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The 1,000th Solar Suitcase: Scaling Innovation out of the University

By Tamara Straus

A nurse demonstrates a Solar Suitcase to power medical lighting, mobile communication, and essential medical devices during power outages in her clinic in Nigeria.

Laura Stachel never meant to be a social innovator. She never imagined working in developing countries. And if you told her 10 years ago, that she and her husband, Hal Aronson, would come to focus on energy poverty in healthcare—and that they would deliver their 1000th "Solar Suitcase" to provide electricity to health clinics trying to recover from the Ebola outbreak in Sierra Leone, she would have looked at you with undisguised amusement.

But this, in an overly simplified way, is what has happened to Stachel over the last five years. In 2008, after a back injury ended her career as an obstetrician, she enrolled at University of California, Berkeley, to earn a master's degree in public health. An invitation to observe the maternity ward at a state hospital in northern Nigeria came from Daniel Perlman, a medical anthropologist at the university's Bixby Center for Population, Health & Sustainability. Stachel leapt at the chance to connect her expertise in maternal health to her current studies, and headed to Abuja.

At the Nigerian hospital, as she writes in an essay in the 2013 book *The Rise of the Reluctant Innovator*, "I was immediately struck by the grim conditions. The labor room had four bare metal delivery tables, a limited collection of obstetric instruments, a newborn incubator that hadn't worked in years, a broken lamp, two newborn scales in poor condition, and little else. There were no mattresses, sheets, bright lights or monitors characteristic of an American hospital. Most striking were the frequent power outages that left the hospital in darkness, creating an immense barrier to care."

Stachel was deeply disturbed that the hospital's frequent power outages meant emergency patient care was delayed, disrupted, or just impossible. And suddenly a statistic—that half a million women die each year in childbirth, 99 percent of them in developing countries—was understandable. She described the desperate hospital conditions in an email to her husband. Aronson, who taught solar energy technology in California, decided the sun could provide electricity to the hospital during outages. And when Stachel returned, they embarked on what could become a lifelong journey to provide portable solar energy solutions to places like the state hospital in Zaria, Nigeria.

Stachel credits UC Berkeley and the Blum Center for Developing Economies as among the main forces that enabled her and Aronson to pursue their ideas and then implement them. "This project has always been part of the university," she said on a typically busy morning of staff, student interns, and masses of email in her Blum Center office. "We've been able to tap into the university's amazing human resources—faculty advisers in the School of Public Health, the School of Engineering, Lawrence Berkeley National Laboratory, Haas School of Business, and students from across campus. I would never even have been put into a position to see the problems I saw without having the university context of people doing research in Nigeria and exploring maternal mortality through hospital ethnography."

The Blum Center has provided crucial support from the beginning. When Stachel returned home from Nigeria in April 2008, Aronson worked with her to sketch a design for a stand-alone solar electric system for the Nigerian hospital's maternity ward, labor and operating rooms, and lab. The problem was how to pay for it. Stachel noticed that the campus-wide innovation contest Big Ideas @ Berkeley, now run by the Blum Center, was advertising a $12,500 prize for a social good technology. But the deadline was less than two weeks away.

Stachel, Aronson, and two students from the School of Information and the Energy & Resources Group, Melissa Ho and Christain Casillas, applied anyway and won a $1,000 honorable mention, not enough to fund the project. Then, a few hours after the winners were announced, Thomas Kalil, a university technology policy advisor who had created Big Ideas, called. "You should have won," he said. "How much do you need?" Three weeks later, Kalil secured more funding through the Blum Center, whose mission is to alleviate global poverty through education and innovation.

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The first year of We Care Solar, as Stachel dubbed the nonprofit, was devoted to developing the solar electric system for the state hospital in Zaria. To prepare for a trip in which hospital workers would give feedback, Aronson placed demonstration solar equipment in a large suitcase for his wife to carry. After she unpacked the suitcase and got the components to work, not only did the head of hospital give approval for the full installation six months hence—an operating room technician by the name of Aminu Abdullahi, said: "You must leave your suitcase here. This will help us save lives now." The idea for a portable solar system in a suitcase was born.

When Stachel returned to Nigeria in April 2009 to oversee the larger hospital installation, she saw the fruits of her husband's work: midwives could perform obstetric procedures throughout the night, doctors and nurses could be summoned quickly through solar-powered walkie-talkies, and patients were no longer turned away for lack of power.

Word spread quickly of We Care Solar's innovation. After a chance meeting in April 2009 with Nicholas Kristof, the *New York Times* columnist wrote about Stachel's successful solar power installation, and the former obstetrician was inundated with requests for similar systems in maternity wards throughout Africa and Asia. "That's when I realized the need extended far beyond Nigeria," she said, "and that we needed an intervention that could scale." Stachel, Aronson, and their small team of volunteers began making portable systems from their Berkeley home, while applying for all manner of fellowships and social innovator contests to make ends meet.

We Care Solar has since won multiple awards from UC Berkeley, including CITRIS' Big Ideas Award, a Global Social Venture Competition Award, and the Chancellor's Award for Civic Engagement—as well off-campus recognition from the United Nations Global Citizen Award, the Department of Energy and MIT C3E Award for Advancements in the Developing World, the CBS Jefferson Award for Public Service, and the 2013 CNN Top Ten Heroes Award, among others. Additional support has come from UC Berkeley's Development Impact Lab, which is funded by the United States Agency for International Development. USAID's Administrator Raj Shah has cited Solar Suitcases as a lead example of high-impact university innovation.

"We Care Solar is one of UC Berkeley's social innovation jewels," said Maryanne McCormick, executive director of the Blum Center. "It rose out of a student innovation contest at Cal and has been nurtured by a constellation of faculty, staff, students, and programs. It's been an education to see it grow."

To date, We Care Solar's staff of six has equipped off-grid medical clinics with power in 17 African countries, 10 Asian countries, and in Mexico, Nicaragua, and Haiti. Solar Suitcases are being used not just to provide medical and surgical lighting in blackouts, but to power cell phones and essential medical devices. In addition to installations in clinics and hospitals, Solar Suitcases also have been used for emergency and humanitarian relief. When the 8.0 magnitude earthquake struck Haiti in 2010, emergency medical providers contacted We Care Solar and Aronson managed to retrofit the suitcase design for the country's energy needs. After Typhoon Haiyan struck the Philippines in 2013, We Care Solar received funding from the MacArthur Foundation to bring in 100 Suitcases for emergency workers and maternal health centers. In 2014, as Ebola swept through Sierra Leone and Liberia, World Health Organization and ministry of health officials reached out to Stachel for additional Solar Suitcases to power Ebola checkpoint centers and health clinics. Eventually, though a partnership with Direct Relief and three in-country NGOs, We Care Solar sent 15 Solar Suitcases to Liberia and 70 Solar Suitcases to Sierra Leone. Among them, was the 1,000th that We Care Solar manufactured and distributed.

