation?

Fortunately, there is a growing infrastructure to support exactly this kind of work. Each year, the MIT Generator events – a Generator in the early fall, a Re-Generator in the early spring, and an Eco-Expo in late spring – provide pitch sessions for students to gather around exciting ideas and move them forward. These events are organized by a coalition of student groups (Energy Club, Sustainability@MIT, and a variety of working groups) and administrative staff from Facilities, EHS, and MITEI. The coalition helps students match their interests with project-based courses, independent studies, self-created courses, and other mechanisms for credit. Alongside the Generator, The MITEI Campus Energy Project Grants provide materials funding, while the Campus Sustainability UROP (CS-UROP) program provides credit or wages for undergrads. The website where you can contribute ideas or link up with projects outside of the events is located at: http://sustainability.mit.edu/generator.

Right now you’re sitting on that exercise bike called class, spinning your wheels. It’s good training – but you’re not going anywhere. Realize that the same work you’re putting in can be training, but also accomplish something else, something extra.

You can say that your education prepares you to make changes out in the world. We say, why wait? Start changing your world today, here on campus. Pick whatever slogan you want, paint your project green, paint it khaki – just find a way to make your work matter.
LFM Team is One of Two Finalists in X PRIZE Video Competition

By Lois Slavin LFM-SDM Communications Director

Although they didn’t win top honors, a team of students from MIT’s Leaders for Manufacturing (LFM) Program was one of two finalists in the X PRIZE Foundation’s “What’s Your Crazy Green Idea?” video competition on YouTube. First place was awarded to a team of UC Irvine students.

Sponsored by Prize Capital, the competition invited the public to develop and post a two-minute video describing a concept for a potential X PRIZE in Energy and Environment. Over 130 videos were received and more than 4,200 people voted for the winner.

LFM 2010 students Mike Norelli, Jeremy Stewart, and Jonathan Dreher, produced a video entitled “Energy X PRIZE: Reduce Home Energy Usage.” It was created in conjunction with ESD.932 “X PRIZE Workshop: Grand Challenges in Energy,” taught by Dr. Erika Wagner, within the new LFM energy and sustainability track that offers LFM students a new engineering major in this arena.

“The MIT proposal for modifying behaviors, rather than technologies, showed a deep understanding of the market forces acting in the energy sector,” said Dr. Wagner. “Mike, Jon, and Jeremy took a real systems approach to our energy challenges and demonstrated that technology is not the only way to reduce demand.”

Following the recent award ceremony, the LFM team participated in a roundtable “think tank” discussion via teleconference. They and the other teams discussed their contest ideas and potential solutions to the current energy crisis.

All finalists’ “Crazy Green Ideas” video competition will be considered for the next X PRIZE in Energy and the Environment. “Our team feels very strongly about the need to inspire Americans to reduce their household energy consumption, and we believe that a prize is a great first step in achieving this goal,” said LFM ’10 Jeremy Stewart.

Dr. Wagner concurred. “Congratulations to Mike, Jon, and Jeremy for a stellar performance. Their behavioral prize proposal was a creative approach to taking a bite out of the energy crisis.”
Snowriders Graduate Community Ski Day to Waterville Valley

Join Snowriders for their weekly bus trip to a New England mountain to ski, snowboard, or to learn. This last Graduate Community Day will be to Waterville Valley. It is a smaller mountain with cheaper rates and great discounts, and is great for families and beginners. The first 54 graduate students will receive a $25 subsidy on any package. For details and to sign up visit: http://snowriders.mit.edu.

This event takes place Saturday, March 7, from 5:00 a.m.–9:00 p.m., and buses depart from the Sidney Pacific dorm. Open to the MIT community only and cost varies $15-100.

For more information contact: Snowriders Officers, sr-officers@mit.edu.

Milk (2008)

Academy Award winner Sean Penn takes the title role in Gus Van Sant’s biopic tracing the last eight years in the life of Harvey Milk, the ill-fated politician and gay activist whose life changed history, and whose courage still inspires people. When Milk was elected to the San Francisco Board of Supervisors in 1977, he made history for being the first openly gay man in American history to be voted into public office. But the rights of homosexuals weren’t Milk’s primary concern, as tellingly evidenced by the wide array of political coalitions he formed over the course of his tragically brief career. He fought for everyone from union workers to senior citizens, a true hero of human rights who possessed nothing but compassion for his fellow man. The story begins in New York City, where a 40-year-old Milk ponders what steps he can take to make his life more meaningful.

Eventually, Milk makes the decision to relocate to the West Coast, where he and his lover, Scott Smith (James Franco), found a small business in the heart of a working-class neighborhood. Empowered by his love for the Castro neighborhood and the success of his business, Castro Camera, Milk somewhat unexpectedly begins to emerge as an outspoken agent for change. With a growing support system that includes both Scott and a like-minded young activist named Cleve Jones (Emile Hirsch), the charismatic Milk decides to take a fateful leap into politics, eventually developing a reputation as a leader who isn’t afraid to follow up his words with actions. In short order, he is elected supervisor for the newly zoned District 5, though this seeming triumph is in fact the catalyst for a tragedy that starts to unfold as Milk does his best to forge a political partnership with Dan White (Josh Brolin), another newly elected supervisor. Over time it becomes apparent that Milk and White’s political agendas are directly at odds, a revelation that puts their personal destinies on a catastrophic collision course.

Showing on March 6, at 7:00 and 10:00 p.m. in 26-100 and again on March 8, at 7:00 p.m. in 26-100.

