BLUM CENTER
FOR DEVELOPING ECONOMIES

Hand-To-Hand: Human Rights Accompanier Kaya Allan Sugerman

By Sean Burns

There are places in the world where, if you are born into a tradition of subsistence farming and you are determined to preserve that tradition, you risk being murdered. The resource rich, Urabá region of northwestern Colombia is one such place. The reasons for this extreme danger are many and complicated, and recent UC Berkeley graduate Kaya Allan Sugerman is learning them firsthand or, perhaps more precisely, hand-to-hand.

Allan Sugerman is a "human rights accompanier" for a number of marginalized villages in different parts of Colombia, the most well known of which is called La Comunidad de Paz de San José de Apartadó (Peace Community of San José de Apartadó). In 1997, campesinos from several villages declared themselves a Peace Community in an effort to advance their right for political and economic autonomy in a region plagued by violence. The communities face fierce, multi-actor warfare largely fueled through contestation over land that is ideal for drug trafficking routes. Urabá is adjacent to the border with Panama, and therefore lies at a geographical doorway to the markets of Latin and North America. The Colombian Army, state-affiliated paramilitary groups, and guerilla factions—the best known of which is the FARC—have fought for decades in this area. Civilian causality numbers are horrific. Since 1997, in the small villages of Peace Community alone, there have been 210 killings. The unprecedented 2013 report "Enough Already," produced by Colombia's National Center of Historical Memory, puts these numbers in an alarming national context—over 200,000 civilian casualties since 1958, most of these since the 1980s.

To compound this terror, public and private corporations seek profits through extracting the abundant, diverse natural resources of this area and other regions throughout Colombia. Water, mineral deposits, and land for corporate banana farming are at the top of the list. Corporate quests for these resources have historically resulted in mass displacement of indigenous, afro-descendent and campesino communities—an act referred to by human rights lawyers as "involuntary resettlement."

Kaya Allan Sugerman, a Global Poverty & Practice graduate, is a member of FOR Peace Presence, which provides human rights observation.

Against these multiple threats to their survival, the Peace Community, for 18 years now, has committed to a non-violent project of autonomy. From the beginning, they knew they could not walk forward alone.

This is where individuals like 25-year-old Kaya Allan Sugerman come into the picture. Allan Sugerman is a member of the international human rights organization Fellowship of Reconciliation Peace Presence (FOR Peace Presence). Its mission is to provide "physical safety, political visibility and solidarity by accompanying communities and organizations that embrace active nonviolence to defend life, land and dignity." Very importantly, the organization's commitment to accompany must begin with an invitation.

In 2001, shortly after two massacres in the region, the Peace Community in Colombia, which numbers around 1,500 residents, requested that FOR Peace Presence consider establishing human rights accompaniers in their villages. Human rights accompaniment is a preventative tactic increasingly used by threatened communities in many parts of the world, to diminish violence by having international volunteers physically present amidst their communities.

The tactic works for a simple yet disconcerting reason. When poor and vulnerable communities are accompanied, or observed, by people from around the world —then the perpetrators of violence are less likely to commit atrocities for fear of retribution. Thus, human accompaniment works through the power of witnessing—a certain kind of witnessing. Its efficacy reminds

us that in our world, some lives are worth more than others. Allan Sugerman, a U.S. citizen, and her fellow FOR Peace Presence members provide protection to campesinos, because they physically embody the potential of diplomatic and economic intervention by powerful, outside states. In this respect, as others have explored, the tactic is inextricably bound up with dynamics of nation, race, and class privilege.

Allan Sugerman's path toward human rights accompaniment runs right through her experiences in the Blum Center's Global Poverty & Practice minor at UC Berkeley. "I first got interested in indigenous communities struggling to maintain their land during my practice experience for the Minor," recounts Allan Sugerman. "I traveled to Malaysia as part of a research team with Professor Gurdial Singh Nijar to assist rural communities in their defense of traditional plants and coveted, traditional medical knowledge." When Allan Sugerman returned from the field and enrolled in her capstone GPP minor course, she was challenged to reflect on what she had learned in

Malaysia and how this learning might translate into her future choices after graduation. A year after getting her diploma, Allan Sugerman was on a plane to Colombia for her first training with FOR Peace Presence.

"GPP taught me that specific injustices are rooted in larger systems of injustice," says Allan Sugerman. "My biggest reason for signing up for the minor—and doing my work in Malaysia and Colombia—has been my concern for the historic influence of the U.S. government in fostering militarization abroad and fueling conflicts such as that in Colombia, in an effort to advance its own economic interests."

She adds that the work of accompaniment has enabled her to carry out her commitment both to combating the immediacy of injustice—protecting people's lives—and to understanding and changing the larger structures that produce and reproduce inequities. That is because human rights accompaniment requires two kinds of work. First, the strategic act of being physically present in the right places at the right time requires enormous amounts of research, planning, and communication. Second, for accompaniment to be successful, all of the relevant actors facing potential violence must be aware of the presence of FOR Peace Presence members. As the social landscape of struggle can often shift, this requires studying who is a threat to the community at any given time and effectively communicating with various kinds of state diplomats to ensure maximum visibility for accompanied communities. Visibility is paramount for accompaniment, and, despite it being an explicit gesture of solidarity, human rights organizations such as FOR Peace Presence must maintain an unwavering commitment to political neutrality. They are present as observers. They bring no material aid and no political opinions.

To carry out these roles, Allan Sugerman splits her time between a variety of rural villages (some coastal, some in mining-intensive areas around Cesar and Magdalena, and some in the North) and the capital city of Bogotá, population 7 million plus. This rotation enables her to conduct research and carry out vital communication in the capital, and then return to different villages three times a month with fellow accompaniers and partner organizations.

While the work of FOR Peace Presence specifically focuses on accompaniment, the broader vision for nonviolence motivates employees and volunteers to collaborate with other NGOs—some of which explicitly advance social justice advocacy work. In the fall of 2014, Allan Sugerman helped coordinate an educational speaking tour to multiple U.S. cities—including Berkeley—with partner organization Tierra Digna. The tour, entitled People, Profits and the Planet: Prospects in the Face of Corporate Supremacy, enabled Tierra Digna human rights lawyer Johana Rocha to build awareness in the U.S. around the extractive industries and large-scale development projects affecting rural Colombian areas such as Urabá. Kaya travelled with the tour as a translator and representative of FOR Peace Presence.

Having worked with FOR Peace Presence for a year and a half, Allan Sugerman has reflected intensely on the meaning and practice of accompaniment. She emphasizes that the most salient characteristic of her relationship with the people of the Peace Community is "the feeling of mutual respect—treating each other as equals." She says, "My day-to-day interactions feel like an intercambio, a knowledge exchange." As Allan Sugerman relays these impressions to me, I am struck by how aligned they are with a current, public conversation on the term "accompaniment" as a promising orientation for carrying out social justice work in variety of contexts.

While FOR Peace Presence and other human rights organizations use the term to reference a specific set of protective tactics, other activists broaden its meaning to different kinds of solidarity work. In 2012, for example, U.S. labor and prisoner rights lawyer Staughton Lynd wrote an impassioned book—part memoir, part treatise—entitledAccompanying: Pathways To Social Justice. His central claim is that accompaniment, with its emphasis on humans collaborating as equals, provides an urgently needed corrective to long prevalent notions of "organizing" in North American social justice traditions. Lynd opens his book with an analysis of Dr. Paul Farmer's well circulated 2011 commencement address at Harvard's Kennedy School of Government—"Accompaniment as Policy"—wherein Farmer, the world-renowned founder of Partners in Health, describes his understanding of the term. Farmer's insights stems from decades of observing development projects, some of which have failed miserably, worsening people's lives through "unintended consequences of social action."

For Farmer, accompaniment is an inspiring corrective because it demands a certain kind of accountability defined both by its endurance and its humility. "I'll go with you and support you on your journey wherever it leads," he says

Allan Sugerman splits her time between a variety of rural villages in Colombia, like this one in a mining village, and the capital city of Bogota.

of the practice. "I'll keep you company and share your fate for a while. And by 'a while,' I don't mean a little while. Accompaniment is much more often about sticking with a task until it's deemed completed by the person or people being accompanied, rather than by the accompagnateur." This last line foregrounds how accompaniment, as a mode of comporting oneself in social justice work, compels a specific approach to evaluating the success of our actions: those who seek to help should not serve as the measurer or the measurement tool for what is working.

As I sit in my UC Berkeley office, listening intently over Skype to Kaya Allan Sugerman share her stories from northern Colombia, thinking about their relationship to the ideas of Lynd and Farmer, I am struck by the relevance of accompaniment to the challenge of social justice.

