Ruth Walker
News Office Correspondent

Can MIT help engineer a break with history in Jerusalem?

The steering committee of Jerusalem 2050, a joint initiative of MIT’s Center for International Studies (CIS) and the Department of Urban Studies and Planning, hopes that the answer is yes.

To that end, the committee has just launched a design competition called “Just Jerusalem: Visions for a Place of Peace.”

The name of the competition turns on its head the conventional one—daily life in the city—perhaps we could imagine a better way.”

The light-bulb moment for Richard J. Samuels, Ford International Professor of Political Science and director of CIS, introduced the competition as an effort to “start thinking new thoughts” about Jerusalem.

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MIT announces 2007-2008 tuition; financial aid to increase almost 12 percent

MIT has set tuition and fees for 2007-2008 and has budgeted an additional $7 million for financial aid enhancements, bringing its total undergraduate financial aid budget to $68 million, President Susan Hockfield announced.

“The world needs the kind of leaders and thinkers who graduate from MIT. By finding innovative ways to enhance our strong, entirely need-based financial aid program, we are ensuring that an MIT undergraduate education is affordable to all of our admitted students, without regard to their economic circumstances,” Hockfield said.

Tuition and fees for the upcoming academic year will increase 4.1 percent to $34,986, while undergraduate financial aid will increase 11.7 percent.

Daniel Hastings, dean for undergraduate education, noted that the Institute has steadily increased financial aid over the past eight years. “Our commitment to making MIT affordable for all who qualify for admission has been unyielding. This year, as in seven previous years, MIT has increased funds available for financial aid by a factor greater than the increase in tuition. The result: The net price an average student or family pays for an undergraduate MIT education has actually dropped,” Hastings said.

Overall, the average MIT scholarship is more than $39,000, supported by endowed funds, gifts from alumni and general Institute funds. Sixty-four percent of undergraduates qualify for need-based financial aid. In 2006-2007, 23 percent of undergraduates pay no tuition, thanks to the Institute’s financial aid program, Hockfield noted.

A new program beginning in the 2007-2008 academic year will further amplify MIT’s financial aid portfolio. Beginning next year, MIT will guarantee funding for a paid research opportunity through the Institute’s Undergraduate Research Opportunities Program (UROP) for all upperclassmen who receive financial aid. About 85 percent of MIT undergraduates participate in UROP over the course of their studies at the Institute.

One of the earliest programs of its kind in the United States, MIT’s UROP invites undergraduates to participate in research as the junior colleagues of Institute faculty. The UROP program has given generations of undergraduates their first hands-on experiences with research and has opened the doors to ongoing relationships with faculty, Hastings noted.

The new UROP funding will help students who are interested in term-time work to earn money by doing research as junior members of MIT’s faculty. “MIT is taking its undergraduate financial aid program to a new level through coherent, guaranteed financial aid awards such as these,” Hastings said.

In December, Hockfield announced MIT’s intention to launch a major fundraising effort to support undergraduate and graduate education and student life. Over the next five years, MIT plans to raise significant funds to support undergraduate scholarships, graduate fellowships, initiatives growing out of the report of the Task Force on the Undergraduate Educational Commons and programmatic and capital investments in student life.

MIT took a leadership role in the national debate on financial aid just one year ago, when it became the first private university to announce a Pell Grant match program to ensure the accessibility and affordability for all qualified students.

Fourteen percent of MIT undergraduates receive Pell Grants, which usually are awarded to students from families earning less than $40,000 a year. Since 2006, it has been possible for Pell Grant recipients to graduate from MIT with little or no debt.
Panel explores links among faith, academia and aid in the developing world

Stephanie Schorah
News Office Correspondent

A forum on the links between faith and development in the Third World became a frank discussion on whether MIT students and faculty could—or should—link their faith to their careers as scientists and educators.

Students and others attending “Faith, Academia and the Developing World: Finding Linkages,” held Saturday as part of the March 1-3 Veritas Forum at MIT, pressed the three presenters for answers on topics like the meaning of altruism, how to balance belief with science and even if aspects of MIT life were “evil.” Others wondered if those who seek to help the poor should use their status as MIT professionals to press for policy change.