Of course, 1,000 portable solar energy systems is a far cry from the estimated 300,000 that are needed in low-resource clinics and hospitals. On this point, Stachel is not exactly sanguine. "Our goal is to try to get to 5,000 in a few years," she said, "but I have to say that we had that goal a few years ago. It's been really humbling to work in foreign countries and to see what's involved in logistics."

Stachel continues: "There are people who say, 'Why aren't you making 10,000 of these and just sending them out?' My answer is: We are really sensitive to the fact that the developing world is replete with broken technologies. Training is really important—and training takes time and cultural awareness."

Stachel used to hand deliver every Solar Suitcase, but that was not scalable. So the nonprofit has been training solar technicians, called "Solar Ambassadors," to train hospital workers and ministry of health technicians in Eritrea, Ethiopia, Malawi, Sierra Leone, Tanzania, Uganda, and the Philippines. "The most challenging thing is not the training,"

Laura Stachel credits the Blum Center as a crucial and early supporter for scaling up We Care Solar, which over the past seven years has provided off-grid medical clinics with power in 30 countries.

said Stachel, "but sustaining the technology. How do you make sure it will work five years from now? By definition, these government health clinics are terribly under-resourced." Stachel recounts a recent trip to Malawi, where one clinic lacked paper on which nurses could write patient notes. "How is that clinic going to have batteries, when a replacement is needed in two years or five years?"

Like many nonprofits working in poor countries, We Care Solar is obsessed with identifying best practices. Stachel and her team are using their Blum Center funding—and Stachel's position there as a staff researcher—to explore models for how to get more Solar Suitcases sustainably into the field. The answer, so far, seems to be partnerships. Over the years, graduate students from the Haas School's International Business Development Program have helped We Care Solar identify international and nation-based healthcare organizations who can share costs and logistics and whose staff can serve as Solar Ambassadors. Current partners include UNICEF, Save the Children, Pathfinder International, World Health Organization, Stiftung Solarenergie Foundation, and many ministries of health—and, due to these associations, the number of installations has been expanding dramatically.

"Right now, we are trying to show a model of what is possible," said Stachel. "On the one hand, there is no reason that every health center shouldn't be electrified. We have the technology. On the other hand, priming the ecosystems to accept, install, and be educated on how to use the technology and have a system of maintenance for it, is crucial. If we get enough funding to scale to 300,000 suitcases, we want an ecosystem in place and we want that ecosystem to work."

Eat.Think.Design: A Public Health Course for the Startup Generation

By Tamara Straus

For the creators of the UC Berkeley course Eat.Think.Design, two things are certain. First, the United States is facing a food and nutrition crisis, with rocketing rates of diabetes, hunger, and health disparity. Second, graduate students today—from fields as different as public health, business, information technology, and engineering—want their education to be more hands-on, more interdisciplinary, and more "impactful" to society at large. In the case of the Eat.Think.Design course, they want to spend class time not just learning about food and nutrition problems, they want to devise actual food and nutrition solutions.

This may sound grand, but for the course's three instructors— Jaspal Sandhu, a UC Berkeley lecturer in design and innovation; Nap Hosang, a longtime Kaiser Permanente medical doctor and UC Berkeley School of Public Health instructor; and Kristine Madsen, an associate professor in the Joint Medical Program and Public Health Nutrition at Cal's School of Public Health—there is nothing grand or inappropriate about letting students attempt societal solutions while in school.

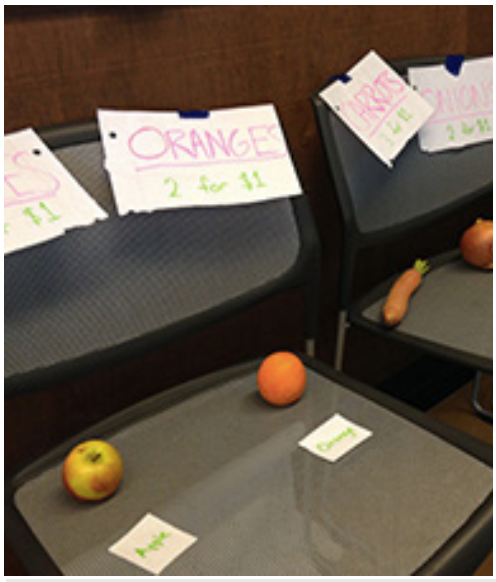
"The reason we emphasize experiential learning is because it has proved to be more effective," says Sandhu, who is also a partner at the Gobee Group, a consulting firm he runs with two other multilingual Fulbright scholars with UC Berkeley roots. Sandhu speaks Punjabi, Spanish, Mongolian, and English, and prior to Gobee worked with the Mongolian Ministry of Health designing mobile health information systems.

Sandhu emphasizes that his students' backgrounds demand more than lecturing. Among the 25 people enrolled in Eat.Think.Design this spring, many have relevant work experience. At least three have started their own companies, several have worked for big companies like IBM, Deloitte, and Eli Lilly, and most have about five years under their belts working for government agencies or large nonprofits. "To keep the attention of such students," says Sandhu, "we need to give them actual problems to focus on."

Working in interdisciplinary teams of three under an instructor, Eat.Think.Design students spend the bulk of the semester on one project, conducting ethnographic and market research, investigating models, and constantly devising and then revising potential solutions. Members of last year's class, for example, streamlined SNAP federal nutrition benefits payments at San Francisco's Heart of the City Farmer's Market, worked with the Kossoye Development Program in Ethiopia on strategies to make home gardening more accessible, and built a pilot program with Partners In Health: Navajo Nation to test a pop-up grocery store in areas that are one hour's drive from fresh food. Although the project in the Navajo Nation helped COPE to receive a three-year, $3 million REACH grant from the Centers for Disease Control & Prevention to pursue healthy eating programs in the vast American Indian territory—Hosang argues that the course is not designed to incubate social innovations per se.

"Our goal is to incubate innovative people—people who can be influencers in the public health sector," he says. Hosang, who has served as head of the interdisciplinary online MPH degree program for the past 15 years and executive director of the Interdisciplinary MPH degree program since 2010, is not subtle in his criticism of public health teaching. "Most academics are in a silo," he said, "and their silo has driven them more and more into their specialist thinking." Yet this specialist thinking, Hosang argues, is running counter to the view that public health is enmeshed in almost every field—from architecture and transportation, to product design and education. "We need to change the way public health professionals approach problems," said Hosang, "and we need them to be in touch with people from other disciplines to inform their problem-solving processes."