At its most elemental level, the yearning for a more socially just world presents two problems: what and how?What is the particular vision of social justice? How to go about working toward that vision? Answers to these questions dramatically affected world events throughout the 20th century, and any current effort to advance struggles for social justice should grapple with these complex legacies and sustain these questions. Accompaniment offers a particular way into and a particular way forward for both the what and the how of social justice.

Listening, walking hand-in-hand, these are the practice.

I thank Kaya Allan Sugerman '12 for speaking with me; any errors in understanding or analysis are mine alone.The Global Poverty & Practice minor at UC Berkeley creates an educational community for student scholar-activists committed to exploring the difficult ethical and political questions necessary for building social justice in the 21st century.

The Double Burden of Malnutrition: An Interview with Janet King

By Tamara Straus

There is a quotation on the website of the Children's Hospital Oakland Research Institute (CHORI) that sums up Dr. Janet King's ability to combine international nutrition expertise and common-sense thinking. The quote says: "We don't need new lab research to show us the benefits of fruits and vegetables. We need research that emphasizes real-world solutions."

King, who serves as executive director of CHORI, is not your typical research scientist. In addition to publishing 225 scientific papers, review articles, and book chapters, she has a track record for turning nutrition research into public policy. In the early 2000s, she chaired the U.S. Department of Agriculture/U.S. Health and Human Services Dietary Guidelines Advisory Committee, which resulted in the Dietary Guidelines for Americans 2005. She is a member of the National Academy of Sciences, Institute of Medicine; and in 2007, she was inducted into the USDA Research Hall of Fame. She also has directed the USDA Western Human Nutrition Research Center at the University of California, Davis (1995-2002) and chaired the Department of Nutritional Sciences at University of California, Berkeley (1988-1994).

The Blum Center sat down with Dr. King, a Blum Center advisor, to learn more about the connections between child nutrition and socioeconomic development.

When did child diabetes rates start to spike in the United States?

We began to see a rapid increase in the incidence of obesity in children in the 1980s. However, the association between obesity and Type 2 diabetes didn't make it into the scientific literature until 20 years later. I can only speculate why this is. It might be because the incidence of obesity in children hadn't reached the threshold where the association with diabetes was apparent to medical staff. Nonetheless, these days about 45 percent of all cases of diabetes in children are associated with obesity and are type 2 diabetes. Whereas in the 1980s, the only time we saw diabetes in children was when it was type 1. As that time, we would call type 2 diabetes "adult onset diabetes," because it was so rarely seen in children.

What were the chief reasons for the 1980s rise in child obesity and diabetes in the U.S.?

I think there are many contributors. One is the increase in screen time among children. TVs were certainly available in the 1960s and 1970s, but we didn't have the access to the computers and videos games that we have today. That has been a huge impact on the lifestyles of children, in that they spend more time in front of the screen than outside being physically active. What we hear in the obesity clinic at Children's Hospital Oakland is that it's not safe to play outside. So children come home from school, and many of them have their own video games or TVs in their room, and they spend most of their time playing in front of the screen. Another factor is that that the family structure has changed in the last 35 years. Now it's almost essential that both parents work outside the home to make enough money to support the family. That means meal structures have changed. The meal together that I think was fairly common in the 1960s and 1970s doesn't exist as much across all economic groups. I think that's another problem because it encourages more snacking, especially among children. They come home from school, they're hungry, and they eat snacks. The snacks are high in sugar and fat and generally high calorie.

What are you learning about the child diabetes worldwide?

I should mention first that there are differences in susceptibility to diabetes linked to ethnicity. Asians are more susceptible to diabetes, as are Latinos, Native Americans, and African Americans. In Mexico, the incidence of diabetes is growing very rapidly both in adults and children. It's associated with the genetics as well as with lifestyle and diet. But the Mexican government is very proactive in developing and implementing nutrition programs to improve the quality of the diet of lower income people. The government supports subsidy programs providing a special fortified milk for mothers to feed to their children. They also have a tax throughout the country on sugar-sweetened beverages. Berkeley is the only place in the United States where such a tax exists. Well, the whole country of Mexico has a tax on sugar-sweetened beverages.

Vietnam is another country, where I work, where obesity is increasing among children. You'll be out in the middle of the countryside and find a road-side stand selling sweets, salty snacks, and sugary drinks. Those items are readily available throughout the country. I'm not aware of any programs at this time in Vietnam to reduce the intake of high-sugar, high-fat foods to prevent the development of obesity.

What is clear, however, is that child obesity and diabetes is a global phenomenon. It accounts for what we call the "double burden of malnutrition": under-nutrition and over-nutrition co-exist in the same household and in the same neighborhoods. It's really hard to sort out why one child is stunted, thin, and under-nourished, while the next child is overweight, yet also stunted and malnourished.

How are we trying to solve the child diabetes epidemic in the U.S.?

We recognize that part of the problem is that many young mothers today have very little experience in purchasing food, preserving it appropriately, and cooking it. Thus, frozen meals, ready-made foods, and quick meals from fast-food restaurants are common. Those particular foods tend to be higher in calories and more expensive than preparing good meals at home. I think it is very important to establish programs that teach families how to manage the household with respect to food and to create healthy meal patterns.

Do you think we need to bring back home economics?

We need to bring back something! I know we don't have home economics in the schools anymore and it's not a cool thing to be studying, but food management skills are life-enhancing skills. If you don't know how to manage your money or manage your food supply, it puts you at a real disadvantage.

Do you see potential learning from previous public health campaigns— for example, smoking—that could be used to thwart childhood obesity

and diabetes?

The message is easier to understand for smoking than for nutrition. The message with smoking is: Stop. But we can't tell people to stop eating. What we can do is ask people to change habits. Yet many nutritionists are pessimistic about using that approach, because it's difficult to get people to change habits. It's also expensive. It takes a lot of time to provide meaningful, one-on-one counseling. Thus in the United States and in many countries, to implement change more expediently, we've increased the availability of foods fortified with vitamins and minerals in the market. Breakfast cereals are a prime example.

Is this less effective?

I think it's less effective if you're not providing the nutrition education to go along with the increased availability of fortified foods. If you're fortifying your breakfast cereals, it's true you get more of certain nutrients from that breakfast cereal. But there are other micronutrients and health components in our foods that aren't routinely added as fortificants. We need a variety of foods in our diets. That is an old, well-worn message that doesn't get the public's attention any more. .

Was there a highpoint in this country in terms of nutrition?

It's hard to say. We have always had nutritional problems in the United States, but they have never been as severe as in lower-income countries. For example, we had pellagra, a niacin-deficiency disease, in the southern part of the U.S. This public health problem was the basis for our first major public health nutrition program, fortifying wheat flour with thiamin, riboflavin, niacin, and iron. Since then, the U.S. has always played a leadership role in developing solutions for major nutrition crises around the world. In the mid-20th century, when millions were starving from insufficient food, Norman Borlaug, a biologist and agricultural scientist, developed high-yielding, disease-resistant wheat varieties that are credited with saving billions of lives due to starvation. This was the origin of the "green revolution."

Our nutritional problem in the U.S. today is more complex, in my opinion, than any other nutritional issue faced in the past. Today, both children and adults are suffering from malnutrition because low-cost, high energy, tasty, but nutrient-poor, foods are readily available. The problem affects the affluent as well as the poor, but it is more common among the poor because these foods are inexpensive. Today, as never before, people have to make a conscious decision to eat healthy because many less-healthy foods are readily available.

If you could broadcast one message about nutrition to caretakers of children what would it be?

Focus on healthy snacks! However, I also think diet quality would be better if we focused on eating regular meals rather than snacking throughout the day. That would enable to the child to learn how to recognize hunger and satiety. Since many of our children snack continuously throughout the day, I'm unsure if they ever learn when they are hungry and need to eat and when they are satisfied and should stop.

Is there enough discussion about the correlation among child diabetes, malnutrition, and poverty? If so, what is productive about the discussion? If not, what impedes the discussion?

It is a pity that we have hungry children in the United States. Many children in low-income households suffer from food insecurity, which, in turn creates problematic food behaviors, such as hoarding and gorging. The body responds to this irregular pattern of food intake by becoming very efficient at storing calories as fat when food is available. This puts the underfed child living in poverty on the road to obesity and, eventually, diabetes. During the last decade or two, we've learned a lot about this double burden of malnutrition. But, we are far from solving the problem. Why? I think this is largely because of the complex, multifactorial nature of the problem. As a nutrition researcher, I talk primarily with other pediatric nutrition investigators. But we rarely interact with experts in public policy, economics, food science, and agricultural sciences to discuss solutions to the problem. Until leaders from all components of the issue come together with a combined commitment to develop effective solutions, I am pessimistic that we will make much progress.