The free-wheeling discussion presented presenters Troy Van Vleck, associate chemistry professor; Annette Kim, assistant professor in the Department of Urban Studies and Planning; and Elliot Hui, a postdoctoral fellow in the Harvard/MIT Division of Health Sciences and Technology, who had hoped for an informal exchange. All three also talked about their own motivations for choosing about the religious faith that informs their career choices.

“God has a special concern for the poor and oppressed,” said Hui. Van Vleck, whose research focuses on electronic dynamics, but who also volunteers with Habitat for Humanity and other organizations, “If God cares about that, I care about that.”

Kim said that development research should not disregard faith issues, noting that religion may be a factor in why some development programs succeed and others fail.

“A community’s beliefs are ‘key to their economic action,’” she said.

Hui, who got his B.S. in physics and electrical engineering at MIT and his Ph.D. in electrical engineering at the University of California at Berkeley, said he chose to forego research that focused on military applications to conduct public service. He also sees a special role for research in avoiding health problems of wealthy nations inflicted on poor regions.

“Suddenly it’s really cool to do work in the developing world,” he said. Maybe, he admitted, his own choice might prove to be premature, but he sees a changing tide that moved his career in a more social direction.

“I think it’s something you actually have to look for,” he said.

One audience member had a more direct question: “Do you think there are fields of study that are at odds with your beliefs?”

“I asked these questions as an undergraduate,” Kim said. “I think the answer is: ‘It depends.’” She suggested looking at the overall “system” to see if an area is more a moral acceptable choice. In school it’s normal to study a particular field, Van Vleck said; the question is whether once in the field, you feel you are “swimming against the stream.”

The presenters were asked if they acted out of a sense of guilt over their well-off lives. “There’s no way to work in development and have guilt continuing to be your motivation,” Kim noted. Asked: “What is your definition of altruism and is it possible?,” Van Vleck said his definition was “doing something of absolutely no benefit to you at all.”

For many in the audience, the question was not whether MIT had an obligation to help develop nations, but how to help.

“It is important for people in the developed countries to actually have contact with the people they think they are helping,” Hui said. “Instead of just thinking of technology, they have an in-depth knowledge of what’s happening in those countries.”

That knowledge should include, the presenters insisted, a sense of the spiritual—as well as material—needs of a community.

The Veritas Forum at MIT, veritas.org, seeks to explore the practical connections among science, faith and technology. Other forums explored theological issues raised by the Human Genome project and by intelligent robots, whether science and Christianity were at odds and questions of truth-telling in the business world.

Corporation accepts 41 faculty promotions

Robbin Chapman, diversity recruiting manager, foresees sustainable inclusiveness for MIT

Robbin Chapman (Ph.D. 2000) has joined the School of Architecture and Planning as manager of diversity recruiting, the first person ever to hold that position in the School of Architecture and Planning.

In announcing Chapman’s appointment in February, Dean Adèle Santos said, “We have an aggressive set of goals to accomplish in this area and will need the assistance of all members of the school to work toward that goal. I couldn’t be more pleased to have someone of Robbin’s caliber to lead this initiative, to help meet our goals and to make enhancements to the solid foundation that many of you have worked so hard to build.”

Q: What is your goal as manager of diversity recruiting?
A: Yes, Adèle wants to be clear that this effort is being supported at the highest level of the school. The School of Architecture and Planning is really serious about increasing diversity in the school, and it’s about more than just counting heads. We could just bring in higher numbers of people, that’s not necessarily going to translate into people staying, people being satisfied, people doing well. You want to be sure you’re connecting with people and talking about their entire lives here.

Q: How did your educational path prepare you for this role?
A: All of the time I’ve been at MIT I’ve been working with students, helping with peer counseling, listening skills, conflict resolution, stuff like that. And I’ve also been doing a lot of work around diversity recruitment, separate from my graduate work.

Q: What kind of training have you directed?
A: I have taught listening skills, how to talk diplomatically with students from varying backgrounds, in a way that’s inclusive of everyone. Also, I have taught skills about how to teach people when they have differing ways of thinking and learning.

Q: That sounds like it relates to your dissertation work.
A: It does. I was interested in the different ways that people learn and how to design an existing framework of learning called constructionism. Seymour Papert is the founder of that framework. It’s based on the idea that people learn best when building in or creating something that is then made public: so others can see it.