Hosang and Sandhu started working on their public health course in October 2010, after Hosang read Sandhu's dissertation on public health design research in rural Mongolia and was impressed by the combination of grassroots and trial-and-error learning. In the spring of 2011, they launched their course, with financial support from the Blum Center for Developing Economies, which seeds interdisciplinary, social impact courses on campus. Madsen joined the course in 2014 when the focus narrowed from designing innovative public health solutions to designing innovative food solutions. In a March 2015



Students in the Blum Center-supported course Eat.Think.Design use the hands-on approach of "design thinking" to understand and develop solutions to affordable food access.

article in the *American Journal of Public Health* titled "Solutions That Stick: Activating Cross-Disciplinary Collaboration in a Graduate-Level Public Health Innovations Course at the University of California," the three instructors describe how their approach is part of a much-needed pedagogical shift. They write:

"A Lancet Commission, convened to discuss the education of health professionals in the 21st century, argued that educational transformation is critical to meet the public health problems we face in this century. Specifically, the commission called for a higher level of learning, moving beyond informative learning, which transmits knowledge to create experts, to transformative learning, which transmits leadership attributes to create agents who can successfully implement change."

Sandhu explained that when he and Hosang came up with the idea for the course, not only was this "change agent" approach novel but no one was applying design thinking or human-centered design approaches at the School of Public Health at UC Berkeley. (He describes those approaches as ones that enable teams to systematically develop novel, effective solutions to complex problems.) Yet Sandhu says it is clear there's a demand for this kind of problem solving.

Sandhu's proof is the continual over-enrollment in and rave reviews of his course. This year, 60 students applied for 25 spots. And for the past four years, 40 percent of students indicated it was the "best course" they took at

UC Berkeley, with the other 40 percent stating it was in the "top 10 percent" and the remained saying it was in the "top 25 percent."

Christine Hamann, a MBA/MPH candidate who took Eat.Think.Design in 2014, confirmed that "the teaching team is phenomenal—both in terms of the academic leadership and the mentoring of graduate students." She also confirmed that she and her fellow students want "practical challenges in graduate school," adding "we are tired of theory."

Hamann is one of the many students who has brought past work into the classroom. Before grad school, she worked for seven years at Partners In Health, most recently on the nonprofit's COPE Project in the Navajo Nation. She said the course forced her to look at Navajo Nation residents' consumer needs around food and nutrition—and to see food less as a supply issue and more of a demand issue. "Traditional public health approaches focus on supply, but that is why you see programs that don't meet the needs of the community," she said.

Hamann and the three other graduate students opted not to focus on the best truck routes to bring fresh produce into the 27,000 square mile territory—and instead focused on seeing what citizens there want to consume and what can last in what is a food (and actual) desert. During the summer of 2014, with funding from the Blum Center, Hamann created pop-up grocery stores in Navajo, to determine which food items were most in demand and could help reduce chronic diseases like diabetes, which affects 20 percent of residents. This exploration helped lead to the aforementioned $3 million CDC grant for COPE.

As to why so many Cal students are so focused on food and nutrition, Hamann has this to say: "From a public health perspective, I think we're seeing the ramifications of the American diet play out in really scary chronic disease indicators." She also noted that there is a general heightened awareness of food systems—"of where food is coming from, the corporations that own it, and the detrimental effects those relationships can have on both health outcomes and business models." Third, Hamann said a growing number of students want to see tech innovation applied to less wealthy and less urban populations—"the people," she said, "who need it."

Then, there are the galling statistics: Americans throw out an estimated 40 percent of food grown per year. An estimated 50 million Americans do not have access to enough food. As of 2012, about half of all adults—117 million people—have one or more chronic health conditions, such as heart disease, stroke, cancer, diabetes, obesity, and arthritis. And childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years.

Sandhu is aware that a course on food innovation is well timed at UC Berkeley. In 2013, UC Berkeley's College of Natural Resources, the Goldman School of Public Policy, the Graduate School of Journalism, Berkeley Law, and the School of Public Health joined forces to create the Berkeley Food Institute to improve food systems locally and globally. A year later, UC President Janet Napolitano launched the UC Global Food Initiative—to prompt all 10 campuses, UC's Division of Agricultural and Natural Resources, Lawrence Berkeley National Lab, and a consortium of faculty, researchers, and students to address food security, nutrition, and sustainability issues. Even BigIdeas@Berkeley, the annual student innovation prize, has a contest category on food systems innovation.

"Our timing is either well forecasted or extremely lucky," said Sandhu.

Eat.Think.Design may be a popular course—and may inspire copycats—but both students and instructors are quick to point out that the course cannot serve as a model for every class. "It is difficult to take more than one experiential class per semester," said Hamann. "The time commitment with fellow students and with our client is just too big." Amy Regan, who took the course in 2013 and now works with the San Francisco Unified School District's Future Dining Experience program, agrees that "compromising and agreeing on the best approach among a group takes time."

For instructors, Professor Madsen estimates the course requires one and a half to two times more time than an average School of Public Health offering, because she, Sandhu, and Hosang each mentor three student groups during and after class time. The three instructors also spend time cultivating their connections to bring in student projects from nonprofits and government agencies. During the class on Feb. 4. 2015, 16 pitches were made by representatives of various organizations, including California Farm to Fork, San Quentin State Prison, and Project Open Hand. "Much more work goes into creating the class because of all the connections to be made," said Madsen.

And very little is scripted. This gives the course the feeling of a kind of pedagogical startup, exciting but uncertain. Madsen said this atmosphere comes with a distinct disadvantage for professors. "You have to admit you don't know as much," she said. "If your identity is wrapped up in being an academic expert, this won't work; you'll always default to the more narrow but comfortable path."

For Sandhu and Hosang, who are adjuncts, there is less face to lose. "I think over the last seven years, since the start of the Great Recession, there's been a transformative energy happening in higher education," said Hosang. "It's coming from the younger generation who see the world has changed and who no longer see college as a ticket to success. That's where this move toward an interdisciplinary, hands-on approach is coming from."

Mezuri: Eight Questions for Eric Brewer on Data and Development

By Jordan Kellerstrass

For most of its history, international development has been an inexact science. Validation of development interventions to improve health or economic outcomes was generally unfounded. With the increasing reliance on data to prove that a program is effective, however, the field is entering a new era. Data-centric evidence is becoming the lead arbiter of whether an intervention is renewed or scaled.

The continual improvement of technology and the digitization of vast amounts of survey, sensor, network, and other numeric and textual data are promising more reliable, timely information for development actors. At the same time, the ability to use this data well is hampered by the lack of consistency in tools and methodologies for end-to-end data management. The Mezuri team — which includes researchers from UC Berkeley's Technology and Infrastructure for Emerging Regions (TIER) group, University

Eric Brewer, a UC Berkeley computer science professor and Blum Center affiliated faculty member, presented the Mezuri Data Platform at Tech-Con 2014, the annual meeting of USAID's Higher Education Solutions Network, hosted at Cal.

of Washington, University of Michigan, and Portland State University — are addressing this issue. Together, they are building a cloud-based data management platform to support the entire pipeline — from raw data collection to meaningful, actionable results in the form of visualizations and statistics.

