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Beyond Providing Clean Water: A Profile of Development Engineer Syed Imran Ali

By Tamara Straus

In August 2010, while floods from monsoon rains covered a fifth of Pakistan, Syed Imran Ali, an environmental engineering PhD student from University of Guelph, sat in a newly built lecture hall at the Indian Institute of Technology in Madras. Ali was in South India to research safe water systems in slums—and, as is typical in academia, a visiting professor had come to give a lecture and graduate students were expected to fill the hall. The lecture, by a Purdue University professor, was on a stochastic method to predict floods, and as Ali sat there, his demeanor, characteristically courteous, attentive, and collegial, started to shift.

"I started to think: I don't know what you're talking about, and I don't think anyone else in this room knows what you're talking about," said Ali, now a postdoctoral fellow at UC Berkeley's Blum Center for Developing Economies. "Moreover, I began to think: I don't care. Talking about forecasting floods—when there was a flood next door and people were dying in it—was just untenable."

Ali went back to his office, turned on his computer, and began calling NGOs, government agencies, and UN offices, offering his water and sanitation expertise to help respond to cholera outbreaks in Pakistan displacement camps. He was told he would need to formally apply, and he was told he would need to be interviewed, and he would told he would need to approved before being sent into the field. He also sowed confusion when he explained his background: a Canadian engineer, of Pakistani origin, working in India, seeking to go to Pakistan, India's enemy, to help with the flood.

Finally, Ali got hold of the number for the Pakistan headquarters of Médecins Sans Frontières (MSF/Doctors Without Borders) and found himself on the phone with the head of mis-

Postdoctoral Fellow Syed Imran Ali's work to reform UN guidelines for refugee camp water systems could protect 50 million people.

sion, an Italian nurse, "who was totally frazzled." "He asked me," said Ali, "whether I could work a water treatment unit. I told him I could figure it out. He told me to send him my CV. That evening, I had a phone conversation with MSF in London, and two days later I was flying to Pakistan.'"

Ali's job was to set up a water treatment unit, to supply safe water to one of the many camps for internally displaced persons in Sukkur, Pakistan. Sukkur had been the third largest city of the Sindh province, but by the time Ali arrived in August 2010 the Pakistani army was evacuating 350,000 people from low-lying areas and bringing them to the higher grounds of what would become a refugee city of half million. Ali was told an experienced WASH (water, sanitation, and hygiene) specialist from MSF would supervise his work. But the specialist got held back at another camp with a cholera outbreak, so the 26-year-old had to wing it. "It was sort of like Lego," said Ali of his experience assembling the MSF equipment entirely from manuals. He worked there for five weeks, treating river water and training local staff to operate the water treatment plant.

Since that time, Ali has grappled with what it means to be a development, or humanitarian, engineer. His disserta-

tion, published in 2012, was not typical of an academic engineer. Instead of focusing only on new techniques for efficient and safe water systems for South Asian slums, he questioned the moral and political complexity of their implementation. Ali advocates a "participatory design" approach, in which technicians like himself collaborate with "users" (in his case, slum residents), to come up with sustainable and contextually appropriate solutions to water and sanitation systems.

The impetus for this has come from deep reading of post-colonial scholars like Franz Fanon and Paulo Friere. It also has come from the four on-and-off years Ali spent in a slum called Mylai Balaji Nagar on the outskirts of Chennai, India. There, about 10,000 residents continue to rely on highly polluted surface water. Ali first showed up in the ramshackle sprawl of a town in 2009, as part of a University of Guelph-IIT project that he started. His goal was to remove contaminants from the water system, which was drawn from a polluted lake and was pumped, often untreated, into standpipes where it was used for bathing, food preparation, and drink-

ing. But the longer he stayed in Mylai Balaji Nagar, the more Ali learned that the residents' views of clean water did not necessarily cohere with his or his university colleagues.

Through interviews and focus groups, Ali gleaned a couple of key details: that the residents of Mylai Balaji Nagar had been forcibly moved there in 1995 to make way for the city's railway expansion; that the government had never consistently supplied adequate or clean water to the area; and that residents considered water and sanitation services to be a government, not a community or individual responsibility. Ali also learned that everything that the community had managed to get in terms of education, health, or housing supports—had came from lobbying the government.

"I came to realize that much of my work in Mylai Balaji Nagar was what University of Toronto Anthropology Professor Tania Li calls 'rendering technical,'" explained Ali. "Residents viewed the water supply as the responsibility of the government and they demanded water and other rights through collective political mobilization and direct action. Often, they won. But we engineers were focusing on doing water treatment with residents at the household level.

"You see," continued Ali. "I rendered technical the water supply problem at Mylai Balalji Nagar. And in doing so, I submerged the political economy of water in this community's history."

Ali defines rendering technical as stripping a phenomenon of its complex social, political, and economic realities and distilling it to just its technical aspects. He said people in international development do this for two reasons: "One, we are technical experts and see the world through the framework of the solutions we have to offer; and two, it gives us something to do." Ali adds to this list a third reason: human fallibility, especially in crisis situations.

In September 2012, Ali enlisted for a second humanitarian crisis. He joined an eight-month mission with Doctors Without Borders in South Sudan, where the newly independent country was being overwhelmed with refugees escaping years of violent clashes. Ali's job was to implement emergency water treatment systems in refugee and transit camps, manage water and

sanitation infrastructure and staff in MSF healthcare facilities, and lead camp sanitation building projects. He was witness to a severe health crisis at a camp called Jamam on the Upper Nile state of South Sudan, to which 30,000 people had fled. Jamam, which means "swamp" in Maban, was picked in haste by authorities of the United Nations High Commissioner for Refugees (UNHCR) and in part because it was 50 km from the Sudanese border, a UNHCR requirement. The place lived up to its name. When the rainy season hit in May, the camp flooded and diarrheal illnesses and hepatitis E overwhelmed the refugee population.

Ali and his colleagues worked tirelessly. In a Jan. 29, 2013 MSF blog, he wrote: "I've stopped thinking. The last time I stopped to think something out, to parse it, to give it a name, was months ago …. [Yet] I had a home that was not this place, this strange, inhospitable, impossible place that is now home for 15,000, 65,000, 115,000 people, who had to run here, and from where it seems like they won't leave for a long time still, for the abode of war still reigns in their hills."

Among the reasons that Ali's brain was functioning only for emergency purposes was because by January he was also working in a nearby refugee camp called Batil, which had become home to 35,000 people and where a third of the camp had no sanitation services. The result was another large hepatitis E outbreak from so many people defecating outside. "There's a structural problem in the humanitarian system," said Ali in response to why the story of aid seems often to be one of failure. "There's no feedback mechanism. No one in the field has the capacity, because they're always reacting."

But Ali has found a way to provide feedback. During his time at the Jamam refugee camp, he realized that chlorination levels for camp water systems were based on standards for municipal, i.e., urban, water systems with sophisticated infrastructure—even though a refugee camp is radically different from a city. To deal with the daily reality of sick and dying people, Ali began to study how free residual chlorine in water behaved in the refugee camp setting. He soon discovered that it was inadequate—that within four to six hours of collection, the chlorine was mostly gone. He set out to correct this oversight.

Ali's current work at the Blum Center may very well rewrite the UN guidelines for refugee camp water systems, protecting upwards of 50 million people. "This project will help to build the evidential base for safe water practices in humanitarian settings, something which is almost totally lacking at present," said one of Ali's mentors, Ed McBean, a professor of engineering at University of Guelph, who holds the Canada Research Chair in Water Supply Security. "The work will improve best practices for safe water supply in emergencies the world over."