Q: And how does your education build on that work?
A: A critical role I have played was as a community builder. I’m trying to serve in a similar role here. I don’t want the faculty in here to sign off too quickly. I want to back and let me take care of increasing diversity at the School of Architecture and Planning.

Q: What are the challenges ahead?
A: We all have baggage that we bring into our interactions with others. Sometimes it’s difficult to unpack that baggage. But we’re MIT. We’ve really good at figuring things out, building something new and better.

At a meeting held on Feb. 2, the Executive Committee of the MIT Corporation accepted President Susan Hockfield’s recommendations for the promotion of 27 assistant professors to associate professor without tenure and of 14 associate professors with tenure to full professor. All promotions are effective July 1.

Profiles of those promoted to full professor will appear in a subsequent issue of Tech Talk.

Those who were promoted from assistant professor to associate professor without tenure are John A. Ochsendorf of architecture, Judith A. Layzer of urban studies and planning, Ennio Franzolin of aeronautics and astronautics, Forrest M. White of biological engineering, Regina Barzilai, Karl E. Berggren, Luca Daniel, Dina Katabi, Samuel R. Madden and Assman Onzagla of electrical engineering and computer science. Francesco Stellacci of materials science and engineering, Thomas Pecanock and Yang Shao-Horn of mechanical engineering, Jay Scheib of music and theater arts, Sarah Song of political science, David S. Jones of science, technology and society, Jared E. Curhan, Shane Frederick, David Gamarnik, Dirk Jenter and David McAdams of the Sloan School of Management, Siddharth S. Sangal of linguistics and philosophy, Charles Seader of bioengineering, Brian W. Wold of political science.

Additionally, the following 14 have been promoted from associate professor to tenure to full professor:

Caroline A. Jones and Nasser O. Rabih of architecture, Hiroshi Ishii of media arts and sciences, Jonathan D. How and Brian D. Williams of aeronautics and astronautics, William H. Green Jr. of chemistry, Rajeev J. Ran and Seth Teller of electrical engineering and computer science, John G. Brissioff II and John J. Leonard of mechanical engineering, Daniel Fox and Kai von Fintel of linguistics and philosophy, Thomas DeFrantz of music and theater arts and Angelika Amon of biology.

MacVICAR

Continued from Page 1

The 2007 MacVICAR Fellow Faculty are Yoel Finkel, associate professor of materials science and engineering; Jonathan Gruber, professor of economics and associate department head; Charles E. Leisner, professor of electrical engineering and computer science, and James E. Orlin, professor of materials science and David Wallace, associate professor of mechanical engineering.

Daniel E. Hastings, dean for undergraduate education, read student comments about the five following: "One of the best lecturers I've experienced at MIT," a student wrote about Finkel; Gruber has the "rare ability to turn dry lec- turers into lively discussions," a student notes that Leisner is "walking right beside us in our exploration of the world of algorithms”; Orlin’s classes are "full of fun with the best "when it's fun."

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The 2007 MacVICAR Fellows are: Ruth Perry, literature professor, left, and Bryan Owens, senior in mechanical engineering.以下のリンクをクリックすると、さらに詳しい情報をご覧いただけます。

See MacVICAR
Solar power, clean energy inspire Norwegian entrepreneur

Deborah Halber
News Office Correspondent

The fact that darkness prevails over northern Norway much of the year did not stop Norwegian entrepreneur Alf Bjørnsen from developing a company that promotes Norwegian industrial development.

Norway, a leading oil exporter, is putting enormous resources into emerging clean and renewable energy technologies. Connecting with MIT and Massachusetts-based Renewable Energy Solutions—a leader in private sector energy-related innovation—is high on the agenda of the Norwegian government.

In conjunction with his first visit to Boston, Norway's Minister of Development and Energy Minister Jonas Gahr Støre spoke at a March 1 MIT seminar on clean technology and renewable energy technologies. The seminar, co-organized by MIT's Energy Lab and the Norwegian Research Council of Stavanger, had as its goal to explore possible joint projects.

Gahr Støre and Robert C. Armstrong, associate director of the MIT Energy Initiative, outlined existing cooperative programs between MIT and the Norwegian University of Science and Technology (NTNU), Norway's leading technical university. Other ongoing collaborations exist between MIT, the Norwegian Institute of Stavanger, the Research Council of Norway and the Norwegian oil and gas industry.