Eric Brewer is a professor of computer science at UC Berkeley, where he leads the TIER group and is Mezuri's principal investigator; he is also vice president of infrastructure at Google. To provide a deeper sense of the story behind the development of the Mezuri Data Platform, we asked him the following questions.

1. What inspired the idea for Mezuri?

The economic development space has a checkered history, which has led to more intensive efforts to "prove" that an intervention is effective and thus should be scaled up — these broadly fall under the phrase "measurement and evaluation," or M&E for short. This has led to techniques like randomized controlled trials (RCTs) that really aim to meet this bar of proof. However, such an approach implies a significant data management problem: How do you collect, manage, and protect the data you need?

The tools have been rudimentary, typically just laptops and Excel. The consequences are that it is easy to lose data, hard to share it, and even hard to know what exactly was done to the data since you got it.

Making data management and analysis easy and accurate is the essence of Mezuri.

2. How does your background help guide Mezuri development?

A key aspect of Mezuri is leveraging Cloud computing, which is an area of long-time interest for me (and roughly what I do at Google). The Cloud brings reliable data storage with access control, unlimited processing power, and the ability to share not only data but also best practices. Finally, done well, it provides ease of use, as users only need web access to participate and not their own servers or even data centers.

3. Who all is developing Mezuri? How did they come together?

I tried to pull together the best groups I could from around the country to form the whole solution. University of Washington has done a great job with Open Data Kit, which is the basis for the survey aspects of Mezuri. Evan Thomas at Portland State has done the most work with real users (e.g., economists and NGOs) and real data with his SweetSense data collection system; his field experience is particularly valuable. Colleagues at University of Michigan [Lab11] are experts in novel sensors and high-volume, real-time data collection. Bringing these elements together is not easy, but I love the team we have.

4. Why is this possible now? How is this project part of the story of computer science?

The two big enablers for us are the Cloud for scalable data storage and computing, and the rise of mobile phones, especially smart phones, which enable high-quality surveys and data collection pretty much anywhere in the world. These two together will change not only the practice of "development" but are also one of the greatest shifts not only in computing, but in the history of the world. The impact of phones has already been remarkable, but I think the Cloud will be bigger (unless they are viewed as one transition in the end).

5. What is Docker and what role does it play?

Docker, at its core, is a change in the level of abstraction of Cloud computing. Traditionally, the basic unit of abstraction was the "virtual machine" — it is as though you have a raw server and you need to install an OS and applications, and then maintain the OS. This is a high burden, even for computer scientists. The new abstraction is the "container," which is a bundle of applications that fit together well and that can be created once and then reused easily by many. The details of the machine and OS matter less, and users can pick containers that have the software they need (and already know how to use).

6. Who will benefit from a system like Mezuri?

The immediate target audience is social scientists and economists that need to manage data well as part of their research. This should lead initially to better data management and later to more aggressive evaluations that include more kinds of data and that mix surveys and sensors well. However, the real goal is to benefit those in developing regions, by making better investment decisions due to better data.

7. How does Mezuri enable or encourage data sharing?

First, just having data safely in the Cloud is a good start — that is the easiest path to sharing, similar in spirit to Dropbox and Google Docs. Because some of this data has important privacy risks, the key to sharing is actually being able to limit the sharing to just those that should have access. We can also share data at different levels of processing and summarization: often we can share the anonymized or aggregated data, but not the raw data. Finally, it is equally important to share the workflows, that is, the template of processing steps necessary to convert raw data into knowledge. Sharing workflows enables formal review of processes, sharing of best practices, and also enables repeatability.

8. What are the short and long term visions for Mezuri?

In the short term, we need to get real users to collect, manage, and analyze data using the system. This will teach us a great deal about what the real requirements are and what we need to do to make the system sufficiently useful in practice. Long term, I hope to see Mezuri emerge as the de facto way to do data management for the social sciences and a key part of better decisions around how to best spend the world's development money.

UC Berkeley Science Shop: Connecting Community to University for Research

By Sybil Lewis

When Karen Andrade, a PhD student in the School of Environmental Science, Policy & Management, came to UC Berkeley in 2009, she was surprised to discover how challenging it was for outside organizations to partner with students and faculty on research projects.

Although local government agencies, like the San Francisco Department of the Environment, where she worked previously, had countless research topics in need of investigation, Andrade saw "there was no formal, institutionalized way for outside organizations to pose their research questions to the university."

To address what she called this "discrepancy of power," Andrade and other students applied for and won a BigIdeas@Berkeley award in Spring 2013 to start the UC Berkeley Science Shop, a publicly accessible entity within Cal that connects small nonprofits, local government agencies, small businesses, and other civic organizations with undergraduate and graduate student researchers.

Science Shop is housed in the College of Natural Resources (CNR). Rachel Morello-Frosch, a professor in Environmental Science, Policy & Management, said that's an ideal place because a commitment to community participatory research already exists. CNR is home to the Cooperative Extension program, where specialists from UC Berkeley, UC Davis, and UC Riverside conduct research and host public outreach activities to help transfer scientific discoveries from the laboratory to the public.

In its first two years, Science Shop has completed research projects with Nature Village, a sustainability group in UC Berkeley's University Village residencies, and with Salmon Creek Watershed Council in Sonoma County. Science Shop has provided administrative, financial, and project management support to the researchers and free research to the community organizations.

Kareem Hammoud, an undergraduate in the School of Environmental Science, Policy & Management, contacted Andrade after she presented the Nature Village project to his senior thesis class. Nature Village wanted an assessment of the monetary value and sustainability of new shower valves to control and regulate water flow. Hammoud, who planned to write his thesis on the environmental impact of human behavior change, was eager to get involved—and expanded the assessment into a larger social impact project.

From left: Zack Fischmann, former Science Shop associate director; Karen Andrade, Science Shop executive director and founder; Michelle Endo, former Science Shop campus and community relations director; and Connie Kim, Science Shop website developer and graphic designer.

From March 2013 to May 2014, he worked with Science Shop and Nature Village to evaluate the effectiveness of education campaigns on sustainability and give feedback on the water saving potential of the valves. Hammoud recruited 100 households in University Village residencies; half received a low-flow valve and the other half did not. In addition to the valves, some households received workshops and handouts on drought, climate change, and water use.