From the Lecture Series Committee website. All movies are just $4.
Did You Know...

That Kim Cowperthwaite, MBA Admissions Administrative Assistant, once owned a coffee shop in Maine?

Kim and his father, Kevin, opened the shop in Portland in 1997 when Kim was a senior at the University of Southern Maine. The idea ignited when the elder Cowperthwaite, who was selling espresso machines at the time, had a fully-functioning machine with the wrong color fixtures on it, so he said to Kim, “Do you want to open a coffee shop?” Kim agreed, and left school to join his dad in this full-time endeavor.

Within a few short months, the two opened KoKo’s on busy Congress Street, the city’s main drag. The tiny café had just eight seats and sold only coffee, cappuccino, espresso, and tea, and not much else. “We tried several other things…but mostly everyone just wanted coffee,” Kim remembered. “It was very much a hang-out,” Kim added.

The shop attracted a diverse crowd – from the students at the Maine College of Art down the street to the elderly who lived in the independent living facility across the way. KoKo’s sold only coffee grown and roasted in Maine.

Kim’s father had some previous business and restaurant experience, but the whole endeavor was brand new to Kim, who had majored in history with a minor in education. His real education was 15-hour days, seven days a week, working alongside his father – who he saw cast in a new light as a business partner, and not just a parent. “I learned a lot about my dad’s communication style and his business ethics,” he said.

KoKo’s was more than just a coffee shop. Kim brought in local bands, and opened the shop to free disco dancing or swing dancing on Friday nights. “We’d just clear out the furniture and put the music on,” he said. One of his local customers – an existential puppeteer – hosted puppet shows based on the works of Dostoyevsky. The art school students generously donated their artwork to hang on the walls. “I learned a lot about building a customer base,” Kim said.

One of Kim’s biggest lessons was in pricing. “I knew I wanted to be competitive in pricing, but we picked prices vaguely based on cost and realized within the first year that we had not done the numbers correctly. They were a little low,” he said.

Unfortuately, after just two short years in business, Starbucks announced plans to open a store just 400 feet away from KoKo’s. Facing the Starbucks behemoth, Kim had to make a decision. “Do I really want to continue to do this, which was fun, but it was 15 hours a day, seven days a week, or do I want to work 40 hours a week?” He and his dad dissolved their business, and Kim went to work for Starbucks as a shift supervisor. He moved up into management, and was assigned to a Starbucks in Brookline, which prompted his move to the Boston area. He then worked for a Newbury Street restaurant, but once he turned 30, didn’t want to wait tables anymore.

Kim then obtained a funeral service degree from the New England Institute at Mt. Ida College in Newton. Following his two-year apprenticeship at a funeral home, Kim was offered a full-time position in the industry, but it was far outside of Boston, so he declined. Instead, he accepted a temporary position at MIT, and landed here full-time at MIT Sloan, where he said his past experience as a barista, coffee shop owner, and mortician perfectly mesh in his high-profile role at the MBA Admissions front desk. “Everything is always about customer service. What everybody needs, is just to be acknowledged in a friendly way,” he said.

—Amy MacMillan
Dialing Green

The U.S. Environmental Protection Agency (EPA) is making it easier than ever to unload your old cell phone in good conscience. The EPA has recently stepped up efforts to publicize recycling cell phones because only 10 percent of the phones are recycled each year, and many people do not know where to take them.

The EPA's Plug-In to eCycling program has joined forces with several major cell phone makers, service providers, and retailers in a national campaign encouraging Americans to recycle old cell phones, chargers, and PDAs. Recycling cell phones reduces greenhouse gas emissions and keeps valuable materials such as metals and plastics out of the landfills and incinerators. According to the EPA, recycling one million cell phones reduces greenhouse gas emissions equal to taking 33 cars off the roads for a year.

For more information on where you can recycle your old phone visit the EPA website at: http://www.epa.gov/epawaste/partnerships/plugin/cellphone/cell-recycling-locations.htm.

This week: CISR and the Leadership Center

Name: Tracy Purinton
Department, title: Associate Director, MIT Leadership Center
Office location: E60-176
I last worked at: I have spent the last nine years working in various roles in MIT’s Division of Student Life (DSL), most recently as the Special Assistant to the Dean for Student Leadership Development.
The last book I read was: “Water for Elephants” by Sara Gruen
Starbucks or Dunkin’ Donuts? No question, Starbucks.
Red Sox, Patriots, Celtics, or Bruins? Or another favorite team: I’m a Red Sox fan first and foremost. I keep up-to-date on the Pats, but only really tune in when and if it starts to get exciting.
When I’m not at work, I like to: I love to be outside and used to do a lot of hiking, canoeing, and camping. Most of my free time now is spent with my partner (Jayme) and our 3 children (Owen, 5 and Grace and Luke, 3). I still get outside as much as I can with our 7-year-old chocolate Labrador retriever.

Name: Anne Quaadgras (Anna)
Department, title: CISR, Research Scientist
Office location: NE25-779
I last worked at: Boston University getting a doctorate
The last book I read was: “The Devil’s Horn”
Starbucks or Dunkin’ Donuts? Starbucks. Especially the hot chocolate.
Red Sox, Patriots, Celtics, or Bruins? Or another favorite team: Red Sox.
When I’m not at work, I like to: Make music, laugh, spend time with friends, and play taxi for my two teen daughters (so at least I know where they are….)

—Sarah Foote