Last summer, in collaboration with UNHCR, Ali collected chlorination level data at the Azraq refugee camp in Jordan, and in 2015 he will do the same at two more sites, in Rwanda and Jordan, and take data during the winter to observe any seasonal effects. By

At the Jamam refugee camp, Ali realized that chlorination levels for camp water systems were based on municipal standards.

2016, he expects he will have analyzed and generated a revision document for varying refugee camp conditions, which can feed directly into the UNHCR guidelines. Ali does not expect implementation will be difficult, as his work is "an evidence-driven improvement of existing practices."

When Ali tells people about his discovery at the Jamam camp, they tend to be shocked. How could humanitarian organizations overlook something so simple as low chlorination levels in water? Isn't chlorine in water the most well-known and well-used means to ensure water is safe to drink and use? "I think it's been the accidental engagement of academic researchers like myself in the field that have encouraged this," said Ali. "People in the field have already always known [about chlorination problems], they just haven't had the chance to study it and push it." Ali adds that the negative

consequence of higher chlorination levels is poor taste and odor. The balance is to have just enough chlorine to protect the water, but not so much to drive rejection of the water.

When it comes to the larger questions and goals of international development—the eradication of extreme poverty, safe drinking water and sanitation for all, universal access to maternal health—Ali's humanism and historicism seems to outweigh his optimism. "The 19th century Prussian general and military theorist Carl von Clausewitz, once remarked, 'War is the continuation of politics by other means,'" he said. "Since the Marshall Plan and the early years of the Cold War, I believe that development has become the continuation of politics by other means." Ali does not believe that international development practitioners are doomed to come up with only short-term solutions that avoid the systemic political factors that underlay poverty. But he believes that they, and he, must tread carefully.

"I understand why we've moved away from large-scale development," said Ali. "We've been humbled by the technical failures of the 1960s, by the macro level approach. So we're now looking at development through a micro level. We can't change the macro con-

During the summer of 2013, in collaboration with UNHRC, Ali collected chlorination level data at a refugee camp in Jordan.

ditions of global health, so we create a device that improves healthcare access to rural clinics. In that way, we're doing a lot of little things and, especially as engineers, we're doing these things without any real literacy about the sources of the problems."

Ali hopes a corrective to this problem—to the problem of "rendering technical"—will come through the new field of Development Engineering, which began offering classes to graduate engineering students at UC Berkeley in the fall of 2014. Development Engineering, he argues, is different from traditional engineering in that the field aims to re-center technical issues, like clean water provision, within the larger contexts of political economy and society.

"Introducing non-technical elements in my engineering training was really difficult at first, but I saw it as necessary," said Ali. "Working with non-engineers was confusing initially, because I didn't quite understand their language," he continued, "but there was something important there that I needed to understand. It challenged me to go beyond my own technical lens and learn to see from perspectives of new fields.

"Working across disciplinary divides requires intellectual humility. But it's given me ideas about how we can use technical solutions to address development challenges in solidarity with the people we aim to help."

Teaching Leadership, Female to Female

By Andrea Guzman

In 2012, Vrinda Agarwal, now a fourth year Cal undergrad, landed an internship at Senator Barbara Boxer's office in Oakland, fielding calls from constitu-ents. She knew that people rarely called to commend state employees on state policies, but she was shocked by the number of people whose com-plaints stemmed from problems of poverty and inequality.

"It didn't make sense to me that I was answering so many calls from people requesting additional welfare services, wondering when their names would be pulled off affordable housing lists, and struggling to fund their children's college education," said Agarwal, who is studying political science, public policy, and legal studies.

Frustrated yet motivated, Agarwal called on four fellow female students—Julie Brown, Madeeha Ghori, Smriti Joneja, and Ruhi Nath—whom she describes as "incredible leaders, role models, and feminists."

100 Strong was founded in 2013 by five UC Berkeley women undergraduates to develop the leadership potential of low-income high school and middle school girls in the Bay Area. The group has since grown to include dozens of Cal mentors.

In November 2012, at Berkeley's Cafe Strada, the five decided to start a summer leadership camp for low-income female students and call it 100 Strong.

But as the team started to map out a plan through participating in the student innovation contest BigIdeas@ Berkeley, it changed its model.

Agarwal describes attending an after-school program for low-income students and noticing that the group was about 20 percent female and 80 percent male. She felt compelled to work solely with girls—who she knew needed more support to graduate from high school and go on to college—and to provide them leadership training throughout the academic year.

"Whether applying for a job or for college, there is always some question about leadership experience,"

said Nath, a 4th year student majoring in Public Health. "Leadership has become a transferrable skill and we wanted to provide that resource."

In May 2013, 100 Strong won third place in the Big Ideas competition in the global poverty alleviation category, earning it $5,000 in startup funds. Its mission is to have 100 female middle and high school students from the Bay Area participate in a yearlong leadership training and mentorship program with female UC Berkeley students.

Throughout the academic year, female UC Berkeley students mentor girls through weekly workshops and sessions. The mentors help guide the students to create their own social impact projects that will create a positive change in their high schools or local community. Mentee projects can include a composting program, blood drives, or teaming up with a nonprofit to host a fashion show.

"We encourage girls to start diverse programs that benefit their communities, whether it is a coding academy for other low-income women or a community garden," said Agarwal.

During the 2014 fall semester, 100 Strong board members held a student-led DeCal course, to train mentors on topics such as structural poverty, gender discrimination, and public speaking skills. The students' final project is to develop a workshop to present to the mentees in the spring of 2015.

Increasingly, 100 Strong finds validation for its model from external studies. The 2013 report "The Role of Risk: Mentoring Experiences and Outcomes for Youth with Varying Risk Profiles," for example, found that mentorship programs can lead to gains in social acceptance and academic attitudes and grades.

Yet like any new organization, 100 Strong had to overcome unexpected challenges. One of the biggest was the difficulty of finding students to mentor. While some schools expressed interest and support for 100 Strong, many were unable to dedicate the time necessary to introduce the program into their schools.

"Through the process, we realized how busy administrators and teachers are," said Nath. "While they expressed interest, they just didn't have the capacity to follow up."

Despite such obstacles, in its 2012-2013 pilot year, 100 Strong trained 23 mentors and about 20 mentees.

This academic year, the mentors are serving all 50 8th grade female students at REALM Charter Middle School in Berkeley. To continue its growth, 100 Strong is working on measuring and analyzing the impact of its program.

"We have to remember that the program must ultimately benefit the mentors and mentees," said Chief Financial Officer Michelle Nie, a sec-

ond year student intending to major in Business Administration. "By making sure we're creating a positive impact, we can improve our program even more effectively."

100 Strong is participating in a crowd-funding campaign with Indiegogo to raise $5,000. The money would help

In 2014-2015, 100 Strong mentors are working with all 50 8th grade female students at REALM Charter Middle School in Berkeley.

the organization reach its goal of mentoring 100 students per year, fund mentee community service projects, and alleviate some of the time the 100 Strong team spends on raising money for its programs.

The co-founders must also face that they are all graduating in 2015 and will likely leave the Bay Area. Sustainability has thus become a focus of 100 Strong; the founding team is in the process of getting 501(c)3 nonprofit status and cultivating 100 Strong's new leadership among its younger mentors.

Ultimately, 100 Strong's founders hope to create a model that can be incorporated into campuses nationwide.

"There are so many low-income communities across the country in which women do not have the same opportunities as their male cohorts, have lower graduation rates, and ultimately becoming underrepresented in higher education," said Agarwal.

"I want women across the country to have the opportunities that 100 Strong provides: mentorship, the chance the practice their leadership skills, and the ability to start a community project of their own."

100 Strong team members Ruhi Nath, Smriti Joneja, and Vrinda Agarwal pose with their Big Ideas @ Berkeley award certificate.