At the end of the one-year project, Hammoud found that those who used the valves experienced savings of 4 percent, compared to households not using the valves—and that the sustainability education increased savings more than 10 percent. Impressed, University Village administrators did more analysis and determined that if they gave each household a shower valve, the residencies would save an estimated $22,500 to $67,600 per year. University Village is currently planning to install more low-flow valves throughout the residencies.

Andrade argues that experiences like Hammoud's show that Science Shop can challenge students and enable them to interact directly with the people their research is affecting. But this process requires oversight. For that reason, Science Shop assigns graduate student mentors to undergraduate researchers to provide guidance and ensure quality results.

"It is hard to do research for the first time, if you have never done it before," Andrade said. "Science Shop provides students with as much support as we can, while also giving students ownership over the project and allowing for an empowering research experience."

Likewise, Science Shop team members have benefitted from guidance and support from the Blum Center for Developing Economies through drop-in advising hours and workshops. Lina Nilsson, innovation director at the Blum Center and Andrade's mentor, was especially helpful in launching Science Shop by offering expertise in designing and implementing university innovation projects.

In January 2014, the Salmon Creek Watershed Council connected with Science Shop to understand and map out the relationship between the decline and ultimate disappearance of salmon and the residential development along the Sonoma County creek. Daisy Gonzalez, a UC Berkeley senior majoring in Integrative Biology, was doing research for Cleo Woelfle-Erskine, a PhD student in the Energy & Resources Group, who had worked with the Council for his dissertation and connected Gonzalez to Science Shop and the Sonoma nonprofit.

The Council wanted to understand how water use had changed since the 1800s. Gonzalez spent a six months locating maps of Salmon Creek from the Bancroft Library Archives to generate an analysis of how land use affected water usage. Gonzalez noted that the biggest challenge was transforming the Council's initial concern into a viable research question.

"I had done research on water before," said Gonzalez, "but the most difficult aspect of this project was getting out of my comfort zone to find and ask for the resources that I needed."

Noel Bouck, secretary of the Council, said her organization has displayed Gonzalez's water usage maps at a local farmer's market, allowing residents to follow their property as far back to the 1800s. "Working with Daisy has been wonderful, and people can't resist the maps," said Bouck, who noted the maps have drawn dozens of people to engage with the Council about the correlations among

Science Shop team members pose with their first place award certificate from BigIdeas@Berkeley. The team won $7,500 in the 2012-2013 Improving Student Life category.

water usage, land development, and salmon depletion.

Another outcome of the project, said Bouck, is that her organization is connected with new researchers and resources. "One of the most beneficial parts of Science Shop was that it got us access to the UC and all their resources," she said. "We would never have found the maps or had access to them on our own."

In addition to aiding local organizations and providing hands-on research experiences to students, Science Shop hopes to increase student retention in the science fields. "People know science is beneficial, but when you are doing it and you write all those papers, you wonder if it will ever reach someone and go out to the world," Andrade said.

For Gonzalez, who now works for an environmental justice nonprofit in her hometown of Salinas Valley, California, the project with the Council reaffirmed her desire to "serve as a resource to a community."

Science Shop also operates on the idea that community expertise must be tapped and harnessed. The Watershed Council is case in point; community members there had longtime knowledge of water usage and the creek's salmon population, and some were former research professors themselves. Since the project with Science Shop began, council members have provided the university with water samples from different aquifers, information which might have future use.

Science Shop is currently working on another project with University Village and Andrade has received over 20 research queries—more than enough to keep the rotating voluntary staff of 10 busy. The main challenge now is to secure more funding and staff to implement more projects. Science Shop recently applied for a two-year, $300,000 National Science Foundation grant to allow the organization become institutionalized in the university, eventually expanding beyond the environmental sciences to other disciplines

"Science Shop is extremely beneficial for people in my field and for scientists in general," said Morello-Frosch, who guided the organization in applying for the NSF grant. "It's important to collaborate with communities on scientific projects that require community involvement to both collect data and solve problems."

Generation Innovation: Ashley Tsai on Tropical Disease Research and Eradication

By Andrea Guzman

In spring 2013 Ashley Tsai, a UC Berkeley Bioengineering and Material Science major and Global Poverty & Practice minor, enrolled in Public Health 112, which examines health at the individual and community level through multiple factors. Among the draws to the course were its regular guest speakers, including Dr. Peter Jay Hotez, dean of the National School of Tropical Medicine at Baylor College of Medicine.

Hotez is one of the most influential experts in raising awareness about tropical disease research and control, particularly neglected diseases such as hookworm infection, schistosomiasis, and leishmaniasis—which are among the most common infections of the world's poorest people.

"He was really passionate and inspiring," said Tsai. "I decided I wanted to learn more about these diseases."

After Hotez's lecture, Tsai searched online for laboratories that conduct neglected tropical disease research and found Kohn Kaen University in Thailand, which welcomed foreign students. The research sparked her interest and the laboratory was fortunately English speaking. Through a GPP minor fellowship, she headed to northern Thailand for the summer of 2014.

Tsai soon learned that much of the laboratory's research was focused on liver fluke infections, which affect the rural poor in more than 50 countries. "Not a lot of people know about these infections," said Tsai, "and there is not much research or investment in finding out more."

The transmission cycle for liver fluke goes from infected humans, to snails through human feces, to fish that share habitats with the infected snails, and finally back to humans, who consume undercooked fish that carry the parasite. Infections may range from asymptomatic to presenting symptoms, such as abdominal pain, fever, jaundice, and gallstones. Perhaps most seriously, Southeast Asian liver fluke, the type Tsai studied, is classified as a carcinogen and strongly implicated in cancer of the bile duct. Tsai's primary job was to compare the snail proteins and the fluke proteins for further research.

Tsai said she was glad to find that very good research is happening at universities in developing countries. "I realized that it's important to collaborate instead of [universities in wealthy countries] always taking the lead," she said. "Local laboratories working with local diseases probably have more insight than labs at places like UC Berkeley, because the former know the culture and customs a lot better."

She also described how the Kohn Kaen lab took a holistic approach in eradicating diseases. Its efforts involved not just documenting disease transmission but focusing on how to stop transmission by collaborating with other universities and with government agencies and community organizations focused on public education and sanitation.

"This approach showed me that technology and science by themselves are like Band-Aids," said Tsai. "For real change to happen, it has to come from public policy and the local community."

Tsai said liver fluke is easily treated with a drug, but that the drug does not prevent infection from occurring again. In one of the areas where she and Kohn Kaen University researchers were studying, the problem largely derived from a cultural component: people ate raw fish. Thus to be successful in eradicating the disease there, researchers had to create an education campaign about the dangers of consuming fish that was not cooked.

Sean Burns, the Blum Center's director of student programs, said Tsai's field experience allowed her to engage in the kind of interdisciplinary problem solving that is increasingly valued in the fields of development, public health, and poverty alleviation.