The Ultimate Innovation Jam: Big Ideas@Berkeley Announces 2014-2015 Contest Winners

By Sybil Lewis

On May 5, the Blum Center celebrated the eight-month journey that was the 2014-2015 Big Ideas@Berkeley student innovation contest with an awards celebration recognizing 46 winning projects for social change.

This year, the contest received a record number of applications from 201 teams representing over 700 students across nine UC campuses and 17 other universities. The teams presented hundreds of innovative ideas to address today's most pressing issues—from the need for financial literacy among U.S. students facing college debt to the best way to produce sustainable energy in rural Kenya.

Addressing a packed auditorium at Blum Hall, Big Ideas Program Manager Phillip Denny said: "I hope that what contest winners will gain from Big Ideas today and going forward is four things: inspiration, support, funding, and validation."

Students at the event could be seen smiling and nodding. "During our project design, our mentor—an international development expert—helped us a lot in thinking about how to devise a sustainable model that would actually scale," said Linlin Liang from Michigan State University, who worked on the the m-Omulimisa

SMS Services project, which shared first place in the Food System Innovations category and provides agricultural support to farmers in Uganda through mobile technology.

The other first place winner was Bahay Kubo, a UC Berkeley team that revitalizes Filipino food and culture to promote health through the creation of a culturally based garden and culinary arts program.

Big Ideas is one of the biggest inter-campus efforts in the University of California and the nation. It brings together such entities as the UC Berkeley Blum Center for Developing Economies, UC Berkeley Energy & Climate

BIG IDEAS PITCH DAY GRAND PRIZE WINNERS

GLOBAL IMPACT

1st Place Clean Water for Crops: As Simple as Sand and Seeds (UC Davis): This project will construct and operate a pilot-scale, slow seed-sand filtration system at UC Davis to assess the feasibility of a drinking water treatment technology, prior to building a pilot-scale system in Sololá, Guatemala in order to adjust the system to local conditions.

2nd Place Creating Decodable Readers in Haitian Creole (College of William & Mary): This project employs local teachers to create and teach reading materials that integrate Haiti's mother-tongue and native culture. At its core, it is a software application that enables writers to create books for beginning readers using a systematic phonics approach.

3rd Place Amplify Impact (UC Berkeley): Amplify Impact raises global awareness about social innovation in the Middle East by providing an online platform for nonprofits and socially minded for-profits to produce and distribute story-driven, low-cost videos. The team envisions a world where initiatives that are catalyzing opportunity, hope, and positive change receive the attention they deserve.

CAMPUS & COMMUNITY IMPACT

1st Place BCAPI (UC Berkeley): BCAPI is developing a powerful software and hardware package that will enable technology developers and researchers to create a range of Brain Computer Interfacing (BCI) technologies to assist people with physical disabilities who lack control of their bodies but still control their minds.

2nd Place Bahay Kubo – Gardens of Living Tradition (UC Berkeley): Bahay Kubo ("Little House") revitalizes Filipino food and culture to promote health through the creation of a culturally-based garden and culinary arts program. Bahay Kubo's purpose is to lift up sustainable, healthy Filipino food practices that can ignite a culture shift toward good health.

3rd Place Responsive City Lights: Urban Streets as Public Spaces (UC Berkeley): Responsive City Lights uses interactive light installations to enhance the perception of streets as engaging public spaces. The project reduces crime by increasing foot traffic and pedestrian interaction, bringing the Internet of Things into urban spaces to help fulfill a vital social need.

Aileen Suzara presents Bahay Kubo: Kitchen Gardens of Living Tradition at the Big Ideas 2015 Grand Prize Pitch Day.

Institute, Texas A&M's Center on Conflict and Development, the United States Agency for International Development, USAID's Higher Education Solutions Network, the Center for Information Technology Research in the Interest of Society (CITRIS), the UC Berkeley Food Institute, the UC Global Food Initiative, Michigan State University's Global Center for Food Systems Innovation, the Associated Students of the University of California, and AidData at the College of William & Mary—as well as 150 judges and 45 mentors. Primary support comes from the Rudd Family Foundation.

This year's contest categories included Clean & Sustainable Energy Alternatives, Conflict & Development, Creative Expression for Social Justice, Food Systems Innovations, Global Health, Improving Student Life, Information Technology for Society, Mobiles for Reading, Open Data for Development, and Scaling Up Big Ideas.

Students not only spend hundreds of hours researching social impact solutions—they also learn to refine and, as important, sell them. "The presentations were inspiring," said Christie Vilsack, senior advisor for international education at USAID who served as a judge for the Global Impact Category. "They were all very poised and eager to take advice and answer questions."

Among this year's first place winners were BCAPI, a team of five UC Berkeley undergraduates who are developing a software and hardware package to help people with physical disabilities better drive wheelchairs, write, and communicate. BCAPI's technology relies on advancements in Brain-Computer Interfacing. The BCAPI team won the $8,500 first place prize in the IT for Society category as well as $5,000 from the Campus and Community Impact

Pitch competition that took place on April 28.

Other double awardees included the UC Davis team Clean Water for Crops, which seeks to implement a water cleaning system in Guatemala using sand filtration and a local Maringa seed to treat the contaminated water of Lake Atitlan. Clean Water for Crops team members emphasized that an important part of their idea was not just the ease of use of the technology, but the community engagement process.

"Our mentor Khalid Kadir made us think about the political and community impact of the work—and that the technology is the easy part, while ensuring community involvement is a lot harder and crucial to sustainability," said Kyle Fuller, one of the graduate student team members.

Fuller, like many who have competed for and won Big Ideas, see their experience as the beginning of a lifelong quest to scale this or another social impact project. Over the past nine years, Big Ideas participants have gone on to secure over $45 million in additional funding—and dozens of projects have emerged as successful and sustainable for- and non-profits.

"I have one simple message," said Lina Nilsson, innovation director at the Blum Center and project mentor to some of the teams. "This is not the final step. Continue to show people your ideas and know that you can continue to rely on us a resource to talk through the inevitable challenges ahead."

Summaries for all 46 award winning big ideas can be found at: bigideas.berkeley.edu

Microsoft's James Bernard on the Intersection of Education, Technology, and Development

By Tamara Straus

James Bernard is senior director of global strategic partnerships for the education group at Microsoft, where his team builds multilateral partnerships in more than 130 countries. The core focus of these partnerships is ensuring that technology serves as an accelerator of effective school management, innovative teaching practice, and students' acquisition of 21st-century skills. The Blum Center talked with Bernard in advance of his two-week fellowship supported by the Blum Center's Development Impact Lab.

What have been some of the takeaways from your time at Microsoft bringing technology to developing countries?

One of the key takeaways has been that there is no single answer to this question. There are so many local contexts that are relevant and so many stakeholders, that every situation needs to be approached differently. Nonetheless, I offer three key takeaways:

1. Ensure that the government is included in and feels ownership of all technology decisions. At Microsoft, we see the government as a major stakeholder that needs buy-in and ownership to create long-term sustainable change. But to be successful, the public sector needs the help of many other players, including civil society, the private sector, donors, and other nongovernmental players. In education, many governments make the mistake of thinking that technology—and in particular, the devices they want to give students—will solve all the problems in their education systems. The reality is that technology is only a platform and will never be successful without the right supports, including teacher training, content and curriculum, and assessment of outcomes. Not to mention that the government also needs the necessary buy-in from stakeholders that might be against technology, such as teacher unions or parent-teacher groups. So we work with ministries of education to develop a long-term strategy to bring in the right technologies for the context of that country. We do this through a series of policy-level discussions facilitated by a third party like UNESCO or British Council, but led by the ministry of education, and involving all key stakeholders. This should lead to an ICT [information, communication and technology] strategy before the government goes to tender on devices, and will hopefully ensure that the right choices are made.

2. Ensure that the right technology is being used in the right context and even whether technology is the right solution. Will it create more access or more of a divide between the haves and the have-nots in a community? Will it withstand the rigors or a harsh physical environment? Will people know how to use it? How does it get replaced? Can a mobile solution be used or is a laptop/tablet right?

3. There is tremendous creativity and innovation happening on the ground in many developing countries. Don't assume that something that worked in the West is going to work in Africa, or something that works in Africa will work in Latin America. Find local solutions to local problems, and local enterprises to solve those problems. M-Pesa would never have worked in the U.S., but it was timed perfectly for Africa. It is a great example of a locally created solution.