In addition to the weekly program, 100 Strong also holds two weekend intensives for its mentees. The high school students spend the two days in residential housing and attend workshops, leadership and team building activities, tours of the campus, and guest speaker events to get them excited by their post-graduate possibilities.

Generation Innovation: Jessica Prapath on the Realities of Direct Service Work

By Sybil Lewis

Many students graduate from Cal bent on making an impact in the world. The reality of direct service work, however, can cause even the most committed to feel discouraged and to question what meaningful and financially sustainable work looks like—challenges that Jessica Praphath, a Cal alumna, faced while working on poverty alleviation in her hometown of Stockton, California.

Stockton was hit hard by the 2007 financial crisis. In 2008, foreclosures soared to 9.5 percent and housing prices fell by 39 percent. In July 2012, it became the largest American city to file for bankruptcy protection.

Praphath, whose parents immigrated from Thailand, grew up in "pockets of poverty" in the predominantly Southeast Asian communities around Stockton, and returned there a week after graduating from UC Berkeley in 2013, determined to work on public health and community issues at the grassroots level. She could have stayed in the more affluent cities of the Bay Area, but after minoring in Global Poverty & Practice (GPP), she said she decided her vocation was to better "understand the systemization of poverty and how I and my community fit into that system."

Praphath's first job out of Cal was at a resource center of the Community Partnership for Families of San Joaquin, where she completed her GPP practice experience. There, she was in charge of establishing a virtual education program for students in low-performing schools in south Stockton. But when you "work in a nonprofit in Stockton you wear 25 different hats," she said. She soon became involved with the nonprofit's umbrella program, Neighborhood University, providing online parenting and English as a Second Language (ESL) classes.

Praphath worked countless hours to provide ESL, one of the community's highest demands. Although the first few weeks of classes started off with about 40 people, over time the numbers slowly faded. Eventually, the classes were cancelled due to low attendance. Praphath said she was disappointed to "work so hard and then watch the project fail."

The failure felt personal. Yet she also knew that the class's low attendance might have something to do with the culture of welfare in south Stockton. Many people were distrustful of organized social assistance, in part because Stockton's district lines had been redrawn so that most of the post-crash development money went to renovating downtown rather than to helping low-income south Stockton. Residents became accustomed to social workers using data about their lives to collect grant money that eventually went elsewhere.

Praphath said she discovered that one of biggest problems in development work is to empower a community that has been exploited or ignored. Another challenge is the lack of funding for community members and those who want to work with them. Praphath's $13 hourly wage did not cover her monthly bills, which include payments on almost $20,000 in student loans. The Community Partnership for Families of San Joaquin also wasn't able to provide her health benefits or employ her full-time, even though she was putting in 40 to 50 hours per week.

After months of exhausting work and financial difficulties, Praphath reluctantly left the family center for a job at the Health Education Department of Community Medical Centers, a federally qualified health center in Stockton. Yet two months into the job, she said she felt something was missing—the one-on-one interactions with people, the community aspect.

To fill this gap, she volunteered for the Reinvent Stockton Coalition, a community-based initiative spearheaded by Stockton City Councilman Michael Tubbs. Praphath said the coalition has made her rethink what works in community development.

"I graduated from Cal thinking that meaningful work was measured by how many people you can get in a program," she said. "But in the field, it's not about that. Being effective is not about 40 people attending your ESL class or health workshop. It's about

Jessica Prapath takes some time out with a goat.

whether you can change people's lives."

Looking back, Praphath said she thinks attendance of the family center's ESL classes dropped partly because beneficiaries were not involved in shaping the classes. She is a believer in the participatory development of social programs. Yet she realizes this is easier said than done, especially when there is a "disconnect between professional and college-educated people and community members."

At Community Medical Centers job, she sits on a bimonthly public health task force that brings together representatives from nonprofits, foundations, and government organizations to discuss plans for public health initiatives. Praphath believes in the mission of the taskforce and sees a strong desire to enforce change, but she notes that a fundamental piece is missing: a community representative. The same was true for the initial planning meetings of Reinvent Stockton. When she looked around the table during those first meetings, all she saw were dedicated people who went to good universities and, like her, returned to Stockton to help improve it.

Praphath has since played a vital part in the Reinvent Stockton coalition's expansion to south Stockton community members. They helped write two assessment surveys, which mapped Stockton's "community strength index," focusing on issues such as education, public safety, housing, economic development, and health. And in July 2014, the coalition launched its first community assessment survey, from which community members and volunteers collected more than 800 surveys.

Praphath, who is collecting follow-up surveys, recalled an emotional phone conversation with a south Stockton resident named Regina about crime and policing. Regina told Praphath that her son had recently been shot and that distrust of the police was high.

"I talked to Regina for 56 minutes and 8 seconds," she said. "I know the exact time because I remember getting off the phone and feeling like it was one of those experiences where you feel so connected to another human being and it helps you understand your purpose and why you are doing what you are doing. All the stress goes away and it all makes sense."

Praphath said when she first returned to Stockton with her UC Berkeley degree, some people expected her to have all the answers. She made it clear that she was there to learn.

"When I meet community members, I let them do a lot of the talking," she said. "This way, I am seen not as someone who is trying to push knowledge or test out my education, but as someone with a genuine interest in what they have to say."

A year later, she has come to believe that community members are the ones with the answers. They are the experts—the "think tanks" as she puts it.

A Device That Could Change Healthcare

By Tamara Straus

There are three innovations without which, CellScope—a breakthrough microscopy project of Daniel Fletcher's bioengineering lab at UC Berkeley—would not be possible. They are also part of landscape of innovations that may revolutionize global healthcare.

The first is the 3D printer. Before these printers were mainstreamed, students in Professor Fletcher's lab assembled prototype mobile microscopes from sheets of plastic that had to be cut and glued by hand. New engineering designs usually took weeks and were difficult to modify quickly. With the lab's Stratasys 3D printer, polished prototypes are now being created in as little as a day.

The second innovation that seeded Fletcher's leap forward in microscopy is energy-efficient LED lights. Whereas traditional microscopes rely on powerful arc lamps that cost $200 per bulb and burn less than 300 hours, the CellScope uses long-lasting LEDs that cost as little as $2.50 per bulb, provide up to 20,000 hours of use, and function on battery power in areas with unreliable electricity.

The third and probably most important innovation on which CellScope depends is the mobile phone. CellScope has been able to piggyback on tens of billions of dollars of R&D investment by cell phone companies, which have resulted in, among other things, powerful built-in cameras and the mass production of affordable components. As Fletcher pointed out in a Sept 20, 2013 Wall Street Journal op-ed:

"New phones with larger screens and better cameras may not markedly improve our lives, but the push for more powerful devices—and manufacturers' willingness to respond to demand—is on track to improve the lives of millions of people living in extreme poverty. That's because customers set on having the latest, greatest smartphones are driving a dramatic decrease in cost and increase in functionality that will benefit people whose total annual income is often less than the cost of a single phone."

Back in 2006, when one-megapixel cameras started appearing on phones, Fletcher challenged students in his Optics and Microscopy class to see if the camera of a cell phone could be modified to capture images of human cells similar to those captured on his lab's $150,000 research microscope. Continuing the project the summer after the class ended, Fletcher and a group of students attached a standard set of lenses to his sister's Nokia phone and were able to image blood cells, malaria parasites, and the bacteria that causes tuberculosis. It was one of those moments that scientists dream of.

"We had discussions, during the course, with doctors about how broadly microscopy is used in clinical medicine, particularly in the developing world. I hadn't realized that basic optical imaging is still so important to disease diagnosis and that the most definitive diagnosis for many diseases is seeing the actual disease-causing agent in a patient sample," said Fletcher. "That's when I realized that if we could do microscopy properly on a mobile phone, the device could be very useful."