"During her practice experience, Ashley began to see that complex development challenges needs complex solutions," Burns said. "She and her fellow researchers are envisioning solutions that bring together breakthrough lab science with grounded insights into culture, politics, and social behavior. It's at this intersection, of what we have begun to call "development engineering," that we will see important contributions to poverty alleviation in the 21st century."

Tsai's GPP practice experience at Kohn Kaen University has altered her career plans. "The practice experience taught me that I can live very well on much less material possessions, and that important and fulfilling work is being done in many organizations all over the world," she wrote after the trip. "As a result, I am now strongly considering a career in the academic or nonprofit sector."

Tsai plans to attend a masters program in chemical biology with a focus on neglected tropical diseases and health issues that affect the global poor.

"The GPP minor made me want to look into a field of global health, and taught me that policy change is very important as well as working with the community itself," said Tsai. "Being isolated in a lab and working with science itself is no longer enough."

Edward Miguel on the Untidy (but Important) Link Between Climate and Violence

By Tamara Straus

Edward Miguel, a UC Berkeley professor of economics and Blum Center affiliated faculty member, has pioneered the use of randomized controlled trials and other rigorous evaluation methods to test the impact of development interventions in the field.

On January 3, 2014, Edward Miguel, the Oxfam Professor of Environmental and Resource Economics and faculty director of the Center for Effective Global Action at U.C. Berkeley, published an article in *Science* advocating for increased transparency in social science research. The article built on years of inquiry in which Miguel has focused on African economic development, rigorous evaluation methods to test humanitarian interventions, and the interactions between health, education, environment, and productivity for the poor.

In the *Science* article, Miguel and his co-authors summarized how researchers can improve the quality, credibility, and impact of their work. They also wrote: "Commentators point to a dysfunctional reward structure in which statistically significant, novel, and theoretically tidy results are published more easily than null, replication, or perplexing results. Social science journals do not mandate adherence to reporting standards or study registration, and few require data sharing."

Miguel is not following this trend. Among the research projects he has pursued over the last decade, and with provision of all data, is the untidy link between climate change and human conflict. In an August 2013 *Science* article, Miguel and co-authors Solomon Hsiang, a climate economist in the Goldman School of Public Policy at UC Berkeley, and Marshall Burke, an environmental economist from Stanford, quantified the influence of higher temperatures on conflict, bringing together the results of 50 previous studies on the topic.

The reaction was divided. Some social scientists commended their analysis, which found "strong causal evidence linking climatic events to human conflict across a range of spatial and temporal scales and across all major regions of the world." Others argued the link had considerable shortcomings—even though the authors made clear that rarely is climate change the only factor in increased rates of violence.

Criticism and debate have not stop the three scholars from continuing their analysis. In October 2014, the National Bureau of Economic Research (NBER) published their follow-up study "Climate and Conflict," which added several more studies to the meta-analysis, confirmed previous findings, and detailed a few more, notably that "temperature has the largest average effect by far, with each 1σ [1 standard deviation] increase toward warmer temperatures increasing the frequency of interpersonal conflict by 2.4% and of intergroup conflict by 11.3%" and that "the 2-period cumulative effect of rainfall on intergroup conflict is also substantial (3.5%/σ)." To better understand the new study as well as how it is affecting social science research, the Blum Center asked Professor Miguel the following questions.

Q: What compelled you and your co-authors to undertake the analysis in the first place?

Edward Miguel: I had been working on this issue of extreme climate and violence since 2002/2003. I wrote papers on large-scale civil war and crime, and a few years after, when I was a visiting scholar at Stanford, I joined forces with Marshall Burke. Sol Hsiang was a grad student at Columbia at the time, working on related things. I think it was Marshall and Sol's idea to aggregate the studies and say what is the common effect.

It took us about a year to complete the Science paper, with the three of us and a bunch of researchers. And then it was another few months of work for the NBER follow up. When there are a lot of data sets floating around, it takes a lot of effort to keep everything straight. You need to standardize everything, normalize everything. The NBER paper is more current—not just because it includes more studies, but because we break things down into current effects and lagged effects, temperature effects and precipitation effects. So we went deeper into what we were already doing.

Q: What were the biggest surprises?

Edward Miguel: I think it's interesting that the evidence continues to accumulate from different parts of the world, with different types of violence, yet the patterns remain the same. That's really the point of putting this together. There really is a striking pattern—and not just in the overall effect of extreme climate on violence, but in that temperature effects seem to be stronger than precipitation effects. Even in rich countries like the U.S., we found that when you have higher than normal temperatures, you have more violent crime.

We feel there's a pretty strong relationship at this point linking climate and conflict, and there's an increasing among data to support that link. There have been critiques—people saying, "You guys are lumping together lots of types of violence" [such as domestic violence, road rage, assault, murder, and rape for "interpersonal violence" and riots, ethnic violence, land invasions, gang violence, civil war and other forms of political instability, such as coups, for "intergroup conflict"]. We acknowledge that and we understand that. That's why we make a distinction between crime and interpersonal violence on the one hand versus more large-scale violence on the other. I do think that it's striking that whether you're looking at land invasions in Brazil, or civil war in Africa, or Hindu-Muslim riots in India, you get these similar patterns. There is something deeper going on.

Q: Do you expect scholarship on the link between climate and conflict to grow—and, if so, in what discipline?

Edward Miguel: It's always been an interdisciplinary effort. The first published paper I wrote on this in 2004 in Journal of Political Economy was with two political scientists. Even Sol and Marshall, my coauthors, in addition to their economics training, have a lot of climate science training—so there's this intersection of different types social scientists in this area.

The scholarship is certainly increasing. And in the year and a half since the Science paper came out, that paper has been cited about 170 times. That's because people are looking at it as a benchmark in the literature. To do a meta-study, we had to make a lot of the decisions about how to normalize data and standardize climate variables. Now, all these papers are coming out adopting our approach to normalization and standardization. We are having an effect on the development of the literature, because we've made it easier for the different studies across disciplines to speak to each other.

Q: What does the standardization involve?

Edward Miguel: It's pretty simple. We're looking at the local distribution of climate variation and then standardizing it. We look at the effect of what's called the "one standard deviation change" in local climate. For example, Northern California's climate is very different from the climate of the East Coast, which is very different from the climate of tropical Africa. Year-to-year, we actually have much greater temperature variation here in northern California than in West Africa. Yes, they have high temperatures, but year-to-year they don't have that much variation in temperature. The more northern latitudes have greater temperature variation.

We take that into account and say, a shift of a few degrees Celsius up in Canada is not a big deal; they're used to it or have adapted to it. But a shift of three degrees Celsius in West Africa—for the crops that they grow, for their economic activity—is a huge effect. So we allow a certain degree Celsius shift to have a big effect in the places where it is significant and a small effect where it isn't. This is kind of sensible, but no one had said, "Hey, we can combine all this data by making this assumption."