How can NGOs be most effective in promoting economic development in poor countries and regions?

NGOs have two things that many multinational, private sector organizations sometimes lack: credibility and reach. In many cases, these organizations have worked for years or decades in developing countries and have deep relationships with local communities and/or governments. They bring a credible, non-biased opinion that the government trusts. By partnering with such organizations, private sector companies—which often want the same outcomes as other stakeholders—can overcome the perception that they are simply vendors to the government. Second, NGOs have reach into local communities that the private sector will never have. For example, in Ghana, a country with a $38 billion GDP, Microsoft has two to three people in the country, covering all segments across the entire country. One of our NGO partners, Plan International, is active in 500+ communities in Ghana alone.

NGOs may be mission-driven, but ultimately many see the investments of funding and human capital as a way to build a more productive society that will help alleviate poverty.

How can higher educational institutions like UC Berkeley advance international development goals?

Higher education institutions play a critical role, because they can provide research and development in the space that has been lacking in the past, particularly in the area of technology. Most technology companies are optimizing their R&D resources for markets where they see the greatest growth in the near- to mid-term. Unfortunately, this means many companies are focused on technologies that are relevant for the West. (I think, however, that there is great opportunity for market growth in technology is in developing countries, where most technology users are net-new versus in the West, where technology is essentially a renewal business.) NGOs don't have R&D budgets for the most part—although a few, like PATH, do some R&D, but they are the exception not the norm. So universities can play a critical role in pushing change in development by working with both NGOs and private sector companies. Additionally, universities can provide agnostic research into successful strategies and implementations.

What are the biggest changes you have seen in the intersection of development, education, and technology during your career?

First, I see a greater willingness for different stakeholders to come together to solve some of the big issues facing education: ensuring students have access; driving a greater focus on student learning outcomes; ensuring teachers have time on task; keeping girls in school and out of dangerous situations. Additionally, we are seeing some critical technology trends that increase digital access:

1. The evolution of the User Interface. Touch screens are now almost ubiquitous on most devices. This allows technology to be used in both online and tactile learning environments. Nothing can replace good teaching, but when teachers are supported by interesting content that takes advantage of the UI, magical things can happen. We are seeing many companies now reinventing what it means to serve educational

content. For example, one company created an app that allows students to see a forest, drill into an individual tree, then a leaf, then the cell and the molecular structure of the leaf. They can spin the elements around, and can pull in data from other sources. It changes the way we perceive of educational content.

2. The role of the device. Device form factors have changed drastically in the last 10 years. We now have more computing power in a mobile phone than many early mainframe computers had. In addition, the cost of devices has reduced significantly, to the point where it'll soon be possible to have a high-end device for less than $100 a unit. The danger here is that governments begin to focus on the device rather than supporting it in the right ways. So it's critical that funds, which would have been used for devices in the past, be used for content, assessment, and teacher training. No matter what, a device cannot replace a teacher, so teachers need to understand how to use devices as a part of their teaching practice.

3. Universal access. It's continuously getting easier for people to get online, even in some of the more remote areas of the world. More can be done with 3G and 4G wireless connections, and we're seeing a number of new technologies becoming more ubiquitous, including TV White Spaces, which use unused TV band spectrum (essentially unused channels) to deliver long-range Wi-Fi that can cover up to 100 square kilometers, and does not require line-of-site access. We're already piloting this technology in a number of countries, and believe that with effective cooperation among wireless providers, regulators, and other players, TV White Spaces can be a game changer in providing last-mile digital access. If we have better access, you can easily imagine kids living in a community without a fulltime teacher being able to learn from a trained teacher elsewhere using Skype.

4. The move to the cloud. With greater access to high-speed connections, comes a greater opportunity for education systems to take advantage of cloud services. This unlocks a number of opportunities—from new ways to finance technology (reducing device costs through services models), to better collection and distribution of data, to providing richer, more individualized content for learners, based on where they are in their learning journey. Many of our partners are working on adaptive learning algorithms that allow teachers to identify where a student is, and the system will provide content based on their level of learning.

What areas are being overlooked in the intersection of development, education, and technology?

As I said earlier, too many education decision-makers still view the device as the answer. And this isn't just a developing world problem. Look at what happened in LA last year with their iPad rollout. It's a well-documented failure, because the devices were not well supported. Or the One Laptop Per Child program in Chile or Rwanda. These examples prove that if the devices aren't supported with teacher training, content, assessment, etc., they will fail in education. In many parts of the world, school or system-wide policy does not account for technology's role in driving 21st-century skills or student learning outcomes. A study we did in 2011 in seven countries (including developed and developing countries) showed that teachers who used innovative practice—allowing students to learn inside and outside the classroom, allowing students to learn at their own pace, and using appropriate technology—increased the acquisition of 21st-century skills that ultimately will make students more employable. But many schools don't even allow students to use cell phones in class, and are geared more toward teaching methodologies that were relevant 100 years ago.

If you could make one magic technological fix in the world today, what would it be?

Low-cost solar base stations that could tap into the unused wireless spectrum, and regulations that support this kind of access. Access is the key to all other technologies being used effectively, and gives students the power to find the knowledge that we take for granted every day.

The Road from CalCAP: Can the University of California Achieve Carbon Neutrality by 2025?

By Tamara Straus

Ten years ago, Scott Zimmermann left a career as an oil industry engineer to attend law school at UC Berkeley, retool, and try to save the planet. Al Gore's "An Inconvenient Truth" was just about to come out, and the nation was buzzing with newfound information on the connections between fossil fuel consumption and climate change. Zimmermann said he chose Berkeley because "it was easily the best place in the country for people working on interdisciplinary climate mitigation solutions, especially in the energy space. Virtually every department was making important contributions to climate change research."

Zimmermann took some good early steps. First, he got Professor Daniel Kammen to serve as his advisor. Kammen had a triple appointment at the Goldman School of Public Policy, the Energy & Resources Group, and the Nuclear Engineering Department, and recently had been named Class of 1935 Distinguished Chair in Energy and co-director of the Berkeley Institute of the Environment. He was also about to win the Nobel Peace Prize as a contributing lead to the Intergovernmental Panel on Climate Change.

Second, Zimmermann met a Berkeley attorney and activist by the name of Tom Kelly. In 2004, Kelly and his wife Jane had started Kyoto USA,

a nonprofit to get local jurisdictions to abide to the carbon caps laid out in the Kyoto Protocol. Kelly wanted to institute the caps that the U.S. government wouldn't at UC Berkeley, and according to Zimmermann, "It fit really, really well within the university and its politics."

The state also was moving where the federal government refused on climate change policy. California Assembly Member Fran Pavley presented AB32, which would soon become the 2006 California Global Warming Act, the first law of its kind in the country. It would require California to reduce its greenhouse gas emissions to 1990 levels by 2020.

Kammen, Zimmermann, Kelly, and two other graduate students from the College of Natural Resources—Brooke Owyang and Eli Yewdall—decided that the UC Berkeley should commit to the same reductions and, if possible, get ahead of them to prove the university's leadership in environmental sustainability. They drafted a letter to Chancellor Robert Birgeneau, gathered signatures from 13 professors,

lecturers, and deans as well as from Professor Cathy Koshland, vice provost for academic planning and facilities, and requested that the administration "formally endorse the Kyoto Protocol and adopt its underlying principles." The administration replied with a challenge: to put together a feasibility plan.

"Getting a university to commit to and administrate this kind of goal is not just a really interesting political problem," remembers Zimmermann. "It's also a really interesting technical problem." The first technical problem was quantifying the actual on-campus emissions and understanding them in terms of transportation, consumption, waste, electricity, and so on. The second problem was figuring out how to reduce the emissions through technology, behavior, and other methods.

To tackle these problems, a student-faculty-staff group called the Cal Climate Action Partnership (CalCAP) was formed. As usual, money was scarce. Zimmermann and fellow students Brooke Owang, Sasha Gennet, and Sam Arons applied for a BigIdeas@Berkeley prize and won $5,000, enough to pay a student group to measure the campus' carbon footprint. Student oversight came from Kammen, Civil and Environmental Engineering Professor Arpad Horvath, Energy & Resources Group Chair William Nazaroff, and 10 other faculty, all of whom were doing cutting-edge work on emissions analysis and technology. Fahmida Ahmed, a recent graduate of UC Santa Barbara's environmental science and management program, was hired to manage the process. And for 18 months, momentum grew. There were large department and school head meetings, and many hours volunteered from every corner of the campus.