Not only was the potential for disease diagnosis outside of hospital infrastructure considerable, Fletcher and

Due to advances in mobile phone technology, CellScope may soon provide diagnostic solutions at the same rate as any digitally enhanced microscope in a well-equipped hospital.

his team knew that mobile manufacturers were in a race to integrate phone cameras with computation, SMS, email, Internet access, and friendly user interfaces. In a few short years, this would mean that CellScope could provide diagnostic solutions at pretty much the same rate as any digitally enhanced microscope in a well-equipped hospital.

Members of the Fletcher lab could even foresee a time when patients' blood or sputum smears could be imaged with a mobile digital microscope and then—using a computer algorithm for automated disease detection—proceed immediately to treatment, without the patient stepping foot in a city hospital or medical lab. It would mean, for example, that tuberculosis, which annually kills more than 2 million people and sickens approximately 15 million, could be tackled in places where laboratory facilities are scarce but mobile phone infrastructure is extensive. It would mean that a new point-of-care diagnostic was possible for many diseases that go undiagnosed in many countries, ranging from debilitating eye disorders to chronic blood parasites.

The Fletcher Lab began making its

case for the potential impact of Cell-Scope slowly, as it was a side project in a lab focused on making cutting-edge biophysical measurements of cells. In May 2007, CellScope won a Big Ideas@ Berkeley award of $8,500, and in January 2008 it received a $100,000 grant from Microsoft Research.

By May, The Economist, ABC, Wired, and other media had picked up news of CellScope. In April 2009, the team won another $100,000 grant from Intel's Inspire-Empower Competition, followed by support from the Vodafone Americas Foundation. And in July 2009, it published its first academic journal paper—in PLoS ONE, documenting how CellScope captured images of the parasite that causes malaria in humans, the bacteria that causes tuberculosis, and sickle-shaped red blood cells. The team also showed in a 2012 National Institutes of Health paper how their images of tuberculosis bacteria could be automatically counted using image recognition software.

For Fletcher, CellScope represents not so much new science as a new approach to the old problem of disease diagnosis.

By 2011, CellScope had raised a total of $500,000, thanks to additional grants from the Bill & Melinda Gates Foundation, UC Berkeley's Blum Center for Developing Economies and the Center for Information Technology Research as well as the Vodafone Americas Foundation, and was ready to field test its first device.

Its first large field experiments took place at health clinics in Hanoi Province, Vietnam. In partnership with the Vietnam National Tuberculosis Program and the University of California, San Francisco, Fletcher's group deployed 15 CellScopes for a full year, to evaluate their uptake and ability to detect TB at health care facilities with little medical or IT infrastructure. The Hanoi Province pilots showed that community health care workers were able to operate the CellScope and that disease diagnosis met the standard quality available at major Vietnamese hospitals. This work motivated development of a second generation device that is being tested in Hanoi.

Recently, another CellScope device was field-tested in Cameroon where the Gates Foundation and the U.S. National Institutes of Health had been struggling to find a way to restart mass drug administration programs to fight the roundworms that cause river blindness and lymphatic filariasis. The problem health workers faced was that patients were at risk of serious health complications, including death, if they were given river blindness medication while co-infected with the *Loa loa* worm. But to test for *Loa loa*, health workers needed to draw several milliliters of blood and prepare two blood smears for observation under a traditional microscope—costly and time-consuming steps impossible to carry out across the country.

Health programs were basically stuck; they could not proceed with large-scale treatment.

Then in February 2014, CellScope trials of 120 people proved adept at counting *Loa loa* worms, using only a finger prick of blood and a few minutes of analysis time. The trials also validated CellScope's automated detection of worms in whole blood, and thus the elimination of time-consuming lab diagnosis. Larger tests involving thousands of patients are planned for 2015.

"The *Loa loa* trials may be the ones that allow us to bring the CellScope to scale in developing regions," said Clay Reber, a UC Berkeley master's student in bioengineering who has been on the CellScope project since 2010. "They could show that the CellScope meets conventional diagnostic methods and will be cheaper and easier to use than current methods. They could enable the much-needed mass drug administration programs against river blindness to restart. Worldwide, there are 130 million people at risk of infection with the river blindness worms and 13 million people with *Loa loa*."

Another testing ground for CellScope devices is Thailand, where there are only 648 ophthalmologists for the entire country (1.52 doctors per 100,000), with most located in the urban centers of Bangkok and Chiang Mai. Cytomegalovirus (CMV) retinitis, which disproportionally affects HIV patients and can lead to blindness, is treatable, but infection rates are high and diagnosis rates are low. Since 2012, community health workers and other non-specialists have a half dozen Ocular CellScopes to test their utility for patients at risk of CMS. Results are forthcoming.

Professor Fletcher admits it's challenging to address the many diagnostic opportunities that CellScope could address simultaneously. "The key," he said, "is great collaborators—great clinical collaborators who have embraced the technology, contributed to its design and implementation, and allowed us to plug into existing field studies and test sites with this alternate technology."

With so many potential applications and field tests for CellScope, it is no wonder that the team has at times felt overstretched. CellScopes have been sent and used literally around the world. In Hawaii, the education nonprofit Kahi Kai is using the mobile microscopes to collect data for various water quality indicators, such as plankton. In Egypt, Dr. Annika Guse of Heidelberg University took CellScope for coral reef monitoring. There is even a CellScope in Antarctica, and Parisian artist Geneviève Anhoury is opening a show this December using images taken with a CellScope.

Perhaps the strongest example of CellScope's wide applicability and embrace is its for-profit spinout, CellScope, Inc. In June 2013, Khosla Ventures invested $1 million in the company founded in 2010 by Erik Douglas and Amy Sheng, two former students of Professor Fletcher's. Since then, the company has secured additional funding on the promise it will create a "smartphone-enabled digital first aid kit."

CellScope Inc.'s first product is an iPhone otoscope that enables parents and physicians to remotely diagnose ear infections in children, an ailment that results in an estimated 20 million U.S. doctors visit per year. The release date for the otoscope is set for 2015. Douglas said 800 doctors and clinicians have been testing it since last December, and 100 California families have been using the device at home.

For Fletcher, CellScope represents not so much new science as a new approach to the old problem of disease

diagnosis, one that moves clinical microscopy forward by solving integration, implementation, and usability challenges. "I think it's really exciting to see how a technology that has come from an academic lab, was created on a 3D printer, and is intended for use by minimally skilled healthcare workers can help someone in a developing region receive better healthcare and maybe even help seed an industry here in the U.S," he said.

Fletcher said he has no objections to the domestically oriented for-profit spinout, but hopes "there is continued attention—and funding—to support solving the often very different healthcare problems of developing countries with these devices."

Fletcher's mind tends toward scientific skepticism, toward the need for real-world proofs and repeatable results. But he is willing, after some urging, to forecast his device's possible impact.

"My hope is that CellScope will present a new way of delivering health-care," he said. "It has the potential to provide much faster access to disease diagnostic information as well as more regular information about our own healthcare. Our technology is part of a fundamental change in healthcare that will see each of us able to take much better care of ourselves by collecting and analyzing personal health data with devices like mobile phones.

"And CellScope is just one device in that direction. The mobile healthcare revolution has begun."

Electrification for "Under Grid" Households in Rural Kenya: Five Questions for Ken Lee

By Sybil Lewis

In the summer of 2012, an interdisciplinary research group at UC Berkeley set out to study the demand for and effects of community-level, solar-powered microgrids in Western Kenya. To the surprise of the members of the group—led by Professors Edward Miguel (Economics), Catherine Wolfram (Business), and Eric Brewer (Electrical Engineering and Computer Science)—they could not identify many communities that were truly "off grid." There just always seemed to be an electricity line nearby.