Q: What are the policy implications of the climate and conflict meta-study?

Edward Miguel: We certainly want policy makers to react. In the 2014 IPPC [Intergovernmental Panel on Climate Change] Report, two of the chapters cite the Science paper and the authors frame some of their results around it. So I feel our voice is being heard. In terms of what we want people do, we don't really have a solution. No one really has the answer, because it's been so hard to adapt to climate change. But what we want is for policymakers to begin the process of figuring out what the right adaptations are.

It's striking that even the U.S. is not adapting to changing climate. We're such a rich country, we've got great technology, but year to year, especially in a hot year, agricultural production does fall—and we've not been able to deal with it. So what are folks in the Sahel region, in West Africa, supposed to do? They don't have our resources, our technology, and there's been very little political will. There's all this discussion of rich countries creating a massive fund to help poor countries adapt to climate change, but it's mainly talk. So we don't have the answer, but we hope the research encourages policymakers to seriously try to find a solution.

A Cross Sector Exchange on Governance and Digital Technology

By Sybil Lewis

As part of a 10-day program on Leadership in the Digital Economy, co-sponsored by the National Democratic Institute, the Institute for Representative Government and the House Democracy Partnership of the U.S. House of Representatives, with support from the U.S. State Department and USAID, 20 members of parliament from 11 countries attended a panel discussion with UC Berkeley researchers at the Blum Center on Feb. 17, 2015.

The event was hosted by the Blum Center for Developing Economies in partnership with the Center for Information Technology Research in the Interest of Society (CITRIS)—and the focus of the discussion was how technology can be used to promote open government, civic technology, and the development of a digital economy.

Parliamentary members from 11 countries—Columbia, Georgia, Ghana, Indonesia, Jordan, Kenya, Kosovo, Nepal, Peru, Serbia, and Tunisia—met with Blum Center-affiliated faculty and postdoctoral fellows, who are conducting research on the impact of digital technology on civic engagement, corruption, and public service delivery.

"The work being done by Blum Center-affiliated scholars is enriched by interactions with elected government members who can take up new ideas and enact them," said Sophi Martin, director of partnerships at the Blum Center. "It was truly exciting to have this distinguished delegation here, exchanging ideas and talking with us about the real implications of technology on government and citizens."

Among the presenters was Jennifer Bussell, assistant professor of Public Policy and Political Science at UC Berkeley. Bussell researches public services in India, Brazil, and South Africa. Her recent book, *Corruption and Reform in India*, investigated how digital technologies may be used to facilitate citizens' access to the state and thwart corruption. Bussell is currently working on a Development Impact Lab-sponsored project to examine opportunities for crowd sourcing information on government performance in India.

Isha Ray, associate professor of UC Berkeley's

Twenty members of parliament from 11 countries attended a Leadership in the Digital Economy discussion with UC Berkeley scholars at Blum Hall on Feb. 17, 2015.

Energy & Resources group, also presented to the delegation. Ray's research projects focus on access to water and sanitation for the rural and urban poor, and on the role of technology in improving livelihoods. She has been among the faculty leaders of a BigIdeas@Berkeley startup called NextDrop, which uses cell phones and SMS messages to alert people in low-income urban neighborhoods in India when they will receive water. Ray described how in India and other Asian countries, intermittent water supplies greatly inconvenience people, forcing many to wait at home for the taps to start running. The NextDrop team has been training water valve operators in the twin cities of Hubli-Dharwad to send text messages to neighborhoods receiving water. The project is currently rolling out in Bangalore as well.

The third Blum Center scholar to present was Kweku Opoku-Agyemang, a postdoctoral fellow at the Development Impact Lab. Opoku-Agyemang works on the political economy of development—on how both economic and political factors affect social change, with an emphasis on technological innovations. He has been using voice message surveys to understand changes in civic engagement with local governance in Ghana.

In the discussion, members of parliament expressed enthusiasm about the potential cost-effectiveness and ease of using technology to address governance and democratic process, particularly for historically marginalized groups.

Udaya Shumsher Rana, a member of Constituent Assembly for the Federal Democratic Republic of Nepal, asked how politicians can adjust incentive structures to avoid corruption among bureaucrats in charge of government projects.

"We need to think of how formal and informal structures of government are set up, and figure out how to adjust those structures to produce incentives that encourage better behavior," Bussell responded.

Ray provided examples from her fieldwork in India, where she studied incentives to the people who operate the water valves. She noted operators are often bribed into changing water paths or leaving water on longer in one neighborhood over another. She said that the valve men themselves come from low-income backgrounds and there may be other incentives besides money to get them to operate the valves fairly.

Johnson Arthur Sakaja, a member of the National Assembly of the Republic of Kenya, asked whether the panelists viewed technology as a tool for government officials or as a means of transforming governance itself.

Opoku-Agyemang responded by way of example. He said the surveys he conducted in rural Ghana were no "silver bullet" for understanding citizen views or for improving governance. "At the end of the day," he said, "technology tools will only be as useful as the trust communities foster in government"—in other words, citizens who respond via mobiles or other technological means to government projects and measures must feel that their input is translating into real policy change.

Ray added: "In general, I feel that information and technology can empower people, but it won't always lead to power. Yet keeping knowledge and information from people does lead to powerlessness. So to the extent that I do believe in these technologies, I believe in their ability to widen the stroke of democratic participation, but it cannot guarantee it by any means."

During its Bay Area tour, the international government delegation also met with elected government officials from San Francisco, Palo Alto, and Vallejo and with technology industry representatives from Facebook and other Silicon Valley companies.

From Student to Staff: Five Questions for Anh-Thi Le

Anh-Thi Le joined the Blum Center in September 2013 as a program coordinator for the Development Impact Lab after graduating from UC Berkeley with a B.A. in Political Science and a minor in Global Poverty & Practice. As part of an ongoing series with Blum Center faculty, students, and staff, we asked her about her work in poverty action and education.

Q: What compelled you to focus on public service and poverty alleviation?

Anh-Thi Le: I have always been interested in public service, but it wasn't until I came to UC Berkeley that it became a career choice. Inspired by Professor Robert Reich's class on income inequality in the United States, I spent my first two years as an undergrad working with domestic-focused nonprofits—advocating for Asian Pacific American issues in Washington, D.C., developing re-entry services for ex-offenders in Philadelphia, and providing cancer education and awareness on campus. While my work experiences varied, the one constant was a curiosity about how to effectively address and alleviate poverty, not just domestically but internationally as well. I found myself wondering: How can policies be more effective and have greater impact in resource-poor communities? How can we build better bridges between policymakers and community members to ensure that policies reflect the needs of a community? These were some of the questions that motivated me to enroll in Global Poverty & Practice 115 class taught by Professor Ananya Roy, who, by the way, never provided neat answers. Her class inspired me to enroll in the Global Poverty & Practice minor, to continue engaging in discussions about global poverty and inequality.