By the spring of 2007, CalCAP was done with its reporting and placed a 117-page plan on the desk of Chancellor Robert J. Birgeneau. He signed it, even though Nathan Brostrom, the vice chancellor of administration, didn't know where about half the money was going to come from.

"This was one of the most collaborative efforts of students, faculty, and staff I've ever seen or been involved in," remembers Koshland. "It happened because we had a multi-pronged strategy and an amazing group of graduate students who led the charge."

Koshland went on to chair the CalCAP steering committee, comprised of a 35-member group and overseen by the UC Berkeley Office of Sustainability & Energy. In its first few years, CalCAP produced detailed reports on the path to meet carbon reduction goals and the mechanisms to report the emissions, including the 2009 Sustainability Plan and Climate Action Plan. The efforts led to hundreds of projects across campus on energy efficiency, transportation, procurement, water, and travel. And at each stage, the projects were individually evaluated for feasibility and measured for goal completion.

Kira Stoll, who became involved in CalCAP in 2006 as transportation staff and is now the campus' sustainability manager, said that one of the largest efforts has focused on buildings, which account for 39 percent of CO_2 emissions in the United States. There were plenty of surprises. For example, Stoll and her colleagues originally assumed that there wouldn't be much financial payback from lighting retrofits. "But what we found through tracking those projects," says Stoll, "is that we were getting 60 percent faster better payback."

In 2012, the Office of Sustainability launched the Energy Management Initiative, including a campaign called My Power. My Power is a simple behavioral program that has incentivized Cal departments to reduce emissions by showing them detailed reports of how much energy they use—and then giving them money back, if they go below specific targets. Stoll reports that the Energy Management Initiative has saved UC Berkeley more than $2 million since it was launched.

Also part of the Energy Management Initiative is a platform called Energy Office, which aggregates 100 real-time energy dashboards that change on 15-minute intervals. In 2012, Assistant Professor Duncan Callaway and his class noticed an inexplicable bump up of energy use on Barrows Hall's dashboard, and notified the Energy Office. Stoll says her colleagues used the dashboard software to sort through possible causes of the increased use. They quickly found an equipment problem, went to the building, and resolved it. The avoided annual energy costs to Cal were up to $45,000.

By November 2013, UC Berkeley announced it had reduced its carbon footprint to 1990 levels. The CalCAP-initiated goal was met two years ahead of schedule and beat the state the deadline by eight years. Because of its data management, CalCAP knew exactly how and why goals were met. It gave three main reasons.

First, through energy efficiency investments, building retrofits, and sustainable trans-portation practices, the university saved 20 million kilowatt hours of electricity and 1 million gallons of fuel. Second, Pacific Gas & Electric, which provides the campus electricity and is required by state law to provide 33 percent renewable energy mix by 2020, helped out in reducing emissions as it began to replace coal and oil with wind and sun energy. And third, and perhaps most instructive, reductions came through improved data and reporting methods.

"This shows that if you don't measure it, it's incredibly hard not only to act on it but to have a substantive conversation," says Kammen. "You really need to have targets and goals. Setting them—doing the analysis to figure them out, and then doing the measurement work and adjusting—is what CalCAP has proved."

Kammen is speaking not just about UC Berkeley's first set of carbon emissions goals—but about the next set of goals, which UC President Janet Napolitano announced in November 2013. They demand that the entire University of California system commit to carbon neutrality by 2025.

Matt St. Clair, who was part of the original CalCAP team and who in 2004 became the first sustainability director for the University of California's Office of the President, believes the goals are reachable but there are plenty of challenges ahead. "Energy efficiency is hard work and complex and requires investment," says St. Clair. "We've done a lot of it, and we plan to do a lot more. We also don't want to rely just on supply side solutions, where we use as much energy as we want because we can directly procure carbon-free sources of energy. That's a big, ongoing challenge."

Both St. Clair and Stoll say that UC Berkeley reached its first carbon reduction goals in part by grabbing at low-hanging fruit: cost-effective methods that were as dependent on behavioral changes as much as on new technologies. What the University of California needs now, they say, is financial investment and continued ingenuity.

"We really need to find a way to finance new renewable energy initiatives," says Stoll. "The technology is available, so it's feasible if we can find the finances for it and do it in a 10-year time frame."

Stoll mentions that Stanford University is about to finish a $438 million electric heat recovery system to replace its cogeneration plant. The new Stanford Energy Systems Innovation project is expected to reduce carbon emissions by 68 percent and save the university an estimated $300 million over the next 35 years. Of course, these kinds of upfront costs are not something the University of California can contemplate in the midst of the budget crisis.

Stoll and St. Clair say there are other tactics UC might employ, including purchasing more solar and wind power from energy wholesalers and developing a biomethane substitute for natural gas.

"What's exciting about a system-wide carbon neutrality policy and office of sustainability," says St. Clair, "is that each campus has its own strengths that the others can learn from."

St. Clair notes that Berkeley was the first to do a climate action plan, which his office used to help the other nine campuses develop their own plans. Whereas, UC Santa Barbara pioneered green building efforts with the country's first Platinum LEED certified building, and UC Irvine developed a smart laboratory program, through which it has retrofitted more than a dozen laboratory buildings and cut energy consumption in those buildings by on average 60 percent, becoming a national and international model.

This year, Costa Rica became the first nation to use only clean energy. The country's state utility company announced in late March that it went the first 75 days of 2015 without using fossil fuels like coal or oil for electricity, and expects to rely on renewable energy for more than 95 percent of its electricity for the remainder of the year.

Can the University of California one-up this hydropower-reliant country and achieve carbon neutrality by 2025? For many involved, it's the ultimate hot potato question. Daniel Kammen, however, says the answer is "unambiguously yes."

"It sounds like a revolutionary number to make the energy system carbon free by 2025," says Kammen. "But if the UC system can really innovate and use its physical campuses as living laboratories, I think it's absolutely doable.

What it will take is a scale-up in efficiency—solar, wind, biomass, geothermal—that we have been talking about for a while. Ten years is an incredibly tight timetable. It makes you gasp a little. But we've seen these transitions happen on this scale already."

Scott Zimmermann, Kammen's former student who is now an energy lawyer at the San Francisco firm of Wilson Sonsini Goodrich & Rosati, argues that getting to carbon neutrality is a bigger step. "It's not something you can necessarily do while saving money," he says. "The earlier steps at UC Berkeley were easier because they enabled departments to save money. Now, if there's extra money, the question is: Do you put the money into carbon reducing facilities or hire another professor? Those decisions are harder to make."

A Pattern Searcher from Cal: Rebecca Hui Connects Art, Cows, and Urban Development

By Sybil Lewis

During her sophomore year, Rebecca Hui was still wrestling with her decision not to attend art school—and was tepidly observing her fellow students' focus on professional careers. Through a friend, the double major in architecture and business got an internship at a landscape architecture firm in Gujarat, India. But her boss refused to let her work; instead, he encouraged her to delve into Indian culture and discover what intrigued her.

Hui decided to follow around cows.

"I was shocked by how much respect cows received in the city—they were like a bourgeoisie," Hui said. "I wanted to know why I had trouble crossing the road, but all the cars stopped for a cow."

In Hinduism, the cow is considered a sacred animal; and in many areas, such as Gujarat, vegetarianism is the norm. Hui's interest in human-animal interactions was influenced by her roommate, an adherent of Jain, an ancient Indian religion that advocates a high social consciousness toward animals. Her roommate allowed pigeons to live in their home.

"She would say, 'If we build our houses on their houses, why can't they build their houses in ours?' It became normal to wake up with pigeons flying around my room."

After her summer in Gujarat, Hui decided to switch her second major from architecture to urban studies and to apply for the BigIdeas@ Berkeley competition in the Creative Expression for Social Justice category. She won $3,000, enough to start her project.

The Secret Life of Urban Animals is not a typical BigIdeas project. Hui followed cows in different parts of India to better understand

Hui following cows during her internship in Gujarat in the summer of 2011.

their cultural significance as well as urban planning and sustainable development in the world's most populous democracy. Upon graduation, she received sponsorship to continue the project as a Fulbright-Nehru Research Fellow and National Geographic Society Young Explorer.

Hui wrote in a July 2011 blog entry: "a system's state can be understood by observing how molecules bounce around in its environment. I figured that in the same way, much can be revealed about the state of a changing society by following how its inhabitants, a cow in this case, 'bounce' around its surroundings. Who knew that following a cow could reveal so much about the city's changing cultural, social, and even political fabric?".