As a result, the group shifted its focus to populations who were "under grid"—in other words, people whose homes and businesses were near but not directly connected to the grid network. In partnership with Innovations for Poverty Action, the research group began the time-consuming process of mapping out 150 communities in order to gauge each household's relation to the grid. The census data quickly began to generate a lot of interest from local policymakers and led to the July 2014 working paper "Barriers to Electrification for 'Under Grid' Households in in Rural Kenya," published by the National Bureau of Economic Research (NBER).

To make available the significant economics and engineering findings of the NBER paper, supported by UC Berkeley's Development Impact Lab, the Center for Effective Global Action, and the Technology and Infrastructure for Emerging Regions, we asked lead author Ken Lee, a PhD student in Agricultural and Resource Economics, the following questions.

1. What is the main difference between "off grid" and "under grid" electricity connections, and what policy implications does this distinction have for African countries?

The International Energy Agency estimates that in Sub-Saharan Africa, 600 million people live without access to electricity. What follows quite naturally is an assumption that most of these people are "off grid"—or too far away to realistically connect to a national electricity network. As a result, we've seen growing support for off grid, distributed energy technologies, most of which are best suited for regions without access to grid power.

Yet many countries are expanding the reach of their national grid infrastructure. In Kenya, for example, there has been a recent push to connect all of the country's secondary schools, health clinics, and markets, suggesting that a large proportion of the population is now within walking distance of an electricity connection.

We are hoping to change the framework in which we view this problem. It is possible that a substantial portion of the 600 million people without electricity are not "off grid," but are "under grid," or close enough to connect to a low-voltage line at a relatively low cost, and this is what we illustrate in our research paper. This distinction is important because the policy implications for off grid and under grid communities are quite different. In under

Researchers from UC Berkeley and Innovations for Poverty Action are mapping 150 communities in Western Kenya to gauge households' relation to the electricity grid.

grid communities, it may be preferable to focus on supporting policies that will leverage existing infrastructure with the goal of increasing "last-mile" grid connectivity.

2. Your research showed that despite Kenya's strong push for rural electrification, national electrification levels remain below 30 percent. What have been some of the biggest challenges in effectively connecting rural communities to power grids?

The most important barrier to grid connectivity has been the high price of an electricity connection. Currently, the price of a household connection is $410, which is incredibly expensive even by American standards. In a country where gross national income per capita is $1,730, this price is simply unaffordable for poor, rural households.

There are several other barriers to electrification as well. For example, even if the price were lower, it may still be necessary to provide households with an option to finance their connections, so that they could pay back

the principal amount over time. Finally, rural households in Kenya tend to be spread apart and there are few straight lines through which one could easily run a power line. This makes it challenging for electricity planners to build out cost-effective low voltage networks, particularly when they are unable to connect all of the neighboring households at the same time.

3. What effect does reducing energy poverty have on other aspects of development, such as income, well-being, and education?

There is no question that access to modern energy is a key input for economic development. For example, electricity opens up the possibility for households to extend their lighting hours, changing the way that people use their time, and allowing children to (hopefully) study later at night. It also allows households to engage in all kinds of new income-generating activities. In one of our study sites, we met a woman who had already begun selling cold fruit smoothies to her neighbors, within a month of gaining an electricity connection.

Given the high cost of rural electrification, there is a need to rigorously document the socioeconomic impacts of modern energy. There is also a need to better understand how newly connected households will consume energy moving forward.

Our research team is currently implementing a randomized evaluation of grid connections in Western Kenya, and through this project, we hope to shed additional light on these questions.

4. What are the options available to poor rural Kenyan households to finance electricity installation and continued use?

Currently, the options available for households to finance installations and appliance purchases are limited. Although the national utility had offered a financing plan in the past, the program encountered many challenges. There is, however, high demand for financed energy solutions. The recent success of the "pay-as-you-go" solar home system offered by M-KOPA provides an interesting example. Households are paying as much as $200 over the course of a year to finance a limited solar home system product. What makes their financial model work is that the daily payments can be processed through the M-PESA mobile money platform.

So while there is a general need for additional financing options for grid connections, the example illustrates that there is an equal need to develop innovative billing and collection technologies for financed grid connections that will incentivize both lenders and borrowers in a sustainable way.

5. How can governments in Africa design projects to improve national electrification levels?

Our study region in Western Kenya has high population density and extensive grid coverage, making it an ideal setting in which we would expect to observe rapid rural electrification. Yet the vast majority of the 15,000 rural households and businesses that we document remain unconnected despite being located within connecting distance of a power line. So the real issue is not the lack of an electricity supply, but the fact that both the price of a connection and the cost of supplying that connection is prohibitively high. It just doesn't make sense for a utility to spend lots of money to connect a single household in a remote, rural community, even if the grid is physically present.

The most promising strategies for improving national electrification levels will vary from country to country. Wherever there is grid coverage, however, governments may wish to consider policies that will leverage existing infrastructure, while taking advantage of the economies of scale in supplying last-mile connections. Connecting multiple households at the same time would not only reduce transportation costs but also would allow utilities to plan local distribution networks that minimize costs. Coordinating these connections poses the collective action problem that would need to be solved through a government policy, such as a mass connection program.

The idea of subsidizing last-mile electricity connections to households is, of course, nothing new. This is how many developed nations, including the United States, reached universal electrification.

Water Comes First: Ashley Miller's Work to Support Infrastructure in Southern Kenya

By Sean Burns

How can a wedding change a village? Sounds like some kind of development riddle, or maybe even a Hollywood screenplay. Not for Global Poverty & Practice Senior Ashley Miller.

In the summer of 2013, Miller travelled to Nairobi to participate in a study abroad program at Kenyatta University. As is the case for many students' international sojourns, Miller's most transformative experience didn't occur in the classroom. In the final week of her summer program, Louisa Mwenda, a fellow Kenyatta student invited her to a family wedding in the Kaloleni region of Kenya. The trip would profoundly redirect the course of Miller's undergraduate education and the entire community of Mihingoni, a sub-county of Kaloleni.

Mihingoni is a 6,800-person village in the southern coastal province of Kenya. Miller and Mwenda made the seven-hour bus ride from Nairobi together through farmlands to the Indian Ocean. During the weekend, Miller found herself in all kinds of engaging conversations. Mwenda's father, an American R&B aficionado, bonded with her over Marvin Gaye, Nina Simone, and the global diaspora of African-American culture.

But one thread of conversation trumped them all: the limited access to safe drinking water in the Mihingoni village.

For Miller, conversations about water access and public policy were not new. Concern for the political and environmental dimensions of water distribution were part of what drew her to the Blum Center's Global Poverty & Prac-

tice Minor at UC Berkeley and led her to define her own major in Interdisciplinary Studies. Miller's courses at Kenyatta built upon this interest, focusing on the intersection of resource conflicts with the politics of gender and the challenges of environmental degradation.

During her weekend in Mihingoni, she witnessed how everyone depended on rain catchment and, as she began the trip back to Nairobi, filled with the joy and connections of a wedding weekend, she found herself envisioning an ambitious water project with members of the Kenga Family.

"I remember saying to Louisa's aunt during the car ride: Why don't we work together to get safe water to Mihingoni? But, at first, she misunderstood me; she thought I was suggesting drilling a community bore hole—a small-scale and short-term water source that is commonly funded by outside NGOs." What Miller envisioned was more ambitious.

About 1.5 miles outside of Mihingoni, access to municipal Kaloleni water stops. Beyond, there exists no public infrastructure for the distribution of safe, treated water. What Miller and her comrades in the Kenga family began to flesh out—in the weeks and months after the wedding weekend—was a plan to extend the public water main to Mihingoni, bringing safe water to at least 3,000 community members.