Collaborations around marine science and a university chair alternating between MIT and a Norwegian university are among the other potential joint projects. At a panel discussion moderated by Torger Reve, former president of the Norwegian School of Management, panelists Bjerre, president of Scatec and former CEO and founder of Renewable Energy Corp.; Olav Bolland of the Department of Energy and Process Engineering at NTNU; Richard Lester, director of the Industrial Performance Center at NTNU; and David Marks, co-director of the MIT Energy Laboratory, discussed the spectrum of potential joint projects.

The paradox of aging is, now that we're living longer, what are we going to do with all that extra time? People want to do things, and 30 years ago there wouldn't have been the resources or the opportunity to do that, Coughlin points out that we live in a society that says you're done at age 65. Retirement, he pointed out, may not be far away.

"People want to do things, and 30 years of playing golf is not appealing to most," Coughlin said. "Right now, we are not geared to meet the needs and demands of an aging society."
PSC grants expand MIT’s global reach

Undergraduate and graduate students who work in developing regions outside the United States over Independent Activities Period or over the summer are eligible to receive grants for up to $1,000 from the Public Service Center (PSC). Below is a brief summary of grant winning projects students worked on during IAP 2007.

Argentina: HIV and sex education counseling in Buenos Aires
Sophia Kamran, a junior in biological engineering, and Kerov Lezana, a junior in chemical engineering, traveled to Hospital Rivadavia in Buenos Aires to help the medical workers develop their HIV and sex education counseling services. While they assisted in improving information access for patients, they also improved their own understanding of public health issues in developing countries, learned about cultural issues related to sensitive subjects and gained Spanish fluency.

Brazil: Improving living standards in Rio de Janeiro and Tocantins
Aimee Beasley, a junior in civil and environmental engineering, and Kerov Lezana, a junior in chemical engineering, traveled to Hospi- tal Raulina in Rio de Janeiro to help the medical workers develop their HIV and sex education counseling services. While they assisted in improving information access for patients, they also improved their own understanding of public health issues in developing countries, learned about cultural issues related to sensitive subjects and gained Spanish fluency.

Kenya: Water-carrying donkeys empower Masai women
Zawadi Lemayian, a sophomore in environmental engineering, worked on projects in the rural environments. She also helped to implement a tin can chimney designed by a high school student.

Mauritius: Environmental education at the Hindu Girls School
Christopher Cleaver, a junior in aerospace and astronautics, worked in Ma- ritius, a small island and a developing state located off the east coast of Madagascar. His project was the School Footprinting Initiative, a three-year envi- ronmental education project that challenges students to measure and reduce the environmental impact of their school. Cleaver founded the project, obtained approval from the government of Mauri- tius, and secured a promise of fund- ing from Shell Mauritius. In addition, he conducted a two-week pilot project with a ninth grade class in the Hindu Girls School, discussing ecological footprinting, data collection and reporting. The project resulted in both greater access to water and more respect for women. In addition, Lemayian worked with the chief to convince three families to send their daugh- ters to school this year. Lemayian said, “You only appreciate what you have when you realize how much harder other peo- ple’s lives are.”

Models simulate atomic processes key to nanomaterials

Researchers from MIT, Georgia Institute of Technology and Ohio State Uni- versity have developed a new computer modeling approach to study how materials behave under stress at the atomic level, offering insights that could help engineers design materials with an ideal balance between strength and resistance to failure. When designing materials, there is often a tradeoff between strength and duc- tility (resistance to breaking)—properties that are critically important to the perfor- mance of materials. Recent advances in nanotechnology have allowed researchers to manipulate a material’s nanostructure to make it both strong and ductile. Now, the MIT-related research has allowed researchers to manipulate a material’s nanostructure to make it both strong and ductile.

Chancellor announces launch of Global MIT site

Global MIT, a web site and data- base that will enable users inside and outside the Institute community to learn about the full range of MIT’s international engagement, has been launched, Chancellor Phillip L. Clay announced.

Global MIT is designed to be a pub- licly accessible-comprehensive database intended to include all of the Institute’s international activities. The database already has more than 700 entries. Clay asked for “participation and assistance in updating information on activities with which you or your group may be involved. We are certain that you will have additions and correc- tions that should be in place before the site goes live to the world.” He also thanked contributors in advance for “helping us develop this resource, which represents MIT’s enormous global impact.”