Following cows in the densely populated city of Mumbai, Hui noted that people's relationship to cows varied immensely between rural and urban areas. In rural areas, cows are integrated in everyday life and play an important role as sources of milk and farm labor; they are treated with more familiarity compared to more urban settings, where they are mainly used for commercial activities and in some cases face physical harm from people.

Hui has argued that protection of urban animals and wildlife can strengthen urban planning and public policy. As an expansion of her project, she attempted to study elephants in Tamil Nadu and leopards in Mumbai's Sanjay Gandhi National Park, and noticed that that bureaucracy or real estate interests were often prioritized over conservation. If the elephants' migration patterns were accounted for, she argued, then city planners could create grassy overpasses and roadways to protect wildlife, while still developing for larger human populations.

Some may see this line of reasoning as overly idealistic, especially since India is projected to replace China as the world's most populous country by 2050. While Hui does not advocate for cows and other animals to roam freely in cities due to the health concerns, she argues that taking into consideration human-animal interactions is imperative to preserving ecosystems that humans benefit from.

Maps that Hui drew to document how cows inhabited the city and dealt with different urban realities such as traffic.

Hui admits she has never been a conventional thinker. As part of an independent research project her junior year, she decided to observe how different groups interact with Legos. She left the sets in public areas at the Haas Business School, the university's architecture building, Wurster Hall, and a local elementary school. She found that the Legos at the business school were built into hierarchical structures, such as pyramids; the architecture students tended to make intricate designs, including Star Wars figurines; and the most creative structures came from the elementary school children.

In her undergraduate classes, Hui often put a twist on her assignments. For the business course Entrepreneurship to Address Global Poverty, her goal was to get the Cal student community more aware of social entrepreneurship opportunities on campus. The end result was a series of illustrations of an octopus, whose tentacles served as a metaphor for the reach of different social entrepreneurship opportunities.

An artisan from Madhya Pradesh who specializes in the traditional art form of Gond painting showcases his work.

"When she first came back with the octopus drawing, I chuckled and did not understand it," said the course's professor John Danner.

Some of Hui's sketches showing the city from the cows' perspective.

"But the end result was much better than the original idea—she has an idiosyncratic way of putting ideas and issues together that stop people in their tracks."

Hui just likes to search for patterns in human development and thinks that her ability to notice subtle differences in societies stem from her upbringing. Her father was a professor and during his sabbatical leave Hui moved around nine times as a child between Hong Kong, New Jersey, and Arizona, and said she learned to adapt quickly in order to "fit in."

While the Secret Life of Urban Animals project concluded in September 2014 with a two-week exhibition of Hui's paintings, drawings, and cartoons at the David Sassoon Library in downtown Mumbai, Hui's work in India is far from over.

Currently, she is working to found Toto Express, a social enterprise that she says is the first design-licensing agency for rural artisans in India. During the Secret Life project, Hui met many rural artisans whom she learned were unable to generate enough income due to lack of connectivity and marketing. When they migrated to urban areas in search of employment, they ended up encountering a different form of poverty in the slums.

Hui believes it is important to create alternatives to urban migration—what she calls a "prosperous village" that can recognize villagers' inherent skills and assets. Over eight months in 2014 and 2015, she has conducted three pilot projects with tribes specializing in the traditional art forms of Dhokra metal casting, Phad scroll painting, and Gond painting. She intends to get artisans to upload their designs to an online platform for licensing by corporations.

The platform will capitalize on the estimated $2.5 billion market of holiday gift giving by corporations and a 2014 law requiring that 2 percent of corporate budgets be allocated to corporate social responsibility. Hui hopes that
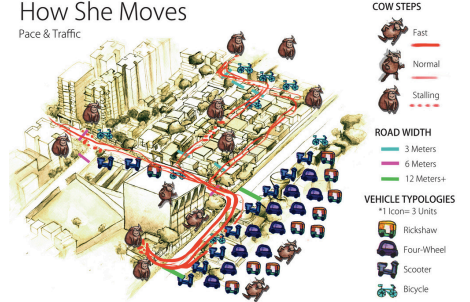
Maps that Hui drew to document how cows inhabited the city and dealt with different urban realities such as traffic.

Toto Express' platform will provide a way for corporations both to meet their gifting needs and meet government mandates. In turn, artisans will benefit from growing profits that will allow them to stay in their trade and village.

Hui with a group of artisans she worked with during Toto Express' pilot projects.
Hui with a group of artisans she worked with during Toto Express' pilot projects.

"Many NGOs and craft ventures work with these artists, which is fantastic, but it seems they are often harrowed by supply chain and inventory challenges," Hui said. "Toto Express increases artists' incomes without having to send the artwork or artist to urban areas—which usually adds more layers to the supply chain, reducing the actual cash that artists receive."

Moving forward, Hui is planning a fourth pilot project that would place permanent design centers in three to four villages, to help artists adapt their artwork for various corporate gifts and better use the Toto website.

"I am dedicated to this project because I relate to artists whose reasons for leaving their art spoke back to my reasons for pursuing a more 'respected' career path within the often risk-adverse Chinese American community," Hui said. "But to see that happen to these communities where art is intimately connected to identity, hurt tremendously. I want to change that."

The Measurement Revolution: An Interview With CEGA's Temina Madon

By Tamara Straus

Temina Madon is executive director of UC Berkeley's Center for Effective Global Action (CEGA), whose mission is to improve lives through innovative research that drives effective policy and development programming. Madon also serves as the managing director of UC Berkeley's Development Impact Lab, which CEGA and the Blum Center co-administer. She has worked as a science policy advisor for the Fogarty International Center of the National Institutes of Health and as a Science and Technology Policy Fellow for the U.S. Senate Committee on Health, Education, Labor and Pensions. She holds a PhD from UC Berkeley in visual neuroscience and a BS in chemical engineering and biomedical engineering from MIT. The Blum Center sat down with Madon to gather her views on impact evaluation, technology for development, and the changing intersections of development economics, engineering, and social science.

Impact evaluation has become extremely important to the field of international development, but many complain that funding is still difficult to come by. What do you think about this disconnect?

William Savedoff of the Center for Global Development and Ruth Levine from the Hewlett Foundation recently wrote that approximately $130 billion is spent each year in official overseas development assistance, compared to about $50 million for evidence—i.e., for rigorous evaluation of programs. That's less than one percent. Would any private sector company that is serious about its products spend that little on R&D? If you look at Google, Intel, and the companies that deliver the services we use everyday to enhance productivity, they are spending 15 to 20 percent of their revenue on product development. I'm not saying that government operates in the same way as the private sector, nor should it. But you would think that for the delivery of essential public services that safeguard people's health, livelihoods, and basic security, more than 1 percent would be spent on product development and evaluation.

What would it take to get the pace of investment in evidence to where it should be?

I think it would take a wholesale shift in the attitude of governments away from process and consensus, toward performance—toward delivery of services that actually improve people's health, their security, and their workforce readiness and education. Bureaucrats need to be incentivized to deliver outcomes, not programs.

What do you say to people who don't understand impact evaluation or the cost of rigorous program evaluation?

First, some programs are actually harmful, just as some drugs tested in clinical trials prove to be harmful. For example, there are programs that try to put money and empowerment into the hands of women, but sometimes they can drive negative outcomes, related to domestic violence and inter-household conflict. These kinds of programs, while very much intending to empower women, can put them at greater risk, if not implemented appropriately. You want research, evidence, and careful design of services to ensure they are implemented in ways that do no harm.

There are also many programs that have no impact. So there is an imperative to allocate money to high performance programs. We like to say that the public has, in some ways, a relatively unenforceable contract with government. We vote for politicians—essentially entering into a contract with our leaders to deliver services that keep our society functioning. But that contract cannot be enforced on a regular basis, because we vote only once in four to five years. A good government, ideally, is accountable day-to-day for the performance of public services. So it is a breach of contract when elected officials allocate resources to harmful or low-impact programs. If you have limited resources, you are supposed to invest in proven, evidence-based policies or programs. This is how you fulfill your contract with the people. Of course, we need a way to identify the highest performing programs—and that's where rigorous evaluation is needed.

CEGA is among a handful of university centers experimenting with wireless sensors, mobile data, and analytics to evaluate poverty-alleviating programs. Do you see a time when one or more of these approaches will become primary or replace randomized control trials in impact evaluation?

We see these innovations as tools for measurement in impact evaluation. Rigorous evaluations just expose the causal links between programs and outcomes. We'll always need this approach. But how you measure your outcomes, in large part, determines the cost of an impact evaluation.