Being an entrepreneurial Cal student, Miller sought out the Big Ideas@ Berkeley competition as a venue to develop and seed fund the idea. Between the fall of 2013 and spring 2014, Miller, through continual and in-depth communication with members of the Kenga family, created a proposal for a community-built project that, in collaboration with Kilifi-Mariakani Water & Sewage Ltd., the Kaloleni municipal water supplier, would bring safe water to a community-accessible water kiosk located at the central Mihingoni

Primary School.

The location was chosen for many reasons. First, the school serves more than 800 students; drinking taps and hand-washing sinks would make a significant improvement to quality of life for students and teachers. Second, the Kenga Family had direct ties to the school faculty, and everyone felt that the school administration was well poised to equitably oversee the community water kiosk through a newly created water committee made up of parents, teachers, and the school principal.

Ashley Miller (center right) with members of the nonprofit she founded, Maji Yaje Kwanza, which aims to provide clean water to the town of Mihingoni, Kenya, and beyond. The phrase translates: water is the first thing or water comes first.

When Miller's proposal won second place in the Big Ideas @ Berkeley Human Rights category, she knew she had accomplished an important step toward the project's realization. To complement this momentum, the Clinton Global Initiative University (CGIU) invited her to the 2014 annual conference. Both Big Ideas and CGIU provided Miller with the mentorship and networking essential to the developing project.

In her lengthy conversations with the Kenga Family, the phrase "maji yaje kwanza" became a guiding aphorism. It translates: water is the first thing or water comes first. For Miller, the phrase struck her as an ideal name

for the project. Much of her undergraduate study has focused on the relationship between water access and broader social justice determinants, including access to education.

"My goal in the project was always about assisting the Mihingoni community in overcoming infrastructural and political barriers to self-determination," she said in an interview.

For Miller and her local collaborators, this decidedly meant working with rather than around local government.

"Many of the international nonprofits in Kenya are digging wells for clean groundwater. While this is good and often reliable, it does not sufficiently address bigger systems of inequality," she explained.

Maji Yaje Kwanza therefore is a community project that seeks to hold the public sector accountable to the populations it is underserving.

During three-weeks in June and July of 2014, Miller and her Kenga Family collaborators successfully coordinated the construction of the 1.5-mile extension of the municipal water main to reach Mihingoni Primary School. With essential support from the local chief, a government water engineer, and school officials, the project hired nearly 200 village residences to dig the trenches and backfill over the new piping. For storage and distribution of the water, two 10,000-gallon tanks were installed at the school property, which now lead to washing sinks and drinking taps.

The Maji Yaje Kwanza team handled the budget and payroll, with a total cost of $20,000 largely subsidized through the Big Ideas award, additional Blum Center support for standout CGIU student projects, and a collection of grants from other sources, including the Donald A. Strauss Foundation, Berkeley's Center for African Studies, and the Shinnyo-En foundation.

Miller is now waiting to hear news of the commencement of water delivery to Mihingoni. While Maji Yaje Kwanza

completed the water main extension and water storage aspects of the project, a larger World Bank-funded initiative is necessary to provide sufficient pumping capacity to get the water to consistently reach the village. Once this comes together, thousands of people will have access to the school water kiosk and, over time, to domestic taps along the 1.5-mile pipe.

The school will sell the water for approximately 6 cents for 5-gallon container of water. This price will enable the school to cover the meter costs, with any additional income going toward the purchase of hand soap (for the three new sinks), antiseptic for the pit latrines, and toilet paper for the students and staff.

For Miller, once the water begins to flow, the next steps will be multiple. First, she aspires for all sub-counties within the Kaloleni region to have similar access to municipal water; this means replicating and scaling up the community process just completed in Mihingoni.

While the first phase of this might be community water kiosks, a further step, in the minds of many residents, should be infrastructure for people to directly receive water in their homes and on their farms. Miller agrees, and she has a particular interest in expanding the practice of rainwater harvesting and drip irrigation in agriculture, the predominant industry in the province. In part, her aspirations are informed by international perspective. "There are many other regions in the world more arid than Kaloeni that have the infrastructure of sophisticated, public water systems," she said. "Think about many areas in the Middle East. Why isn't this the case in Kenya?"

The answer is not lost on the people of Mihingoni. According to Miller, they analyze the inequities that confront their daily lives within the longer history of colonial exploitation of the coastal regions of Kenya. This history has included land acquisition and forced resettlement by successive waves of Portuguese, Omani, and British control.

The Mihingoni are committed, pitchfork by pitchfork, community meeting by meeting, to reverse these colonial legacies.

Crawling the Campus for International Development Innovations

By Sybil Lewis

A dozen UC Berkeley graduate students eager to learn about different campus initiatives on international development participated in the second "Innovation Crawl" Nov. 20, hosted by the Development Impact Lab (DIL) and the Blum Center.

The Innovation Crawl was organized by DIL's Idea Team—a group of interdisciplinary graduate students dedicated to bringing together students, researchers, and faculty working on international development and promoting cross-campus exchange.

"Top-tier research, professional development, and graduate initiatives in international development are going on across this campus, but the average person misses them," said Pierce Gordon, a member of the DIL Idea Team and MS/PhD Student in the Energy and Resources Group. "DIL's Idea Team gather the communities passionate about global poverty issues."

Participants at the Innovation Crawl came from diverse interests, countries, and disciplines. They included Master's and PhD students in Public Health, Business Administration, the School of Technology, Development Practice, and Public Policy.

"The university, like much of the world, operates in silos. I see the importance of understanding what everyone is doing in different departments," said Sasha Feldstein, a first year Masters of Public Policy student at the Goldman School of Public Policy.

The second DIL Innovation Crawl brought students to the Berkeley Institute of Design.

Inspired by the spirit of "bar crawls," the Innovation Crawl included a tour of four labs and centers on campus.

The first stop was the Center for Information Technology Research in the Interest of Society (CITRIS), which focuses on four core initiatives—Energy, Health Care, Intelligence Infrastructure, and Data and Democracy—to address pressing social and environmental issues facing California. Brandie Nonnecke, a research and development manager of the Data and Democracy core, presented the California Report Card, an online platform that allows visitors to grade the state's performance on policy issues such as immigration and higher education. The report card was developed by CITRIS in collaboration with the office of Lt. Governor Gavin Newson.

The group crawled onward to the Berkeley Institute of Design, where Mechanical Engineering Professor Alice M. Agonino showed different human-centered, interdisciplinary design projects, ranging from data collection on Massive Open Online Courses to sustainable design projects in Native American communities.

The final stop was at the Visualization and Control of Biological Assembly Lab, also known as the Fletcher Lab, where students got a first-hand look at tools being engineered to improve the landscape of disease diagnosis around the world. Frankie Myers, a research scientist at the Fletcher Lab, presented CellScope, a technology that turns the camera of a mobile phone into a high-quality light microscope to image patient samples and diagnose diseases such as tuberculosis. Ali Mohammed, a Somali healthcare practitioner who attended the Innovation Crawl, said that in his home country devices such as CellScope could be crucial, as many deaths occur from curable diseases that are not diagnosed due to lack of equipment, energy, or trained medical professionals.