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Doherty professor studies marine organisms
Andrea Cohen
MIT Sea Grant

In work that will improve our understanding of marine microorganisms that are essential to healthy oceans, an MIT professor is using microfluidic devices to investigate the lab under conditions close to what they experience in the wild.

For his work, Roman Stoker, assistant professor in the Department of Civil and Environmental Engineering, has been awarded the 2007 Doherty Professorship in Ocean Utilization from the MIT Sea Grant College Program. Every year, the program selects one or two new faculty members for a 2-year term, with an annual stipend of $25,000 per year for two years.

Underscoring that focus on the marine microorganisms that are at the base of the oceans’ food web and are essential to the oceans’ healthy functioning, “We’re interested in how swimming microorganisms actively respond to their environment,” says Stoker, “as that strongly influences how nutrients are recycled in the ocean and ultimately made available to other organisms.”

To date, quantifying these microscale interactions has been extremely difficult because they occur on too small a scale to be observed. However, with their environmental conditions in the lab has now been possible to test. To study the interactions of these small-scale organisms, Stoker uses custom-tailored microchannels. Tiny channels, with typical sizes of hundreds of microns, are sandwiched between a polymer on the top and a glass on the bottom. Syringes and pumps generate controlled flow rates inside the channels, and nutrient and flow scenarios mimicking those in the ocean can be created.

In his Doherty-funded research, Stoker will be focusing on how cells can capture patches of high nutrient concentrations and get them to behave differently. “If bacteria can rapidly find and consume nutrients, they will be able to swim against the flow and return to the food web. These processes can totally change our estimate of the carbon cycle in the ocean,” he says.

STEM CELLS
Continued from Page 4

into new bone cells. When the protein was added, they differentiated into cartilage cells that the researchers found could be turned in the usual fashion,” Griffith said. “When protected, it protected the cells from being killed by pro-death inflammatory signals. The soluble version of the factor did not.”

So far all of the experiments have been done in vitro, outside the body, but the researchers say their technique is applicable. “We can very carefully recreate typical functioning. “We’re interested in how swimming microorganisms actively respond to their environment,” says Stoker, “as that strongly influences how nutrients are recycled in the ocean and ultimately made available to other organisms.”

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So far all of the experiments have been done in vitro, outside the body, but the researchers say their technique is applicable. “We can very carefully recreate typical functioning. “We’re interested in how swimming microorganisms actively respond to their environment,” says Stoker, “as that strongly influences how nutrients are recycled in the ocean and ultimately made available to other organisms.”

To date, quantifying these microscale interactions has been extremely difficult because they occur on too small a scale to be observed. However, with their environmental conditions in the lab has now been possible to test. To study the interactions of these small-scale organisms, Stoker uses custom-tailored microchannels. Tiny channels, with typical sizes of hundreds of microns, are sandwiched between a polymer on the top and a glass on the bottom. Syringes and pumps generate controlled flow rates inside the channels, and nutrient and flow scenarios mimicking those in the ocean can be created.

In his Doherty-funded research, Stoker will be focusing on how cells can capture patches of high nutrient concentrations and get them to behave differently. “If bacteria can rapidly find and consume nutrients, they will be able to swim against the flow and return to the food web. These processes can totally change our estimate of the carbon cycle in the ocean,” he says.

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Japanese hip-hop: from 50 Cent to mirror balls and world peace

Stephanie Schoewer
News Office Correspondent

Six months of hanging out in smoky, grungy Japanese hip-hop clubs, gave cultural anthropologist Ian Condy insight into how American rap music and attitudes were being transformed by the youth in Japan.

And he couldn’t figure out the mirror balls.

Every club, from large to small, had a mirror ball hanging from the ceiling, shining light into the sweaty haze above the Japanese hip-hop clubs artists, music executives and first-timers.

So I had to develop my own philosophy of the mirror ball," Condy explained.

"It was a way for the club’s performers to show off their skills and attract attention from the audience. The mirror ball illuminated the performers, making them the center of attention, and also created a sense of movement and energy. It was a symbol of the city’s nightlife and cultural scene."

The mirror ball illuminated 'no single star on stage but rather spotlighting and attention on each individual for a moment then passing over all of the participants,' Condry, associate professor of anthropology, said.

"It was appropriate field work for a cultural anthropologist. Of course, he loves surf, Ray."