Often, evaluations are expensive, because you are doing thousands of pen-and-paper surveys. You may have to hire hundreds of enumerators to carry out two-to-three hour interviews with representative households across multiple villages, districts, and regions. You have to pay fuel and housing costs for the enumerators when they travel. If you're measuring biometric outcomes, your surveyors need to be well trained. They may even need to be certified health workers; it depends on the tests you're administering. You may have to pay for the rapid transport of diagnostic tests to a laboratory. This is where the high cost comes from.

If we can shift toward mobile phone surveys and wireless sensors, the costs could drop dramatically. We just need to know that newer methods are as reliable and accurate as door-to-door surveys.

Again, impact evaluations just compare the outcomes—of people, or communities, or markets—in the presence and absence of a program. But they're also a way to give a voice to poor and vulnerable households, to allow them to express whether or not a program has worked for them. If we capture this input using sensors, mobile technology, satellites—it is still impact evaluation. We'll still be looking for causal link between the intervention and its impact, but the technologies reduce the cost of gathering the data. They make it easier to understand the lives, outcomes, and aspirations of the people we care about.

Give me an example from either UC Berkeley or another university of where new technologies are effectively helping to evaluate development programs?

One of the projects supported by the Development Impact Lab (DIL) is trying to expose use of improved cookstoves by women in Ethiopia. The stoves reduce biomass consumption and, with it, health risks from pollution. The question is what kind of educational or marketing interventions could get women to use the stoves. This project started with simple pen-and-paper interviews with women to ask about their stove use—a method that is costly and quite unreliable and biased. If you ask me whether I use your excellent new stove, I'll probably say, "Yes!"

DIL supported a group of researchers to put temperature sensors on

the stoves, in order to gather reliable, high frequency data on stove use. Sensors could lower the cost of evaluation significantly, given the amount of data and the quality of data being captured. The team started to use tablet-based surveys running ODK (Open Data Kit), and then benchmarked their survey data against the sensors, to understand the reliability of each approach. There is an upfront cost for benchmarking a new technology, and you are going to see that with all these emerging measurement technologies.

CEGA is funding another project that is looking at crop yields among smallholder farmers in Kenya and Uganda. Currently, when you send enumerators out to measure crop yields in a region, you take a random strip of a farm plot, cut or harvest the produce in that strip, and then estimate what the rest of the plot will yield. This is incredibly costly. We are trying to do that now with microsatellite data. Very soon, microsatellite operators expect to get optical images, updated daily, of landmass for practically the entire planet. We think we can infer crop yields on very small plots using this high resolution, high frequency data that give time slices throughout the harvest cycle. Crop yields in the context of agriculture are something development economists really care about, because we think they generate increases in income for poor households.

This is why we see the measurement agenda as essential, but also complementary, to surveys. You're not ever going to want to get rid of surveys wholesale, because even if they introduce bias, you're gaining beneficiaries' perceptions. What beneficiaries tell you may not be the actual reflection of their behavior—but you may want to know what they think and say. Also, with satellites and sensors, you may not be able to capture as much information as you would with a survey. So we see these technologies as complementary and as tools that could be embedded within an impact evaluation.

What is the skill set for people going into economic development?

The bottom line is that very few people have all the skills needed, and this is why we are taking a "team science" approach. We are helping to create a new discipline, development engineering. In this new field, you can't be an economist working alone. You might need a computer scientist, an electrical engineer, a mechanical engineer, and other social scientists to work with you on the measurement component of your research. There is a fertile territory for measurement advances that engineers can contribute to and get credit for, because real innovation is required to sense physical properties or to observe trends in the field.

There are a few people who have been able to cross disciplines. In fact, this is where we got the idea for the development engineering as a PhD minor. Joshua Blumenstock was a Cal PhD student in computer science who is now an assistant professor at University of Washington. He got his PhD in the Information School, but he also did a master's in development economics. He took the core econ courses, because he was interested. So he has the engineering insights to build systems for "big data" analytics, but he also understands econometrics and he can tease out the causal linkages between interventions and their impacts. He can leverage new measurement tools, like the call detail records (CDRs) that are generated by mobile network operators.

What other skills might students gain if development engineering were to blossom?

There are a lot of people with a lot of opinions on this question. But the whole idea for "development engineering" came up in a discussion with Eric Brewer and Ted Miguel. We were saying: Josh Blumenstock has these unique abilities, and can tackle unique problems, because of the methods he has been exposed to. How could we create more students like him, who will know how to work with someone from a different academic tradition? We started thinking that the obvious first step is knowing what you don't know— understanding enough development and economic theory to know that there is a body of statistical and data collection techniques that you could tap into, through collaboration. That is one piece.

The other piece is knowing how to do fieldwork. Eric Brewer's concern was that while engineers have become "interventionists" in the ICTD [information and communication technologies for development] community, they don't understand how to access representative, population-level data to inform their work. They are doing focus groups. But when your technology's design is informed by a small number of focus groups, the technology is designed for that population. It's not necessarily scalable, or representative of something that could scale. So we need to teach people how to do field experiments, impact evaluations. We need to teach about the political economy of technology, the regulatory institutions that play a role in scale-up, and how to bundle those into the design of a technology intervention.

The flip side is that for an economist, you need to know the body of technologies that exist. You may not have the modeling or hardware skills to build sensors, deploy a network, and then analyze the data. But you should at least know about the toolkit that is emerging, so that you can think more creatively about measuring outcomes in the field. So again, knowledge about new approaches outside your own discipline is so important.

What do you make of the conversations in the popular press about women in science?

I have been fortunate to grow up in a household where women are expected to be scientists and engineers. Yet I did not become a faculty member, because I did not have that desire in the discipline in which I was trained: visual neuroscience. A lot of people say women tend to seek work that has more social impact or social relevance. I don't know if that is true or not. But it is true for me, personally. It was a big pivot in my career to move toward work that was more applied. I think "development engineering" gives an avenue for women in quantitative sciences and engineering—fields where they tend to be underrepresented—to find social impact in their research. We think development engineering is promising in that regard. But honestly, if you look at economics and engineering, the lack female role models at the level of faculty is a pervasive problem. It is even harder for women in developing countries. A lot of our collaborators in developing countries are male, because those are the people who have risen in their universities. We have very few female research partners in developing countries.

What trends in your field make you most hopeful?

In his annual letter two years ago, Bill Gates talked about measurement. He said you can't fix something until you have measured the problem; and you can't even perceive something as a problem or an opportunity until you've measured it. I, too, am excited about the measurement agenda. I feel like so many things in our lives today are instrumented— from the web browsers we use, to our mobile phones, the GPS on our phones, the Fitbits we are wearing, and the sensors in our cars and homes. There is so much being measured, and it has created such a rich data environment. Yet much of the rest of the world is still invisible. There is very little measurement in poor communities. If you can't record someone's existence, if you can't capture their life and death, their aspirations or communities' needs—then you can't know how to approach shared challenges with ingenuity, innovation, and intervention.

I feel like there will be a real blossoming in economic and social development with better ability to measure outcomes. But again, benchmarking is going to be important. If you are going to use new kinds of information, measurement, and data for policy intervention or program design, or to monitor and keep governments accountable, there is a lot of work to prove to ourselves that our new measurement tools are as reliable as the current gold standard.

Daniel Zoughbie's Contagious Model for Public Health

By Tamara Straus

Among the global health reports that keep Daniel Zoughbie up at night is a World Economic Forum and Harvard School of Public Health study, which predicts that over the next two decades the global economy will lose $47 trillion to noncommunicable diseases, such as diabetes and cardiovascular disease.

"Yet a very modest intervention that tries to make small changes in people's behavior can have an enormous impact in terms of prolonging lives and saving under-resourced communities millions upon millions, even billions, of dollars," says Zoughbie.

The modest intervention to which Zoughbie refers is a social network for "contagious health" behavior, basically a small group of family or friends who support each other to eat healthy and exercise regularly. Zoughbie has obsessively backed this social network idea since 2005, when he founded Microclinic International, using personal scholarships and startup funds from the BigIdeas@Berkeley competition. The UC Berkeley and Blum Center-seeded nonprofit has since gone on on to affect more 1 million people through the establishment of "microclinics," community initiatives, and media campaigns across four continents.

The idea of positive peer behavior leading to positive health results may seem obvious, and that's because it is. Microclinic International's social network approach is based on old notions of community and self-help, says Zoughbie.

The idea also comes from a personal loss. As a junior in college, Zoughbie reflected on the premature death of his grandmother in the West Bank due to diabetes and had two intertwining epiphanies: 1) his grandmother did not have the public health information she needed to help her manage her disease; and 2) if she had been given basic preventative information and found a supportive network, she would have changed her diet and health regiment and lived much longer.