The DIL Idea Team plans to have more Innovation Crawls on themes such as sustainability and health and that address the changing field of international development.
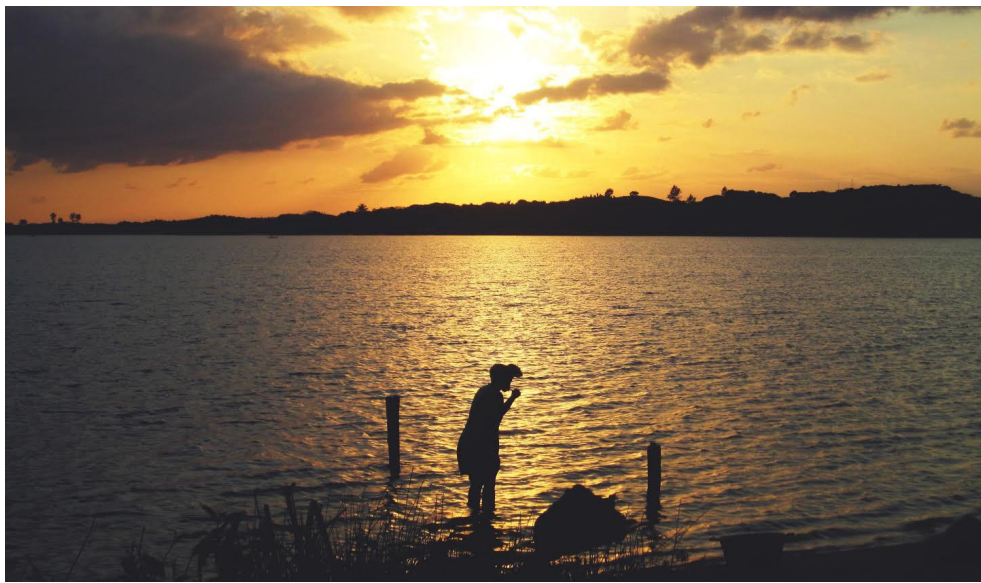
Winners of Global Poverty & Practice Photo Contest

Each fall, students of the Global Poverty & Practice minor of the Blum Center compete to win a cash prize for best photography from their practice experiences. Below are this year's winners.

1ST PLACE:
Priscilla Liu

In the foreground, a young boy in a migrant camp in Hariana, Punjab tends a water buffalo. Like other children in the camp, he's kept home from school to contribute to chores like tending animals or sorting trash. In the background, another boy sorts trash to be sold and a woman walks to a forested area in the camp where ditches serve as makeshift toilets.

2ND PLACE:
Roxanne Rahnama

A woman brushes her teeth at sunrise, using water from a lake in Fort Dauphin, Madagascar, where villagers bathe, wash their clothing, and often openly defecate. Water supply and sanitation are serious problems in Madagascar, where diarrheal disease is a top lethal illness among children under the age of 5.

3RD PLACE:
Thoa Hoang

Walking across a tight rope in the middle of a busy market, this little girl is earning her keep, working to support her family. New Delhi residents tend to pay her only a swift glance, whereas foreign tourists sometimes drop a couple rupees into her metal bowl.

A Contest to Catalyze Literacy Via Mobiles Worldwide

By Andrea Guzman

A 2013/2014 UNESCO report found that 250 million children across the globe are not learning basic literacy and numeracy skills. Of these, 57 million children—a disproportionate number of whom are from disadvantaged backgrounds, live in conflict-afflicted countries, or are disabled or simply girls—aren't enrolled in school at all.

Big Ideas @ Berkeley and USAID's Global Development Lab are aiming to change these numbers through the Mobiles for Reading contest category by inviting students to develop novel technology-based innovations to enhance reading skills for youth in developing countries. This new contest category is sponsored by All Children Reading: A Grand Challenge for Development, a partnership between USAID, World Vision and the Australian Government.

The creation of the category comes amidst a growing international movement to use mobile technologies as tools for enhancing children's reading skills. Numerous studies have shown that children who do not develop reading skills during early primary education are on a lifetime trajectory of limited educational progress and economic opportunities. Meanwhile, mobile devices are ubiquitous, even in low-income regions. According to the International Telecommunications Union, 96.2% of people on the planet have mobile cellular telephone subscriptions.

To Rebecca Leege, project director of the All Children Reading initiative, mobile technology can be a particularly effective tool to disseminate local language instruction materials. "Evidence confirms that children best learn to read in the language with which they are most familiar," said Leege in an email. "However, many children enter schools where they are taught in a foreign language and have little or no access to mother tongue reading resources, making it difficult for them to gain the foundational skills needed to learn to read. This, coupled with low engagement from family or their community to support their learning to read, limits the reinforcement needed to develop a proficient reader."

Leege added: "A basic phone or tablet can provide new and vital mother-tongue reading resources to engage children's curiosity and interest in reading in communities with sparse access to books."

While mobiles for reading remains a new approach, some programs have illustrated promising results. A pilot program for illiterate women conducted by the Afghan Institute of Learning showed that between May 2011 and May 2012 reading via mobile halved the time in which students were able to attain literacy at a basic 2 level. Teachers sent daily texts to students,

Big Ideas @ Berkeley and USAID's Global Development Lab want students to dream up technology-based innovations to enhance reading skills for youth in poor countries.

who read the incoming messages and responded via SMS, demonstrating reading comprehension and writing skills. Researchers found that cell phone texts generated excitement among students, as literacy became not an "abstract skill" of alleged importance, but a tangible skill that could bring the students to "another level of understanding of the world around them."

Over the past few years, a growing number of NGOs, academic researchers, social entrepreneurs, donors, and policymakers have begun to develop and support mobiles for reading technology. On October 15-16 2014, USAID and the mEducation Alliance held the third annual Mobiles for Education Alliance Symposium in Washington, DC, which brought together 185 participants from the Americas, Africa, Asia, Australia, Europe and the Middle East to discuss trends and topics to advance the field.

Although participants repeatedly underscored that technology and mobile devices are exciting new tools to foster inclusive and quality education, many also pointed out that the human element is crucial. "What matters is the human interaction," said Brian Gonzalez, the symposium's keynote speaker and director of the global education sector at Intel. "But not one-to-one, but one-to-many in order to improve the way teachers teach and children learn."

Leege believes that among the greatest barriers to innovation in mobile reading are access to electricity and connectivity. "To assist those learning to read in low-resource settings, low-cost and open source materials easily maintained by the user are vital," she said. "We would like to see student innovation that addresses unreliable—or absent—electricity and connectivity in low-resource communities."

The Mobiles for Reading contest is open to over 500,000 students across 18 universities, from Uganda to Australia (for a full list of eligible universities, visit the Mobiles for Reading webpage.) Students who wish to participate must develop novel mobile technology-based innovations to enhance reading scores for early grade children in developing countries. Alternatively, proposals may use existing mobile-based technologies to improve early grade reading scores by adapting or applying those technologies in new and innovative ways. A five-page pre-proposal is due November 13 to the bigideas.berkeley.edu website. Three to six student teams to be selected to continue on to the full proposal round in the spring. Winners will receive awards up to $10,000 to go toward further developing their idea.

"We hope to capitalize on student's creativity, knowledge, personal experience of learning to read, as well as their desire to innovate for a better world," Leege said.

USAID's Alex Thier on Ending Extreme Poverty

By Abhik Pramanik

On October 20, the Blum Center hosted a talk by Alex Thier, head of the Policy, Planning, and Learning Bureau at the U.S. Agency for International Development. Entitled "Ending Extreme Poverty: What UC Berkeley Can Do," Thier's talk centered around the Post-2015 Development Agenda, USAID's role in the development community, and the need for bilateral and multilateral donors to partner with innovative entrepreneurs to make a difference.

Thier reminded the packed hall that today roughly 1 billion people, or 18 percent of the world population, live in extreme poverty, which the World

Alex Thier of USAID reminded students and faculty at the Blum Center that extreme poverty rates have been cut in half since 2001.

Bank defines as earning or consuming less than a $1.25 day. Although these numbers may seem alarmingly large, extreme poverty rates are actually down from more than 40 percent in 1990.

This reduction represents a fulfillment of Millennium Development Goal 1: to halve the rate of extreme poverty by 2015.

With the imminent expiration of the Millennium Development Goals, the international community is now debating development goals for the next 15 years. Yet one objective is clear: almost every bilateral and multilateral organization, including the World Bank, USAID, the European Union, and the African Union, has set a target of bringing the number of people living in extreme poverty to zero by 2030.