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But Just Jerusalem is not just an architectural competition. Entrants are asked to address one of four aspects of the intra-city, inter-cultural, economic, civic or symbolic environment.

"It is not just an architectural competition. Entrants are asked to address one of four aspects of the intra-city, inter-cultural, economic, civic or symbolic environment," Condy said.

"The jury consisted of six women, including the artist Guillermo Gomez-Peña, who had curated the exhibition "Biennale of Performances," and "Operation Atrocity," a film about the role of U.S. female interrogators in Iraq.

"We’re trying to engineer a break with history," Samuels said. "That’s something that happens very often, but it’s happened before, and that’s often enough to give us hope that it could happen again, even in Jerusalem."
Engineers co-design for clean drinking water

An MIT engineer working toward clean drinking water in Nepal describes in a recent issue of the Journal of International Development how people from developed and developing countries can work together to solve key humanitarian problems, ultimately meeting the basic human needs for security, broadly defined.

Such a collaboration "begins with a relationship among partners in the global village, taking into consideration the specific conditions of the local culture, environment and location," said Susan Murcott, a senior lecturer in MIT’s Department of Civil and Environmental Engineering (CEE).

Murcott has personal experience of a global engineering partnership of this kind—she calls it "co-evolutionary engineering design"—through her work in developing countries.

She and students in MIT's CEE master of engineering program have worked for years with citizens of Nepal and, since 2005, of Ghana, to design, test and distribute inexpensive household water filters that simultaneously remove arsenic and microbial contamination from the available water supply. Murcott notes that some 130 million people worldwide are affected by arsenic-tainted water, while an estimated 1 to 5 billion people worldwide lack access to microbially safe water.

As of December 2006, more than 5,000 such filters are operating across Nepal, serving some 40,000 people. An additional 5,000 filters are slated for sales and distribution in 2007 in Nepal, with further outreach into Vietnam, Cambodia and Bangladesh underway.

"The students and I are trying to make a positive contribution to people’s lives and to improve our collective chances of development and security," said Murcott.

With co-evolutionary design, technical designers from developed countries become partners with the user communities, who are experts in their local conditions. With the MIT Nepal Water Project, Murcott points out, "Our team's partners have included university-educated people and illiterate peasant farmers. We have identified a common need—safe, clean drinking water for all—and we have worked together successfully for seven years so far.

Any system to provide clean water should consider factors such as sustainability, green engineering and World Health Organization guidelines. In addition, the system must meet the requirements of the local women who typically haul and store water, as well as being affordable to people earning one dollar a day. The same general principles also apply to other co-evolutionary design projects.

Murcott is currently focusing her energies in the northern region of Ghana, thanks to a two-year grant from the Conrad N. Hilton Foundation. Here, a social enterprise—"Pure Home Water," initiated by Murcott with Ghanaian partners—is marketing ceramic water filters in one of the poorest regions of Ghana, where cholera, typhoid, guinea worm and other waterborne diseases are rampant. Two Ghanaian social entrepreneurs, together with MIT engineering and Sloan School of Management students, hope to spread ceramic filters to reach more than a million people in northern Ghana in the coming years.

Murcott is also leading MIT teams to Nicaragua, Haiti, Peru and Kenya to address water and sanitation issues in those countries.

She concludes, "We hope to increase awareness of health and safe water issues among the least educated people in remote areas of Nepal and Ghana, subsidize filters for the very poorest people, insure that locally made units are built correctly, and make sure that future teams will effectively and passionately carry the work forward.

"We are confident that this work provides a model of engaged, cross-cultural cooperation that builds self-reliant solutions, at the same time providing a renewed understanding that security for most people in the world relates not to armed conflict but to 'common good' social, environmental and economic challenges, for example, the simple need for safe water."

A team of eight MIT students and their advisor, Susan Murcott, brought their ingenuity and technical skills to villages in Nepal in 2002 to try to solve a very basic practical problem—the need for clean drinking water at very low cost. Above, a young girl pumps water from a well outside Lumbini, Nepal.

Heather Lukacs, former MIT graduate student, chats with a villager at her well in Lumbini.

Barika Poole, former MIT graduate student, tests drinking water.

Former MIT graduate student Hannah Sullivan takes a water sample from a well in the village of Mahilwari, Nepal, assisted by a villager.