"She simply was not able to access a basic level of quality healthcare and education," says Zoughbie, who was born and raised in the Bay Area.

Under the mentorship of UC Berkeley Professor Ananya Roy, an expert in urban studies and international development, Zoughbie began investigating how lower income communities organize themselves from the bottom up in the absence of effective or existent services. He travelled to Palestine and observed that community, not individual or institutional, ties are dominant—and that health behaviors are often social or cultural in nature.

In Palestine, for example, he observed one family with a diabetic father who passed around chocolate when entertaining a guest. Zoughbie remembers the daughter, who had learned about the dangers of diabetes from a Microclinic International program, admonishing her father for reaching for one of the chocolates.

"The daughter told her father that under no circumstances was he to eat that chocolate," remembers Zoughbie. "In Middle East culture, this is a bit taboo: to tell your father what to eat or not to eat in front of guests. But the daughter cared more about saving her father's life than causing some societal embarrassment.

"From these and other interactions, I realized that positive health behaviors could be just as contagious as negative health behaviors."

Zoughbie was named a Strauss Scholar and a Haas Scholar in his junior year. He studied social anthropology at Oxford University on a Marshall Scholarship, and completed his doctorate in international relations there as a Weidenfeld Scholar. Yet he was not a traditional student. All the while, he used his university honors and credentials to travel, conduct research, and network on behalf of Microclinic International.

"While I was a Marshall Scholar, I went to South Africa and was on a bus, where I met somebody who introduced me to somebody else," remembers Zoughbie. "One thing led to another, and I put in an application to the World Diabetes Foundation. We applied for almost $100,000 and, to my great surprise, Microclinic International got it."

Stephen Shortell, UC Berkeley's Blue Cross of California Distinguished Professor of Health Policy and Management, remembers Zoughbie as a young man easy to support. "He came up to me at a Blum Center function and asked whether we could meet and talk," recalls Shortell. "He was attacking a very big problem—diabetes in developing countries—and I could see his concept was both promising and low-cost. I made some introductions."

Zoughbie, now 30, has spent much of the past decade hustling to scale up his nonprofit. The key ingredient, he explains, has been persistence and endurance, "talking to lots and lots of people, and bluntly saying, 'Hey, I have this idea, which has been piloted; it's pretty simple and inexpensive to scale, and could save a lot of lives in under-resourced communities.'"

This kind of persistence led in December 2006 to the formulation of a Microclinic International pilot in Jordan, with support from Queen Rania's Royal Health Awareness Society, the Jordanian Ministry of Health, and a former British Ambassador to Jordan. With support from A. W. Clausen, a former president of the World Bank and Bank of America, Zoughbie was able to establish Clausen Fellowships, hire really bright people, and take a more quantitative approach to understanding the effectiveness of the organization's work and refine its model.

Microclinic's diabetes social network model is based on four key strategies, or "4 Ms"—Meals, Movement, Medication, and Monitoring—and is intended not just to alter dangerous health behaviors but, more importantly, to sustain positive ones in groups of family and friends. As principal investigator for Microclinic International, Zoughbie has initiated several major trials, including a two-year, Jordan-based study published in Lancet Global Health, which found that for most patients, improvements in blood sugar control were sustained for two years after signing up.

Microclinic International also has achieved evidence of impact on the other side of the globe, in Bell County, Kentucky. There, it partnered with the health insurance company Humana to conduct a randomized control trial of 552 participants from five neighborhoods in rural Appalachia, where obesity and diabetes are widespread. Again, clusters of two-to-eight friends and family voluntarily came together to establish and spread healthy norms, such as regularly checking weight and blood sugar, exercising, watching calories, and eating fresh fruits and vegetables. A 16-month follow up of the cohort, published in a 2015 study in American Heart Association journal Circulation, found that a substantial majority of the TeamUp4Health patients experienced and maintained decreased in weight, waist size, and blood pressure.

"Leveraging the social network and peer influences and social networks for support may be important for fighting obesity," said Harvard School of Public Health Scientist Eric Ding, who served with Zoughbie as co-lead author of the Circulation study and is director of epidemiology at

Microclinic International. "We need to focus on more than the individual obese patient in isolation, and look to family and friend networks and the communities where people live."

Zoughbie, whose PhD is in international relations—and who also serves as a political science scholar at UC Berkeley's Center for Middle Eastern Studies (his recent book Indecision Points: George W. Bush and the Israeli-Palestinian Conflict was published recently by MIT Press)—views public health as fundamental to regional and international security.

"When a community is falling apart," he says, "health problems often create a vicious cycle, in which people are poor because they're unhealthy and they become more unhealthy because they're poor. This cyclical nature of poor health creates the seeds for social unrest. It creates disaffected young people who don't see any hope for the future."

This connection between public health and societal stability is what drives Zoughbie to replicate the Microclinic International model in as many insecure places as possible. Backed by the Centers for Disease Control, Google, the International Diabetes Federation, Humana, Mulago Foundation, the Robert Wood Johnson Foundation, and the Horace W. Goldsmith Foundation, Zoughbie's nonprofit is in expansion mode, working with over 260 people. Currently, the United Nations is partnering with Microclinic International to train 1,000 healthcare workers to reach hundreds of thousands of Middle East refugees through social networks by spreading health behaviors and thwarting preventable diseases and their complications.

"I see our model as helping repair the broken fabric of society," says Zoughbie. "Groups of people helping each other to get healthier is a first step for broken communities to rebuild a future. There's an old Arab proverb I like to quote: 'When there's health, there's hope. And when there's hope, there's everything.'"

More Than Hardware: Challenges in Education Technology in Africa

By Sybil Lewis

In 2012, the Inter-American Development Bank concluded that children in Peru receiving computers from the American nonprofit One Laptop per Child did not show improvements in math or reading and that access to the laptop did not significantly increase motivation to learn. This is the kind of survey result that makes technology for development professionals worry—especially since global education technology investments were estimated at $1.1 billion in 2012. In Rwanda alone, 203,000 laptops have been distributed to primary school students through the One Laptop per Child project.

On April 10, the Blum Center hosted a panel discussion on the private sector's changing and often challenging role in education transformation in Africa. The panel was organized and moderated by James Bernard, senior director of global strategic partnerships for the Education Group at Microsoft and a Spring 2015 Development Impact Lab (DIL) visiting fellow. The panel included John Galvin, vice president of education at Intel; Steve Duggan, director of education partnerships at Microsoft; Sara Kingsley, research consultant at the Microsoft Technology and Policy Group; and Alex Cho, vice president and general manager of commercial systems at HP.

First, all of the panelists emphasized that there has been a shift in the past five years away from providing countries with laptops or devices toward context-specific solutions focusing on educational outcomes.

"The focus has moved from the device to thinking about the appropriate solution and service that will provide outcomes," said Duggan of Microsoft. "So you can think of the technology not as the end-all, but as a device that delivers a service."

Indeed, to address the shortcomings of device-only solutions, computer hardware companies are including software development and teacher and IT training into their hardware deployment projects in African and other developing countries. In 2012, for example, Microsoft invested $250 million through its Partners in Learning Project to train teachers in IT and technology subjects.

The panelists explained that one of the biggest challenges in the education technology field has been implementing curricula when government officials are more interested in the quantity of devices sent to students. Another challenge is the lack of reliable Internet connectivity in many African regions, a problem that moved Microsoft, Intel, and HP to place its educational content on USB devices with a 3G connection, so that teachers can provide an alternative way to download information. Africa's connectivity is changing, however, said Kingsley, who works on affordable connectivity projects for Microsoft in Africa. He reminded the panel that many Internet Service Providers and governments are harnessing the power of solar energy throughout the continent.

While "adaptive learning," which allows teachers and students to learn at their own pace through online resources, has produced positive results, the role of technology in the classroom remains unclear. The panelists attributed this ambiguity to the lack of data and rigorous assessment.

Alex Cho from HP said that the collection of real-time data from student and teacher interactions with devices and software along with on-the-ground qualitative data allows developers to track where success and failure is occurring, with the potential of creating predictive data. According to Duggan, the fact that only one third of countries have met the UN's 2015 Millennium Development Goals on education highlights technology's potential to offer more solutions.

The educational ecosystem in sub-Saharan Africa is complicated by resource challenges. A recent UNESCO report estimated that by 2030 2.5 million teachers will be needed to meet growing secondary school enrollment. Teachers and human interaction will always be essential to learning, Bernard assured, but technological innovations can serve as a guide to navigate a landscape lacking quality teachers.

"We need to look at technology from the framework where it is a compliment, not a replacement, to education in places where resources are running short," Kingsley said.