Thier argued that the elimination of extreme poverty is a distinct possibility. While some scholars have talked about severe poverty as inevitable, the remarkable economic movement over the past two decades—which saw 700 million people lifted out of extreme poverty—proves otherwise.

Moreover, the political will to tackle the problem seems to be growing. In his 2013 State of the Union Address, President Barack Obama declared that the U.S. would band together with its allies and partner to end extreme poverty by 2030. Additionally, both USAID and the World Bank have changed their mission statements within the past year to commit to ending extreme poverty.

Though naysayers still exist, Thier said he believes that the outcome ultimately rests on choices—at the individual, village, institutional, and country level to fight for economic development. He noted that the biggest obstacles to ending extreme poverty are fragile institutions and weak governance. Citing the examples of the Democratic Republic of Congo, Botswana, and the Republic of Korea, he summarized how each country took a divergent path since enduring various weaknesses in the 1960s.

Due to rapid industrialization, foreign capital investment, and intensive manufacturing, South Korea is now a high-income country, with a higher life expectancy than the U.S., and it has created its own agency for international development. The DRC, on the other hand, has experienced botched governmental policies leading to debt crises and a bloody civil conflict that has raged for decades. As a result, citizens of the DRC are currently among the world's poorest.

In another example, Botswana has experienced years of high growth followed by sharp economic downturns and even sharper rebounds because of its over-reliance on extractive industries. The lack of economic diversification has hindered Botswana's development, but the country is still much better off than the DRC. Thier said he believes that the key distinction among these nations' economic growth is their level of good governance and effective institutional capacity.

As a result of these insights, USAID recently adopted a "New Model of Development," which centers on leveraging local ownership, engaging in public-private partnerships, scaling up innovative ideas, and using cutting-edge technology to deliver measurable results.

To illustrate how this works, Thier talked about two USAID programs: Feed the Future and Power Africa. The former, started in 2009 in response to the global spike in food prices, works with local farmers to increase their crop quality and yields. The initiative currently runs in 19 countries and already has improved nutrition for 12 million children and pushed 7 million farmers out of extreme poverty. Power Africa was launched in 2013 to help the 400 million Africans who currently lack access to electricity. It aims to double the number of people with access to electricity in Sub-Saharan Africa through the use of innovative financial tools and by applying the lessons learned from the Feed the Future initiative. Within a year, Power Africa has leveraged $25 billion in capital with more than half coming from African nations and the private sector.

Thier ended his talk with a plea to the next generation of problem solvers. He said he hoped UC Berkeley students would heed his call to develop new ideas and technologies to help make development assistance more effective, so that by 2030 extreme poverty could be eliminated.

Some of this work is being done by the Blum Center's Development Impact Lab (DIL), which received a $20 million grant from USAID in 2012 to help transform the way universities source, design, evaluate, and scale up technologies that have a potential to alleviate extreme poverty.

Currently, 90 DIL innovations are being tested and scaled in 30 countries, involving more than 500 interdisciplinary students, and over 400 industry, government, and social sector experts.

Fighting for the Last Mile of Women's Rights

By Sybil Lewis

On Dec. 9, Dr. Phumzile Mlambo-Ngcuka, UN Undersecretary and Executive Director of UN Women, attended a panel at the Blum Center with UC Berkeley gender academics to discuss the state of affairs for women and girls around the world.

Titled "Gender for a New Century: Countering Violence and Social Exclusions," the event served as an opportunity for academics and policymakers to engage in dialogue and marked Mlambo-Ngcuka's first formal visit to an American university.

"Our knowledge about gender has moved so far in the last 30 years, even though many of the problems remain the same," said Raka Ray, Professor of Sociology and South and Southeast Asian Studies and an affiliated faculty member of the Blum Center. "Strangely, there has not been enough sustained conversation between those who produce knowledge about gender and those who create global policies around gender."

Nine distinguished UC Berkeley female faculty members from a variety of departments brought attention to gender problems around the world, including the lack of protection for female migrant workers, the alarmingly high rates of sexual assault against disabled women, and cultural values that normalize violent traditions, such as female genital mutilation. The panel also addressed forms of non-physical violence and discrimination, such as policies that are constructed without recognizing women's physical needs and others that alienate those that fall outside the gender binary.

"You cannot understand gender in isolation; you also cannot understand class, race, and all the other dimensions of oppression and inequality without understanding how they work in and through one another," said Gillian Hart, Professor of Geography and Co-Chair of Development Studies. "This is one of the absolutely crucial challenges that we are facing in the world today."

Mlambo-Ngcuka responded to questions posed by faculty members on the ways that the UN and transnational policy can address violence against women and social exclusion, while also noting limitations within the UN.

For instance, she shared concerns brought up by History Professor Tabitha Kanogo about the dangers of universal gender goals and the importance of local variations. "When we want to target differences and not apply a one-size-fits-all solution, we have to allow for differentiation; but there are times when that is not an appropriate stance to take and we have to insist on universality," said Mlambo-Ngcuka. She mentioned the ways in which national sovereignty arguments are used to avoid implementing human rights legislation. "Nationalism is sometimes a refuge for scoundrels."

UN Women was created in July 2010 to promote gender equality and women's empowerment, and is the UN's youngest agency. Thus far, the institution has spearheaded several campaigns, including HeForShe and UNiTE to End Violence Against Women.

Mlambo-Ngcuka and her colleagues' appearance at UC Berkeley coincided with visits to Silicon Valley technology companies, such as Apple, Mozilla, Twitter, Facebook, and others, to start a dialogue about how technology leaders can promote UN Women's agenda and goals. Cheryl Sandberg, Chief Operating Officer of Facebook, originated the invitation to Mlambo-Ngcuka, who served as Deputy President of South Africa from 2005 to 2008.

Lopa Banerjee, Chief of UN Women's Civil Society Section, said the meetings aim to find ways to increase women representation in positions of power and to look at how data can be used to better understand gender issues. "We need to begin the conversation on how Silicon Valley marginalizes gender," Banjeree said. "The Internet is mostly defined by the users, but [social media company] owners also have a responsibility to be conscious of the politics of that space."

Dr. Phumzile Mlambo-Ngcuka

Mlambo-Ngcuka identified economic participation, particularly in leadership positions, and violence against women as areas where countries have underperformed the most.

UN Women is preparing for the 59th session of the Commission on the Status of Women in March and the UN General Assembly in September to discuss post-2015 development goals. Mlambo-Ngcuka stated that UN Women is working to improve and build on goals established in the 1995 Beijing Declaration and Path for Action, whereby member countries agreed to address 12 areas of concern affecting the lives of women and girls.

While the Beijing goals are not perfect, UN Women will not discard them. Rather, the agency seeks to modify the goals, to minimize the risk of them being "chipped" away. "We have relative control of the Beijing goals and need to sell them as a package to the member states," Mlambo-Ngcuka said.

Mlambo-Ngcuka ended her talk by calling on campuses to mobilize in the fight against gender inequality and violence against women. Specifically, she would like university scholars to provide more research and data about women and girls "to help surmount the trivialization of women's issues." Said Mlambo-Ngcuka: "The UN is not going to win the struggle, the people will—and the people will do that in the streets. Therefore, mobilizing is critical and we need students and the intelligentsia to speak much louder."

Mlambo-Ngcuka called the next 15 years, 2015-2030, a critical period for women's rights internationally. "I would like us to see this period as the last mile. We are going to intensify the struggle of hundreds of years. We should not, however, see this as an open-ended struggle," Mlambo-Ngcuka said. "In Portuguese we call it 'A Luta Continua' (the struggle continues), but it must end at some point."