Q: What is particular or unusual about the Global Poverty & Practice minor?

Anh-Thi Le: Being part of the minor is extremely challenging and thought provoking. It exposed me to the international development space, which allowed me to align my public service interests with my international political science studies. Perhaps most important, the minor connected me to people who are equally passionate and committed to social justice and from various academic and cultural backgrounds. I met students majoring in business, physics, chemistry, social welfare, sociology, and environmental sciences—students whom I otherwise would not have met. Together, we discussed the ethics and methods of poverty alleviation; we framed our perspectives about development (through power, privilege, and sustainability, to name a few); we challenged each other (and sometimes our professors); and we spent hours yelling, critiquing, and discussing the frustrations that came with participating in three-month practice experiences. The Global Poverty & Practice Minor provided a trans-disciplinary ecosystem that allowed for holistic discussion, learning, and practice of development issues. This approach is what makes it and the Blum Center so unique.

Q: How did you come to work at a Blum Center project?

Anh-Thi Le: When I was in India in June 2012, conducting my GPP practice experience with Nest, a U.S.-based nonprofit organization committed to empowering women through market access and capacity building initiatives, my minor advisor notified me about a student position available with CellScope, a UC Berkeley lab, funded partly by the Blum Center and led by Professor Dan Fletcher, which was focused on turning a cellphone into a mobile microscope for disease diagnosis in low-resource regions. A one-year study of the CellScope device was to be conducted in Vietnam, and Fletcher's group was looking for a Vietnamese-speaking student assistant to help support the project. Luckily, my parents, who came to the U.S. in 1975 following the Viet Nam war, had put me through six years of Vietnamese language classes in California and I got the job. While I was extremely excited to work on a global health initiative, I also remember feeling nervous about my qualifications. On the one hand, how could a political science student with little background in global health technology work in a bioengineering lab? On the other hand, the opportunity allowed me to align my passion in the social and economic development of South and Southeast Asia, with an interest in learning more about the role of technology in international development. The first few weeks in the lab were certainly challenging. The CellScope integrates standard microscope options with the visual interface and wireless data capabilities of a mobile phone. With its durable construction, battery power, and ability to digitally record and wirelessly transmit test results, CellScope allows for screening of patients in rural health centers that previous lacked the tools to diagnose TB. For someone who has fairly little technical expertise in this area, the support I received from the CellScope team made the learning curve that much easier.

Q: How did you use your Vietnamese language skills for the CellScope project?

Anh-Thi Le: Neil Switz, then a postdoc with the Fletcher Lab and now a faculty member at Evergreen State College, and I conducted weekly Skype calls late at night with Dr. Ha Phan, UCSF's in-country representative in Vietnam, to troubleshoot any problems with the device. We spent hours replicating, testing, and solving errors when problems arose with the software and hardware, reviewed hundreds of images to conduct quality control, and created countless manuals and instruction guidelines on everything from computer usage to reading sputum slides to support Dr. Ha and the Vietnam National Tuberculosis Program staff. While my Vietnamese skills may have allowed the CellScope team to overcome any language barriers, I must note that Dr. Ha spoke English fluently, had professional public health experience in both Vietnam and the U.S., and ultimately served as a tremendous asset and collaborator for the project.

Q: How did you come to work as a program coordinator at the Development Impact Lab, and what do you do there?

Anh-Thi Le: I began working as a program coordinator for the Blum Center's Development Impact Lab in September 2013. I had recently graduated from UC Berkeley and knew I wanted to continue working in the global development space. After spending a year with CellScope, I became increasingly interested in the role of technology and university-based innovations in international development. Working for DIL and the Blum Center seemed like a natural fit. In my role as a program coordinator, I support DIL's student engagement programs and organize various programs, including the DIL Salons, DIL Workshops, and Practitioners in Residence.

36 UC Berkeley Students Make "Commitments to Action" for 2015 Clinton Global Initiative University

By Andrea Guzman

The Blum Center for Developing Economies is supporting 36 ambitious UC Berkeley's students to attend the Clinton Global Initiative University (CGI U) Conference in Miami, Florida this coming March.

Launched in 2007 by former President Bill Clinton, CGI U hosts student leaders, university representatives, topic experts, and celebrities to come together to discuss and develop innovative solutions to pressing global challenges. This year's conference, held March 6-8 at the University of Miami, will convene more than 1,100 students to discuss how they are taking action to address challenges in the following five areas: education, environment and climate change, peace and human rights, poverty alleviation, and public health.

The Blum Center has sponsored UC Berkeley's participation in the CGI University Network since 2012, supporting students through travel assistance and yearlong advising on student projects. The Network is a distinguished body of higher education institutions throughout the world that have made a robust commitment to the principles of Clinton Global Initiative.

In 2015, the number of UC Berkeley students attending the conference jumped to 36 from 28 in 2014, with approximately 65 percent of the students having additional affiliations with the Blum Center. These affiliations include participation in BigIdeas@Berkeley, the Development Impact Lab, the Social Innovator OnRamp course, and the Global Poverty & Practice minor.

"Student-led innovations and community projects are better positioned to thrive when they have a wide spectrum of support and mentorship," said Sean Burns, Director of Student Programs at the Blum Center. "Because of this, we are thrilled when we see Cal students participating in CGI U, who have been developing their ideas through some of our other Blum Center programs."

UC Berkeley students with Blum Center affiliations are an increasing presence at the Clinton Global Initiative University, which supports students leaders in developing innovative solutions to the world's most pressing problems.

A total of 24 projects will be presented, consisting of 17 group projects and seven individual projects. The projects range from educational programs for survivors of human trafficking to improving energy access in rural, developing areas.

Undergraduate business students Camilo Ossa and Elizabeth Mossessian will be attending the conference representing their project SeedEd Capital. Mentored through the Blum Center's Social Innovator OnRamp course and a current Big Ideas finalist, SeedEd Capital is an online platform that facilitates investors and donors to support underprivileged "seeds," or students, with financial resources. It intends to connect individuals who are passionate about education with students across the Bay Area who need financial resources and other support to pursue higher education. In addition to facilitating student-donor interactions online, SeedEd works to mentor and tutor students so they can achieve their academic goals.

Ossa and Mossessian said they are excited to meet like-minded students at CGI U and to connect with experts and influencers in the fields of education, economic empowerment, and youth support programs.

"We believe the interaction that we can get with experienced individuals, who can mentor us and provide feedback, is going to be immensely helpful in the development of the project," Ossam and Mossessian said in an email.

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