

A vibrant scene of a kite festival on a sandy beach. The sky is filled with hundreds of colorful kites in various shapes and sizes, including traditional diamond shapes and more elaborate designs. The ground is crowded with people of all ages, many wearing bright orange shirts, engaged in flying their kites. In the background, a long white building and a bus are visible on the horizon under a clear, bright blue sky.

Swimming Against the Tide

Adventures with
the TED Fellows

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Against
the Tide**

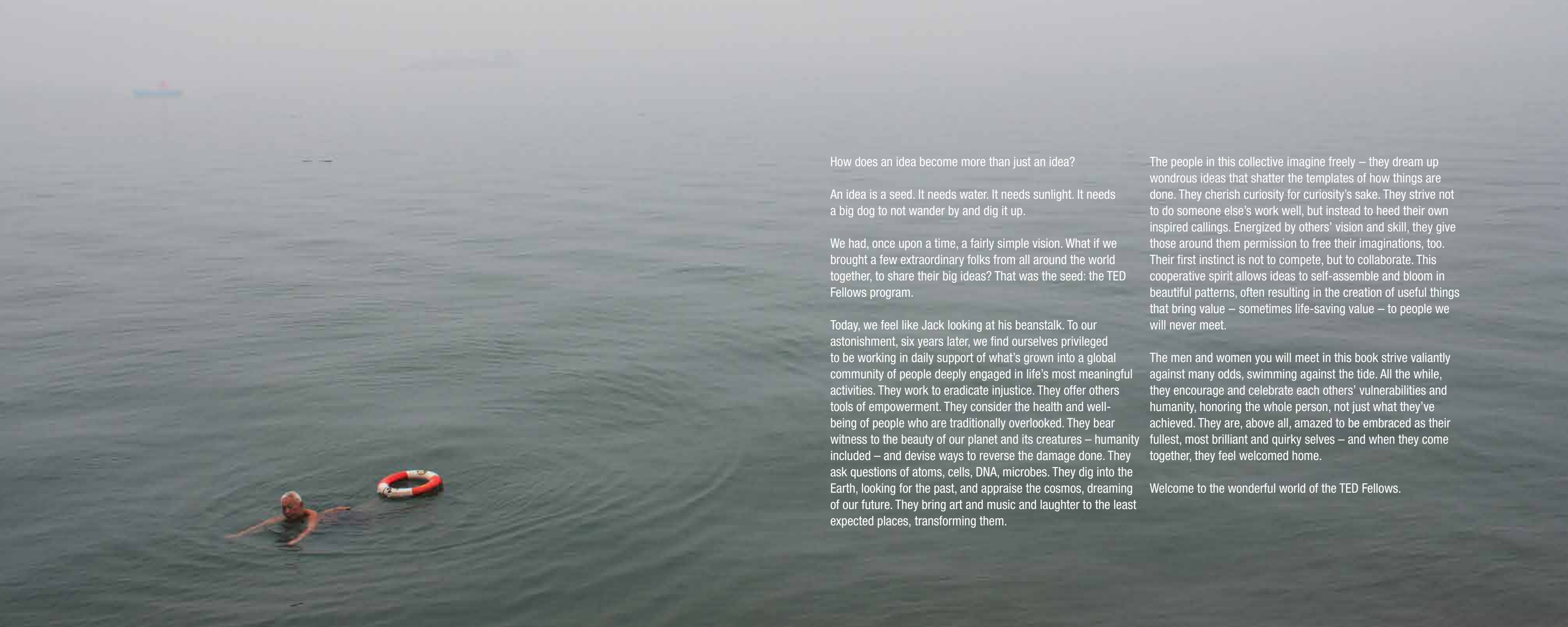


Swimming Against the Tide

Adventures with
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How does an idea become more than just an idea?

An idea is a seed. It needs water. It needs sunlight. It needs a big dog to not wander by and dig it up.

We had, once upon a time, a fairly simple vision. What if we brought a few extraordinary folks from all around the world together, to share their big ideas? That was the seed: the TED Fellows program.

Today, we feel like Jack looking at his beanstalk. To our astonishment, six years later, we find ourselves privileged to be working in daily support of what's grown into a global community of people deeply engaged in life's most meaningful activities. They work to eradicate injustice. They offer others tools of empowerment. They consider the health and well-being of people who are traditionally overlooked. They bear witness to the beauty of our planet and its creatures – humanity included – and devise ways to reverse the damage done. They ask questions of atoms, cells, DNA, microbes. They dig into the Earth, looking for the past, and appraise the cosmos, dreaming of our future. They bring art and music and laughter to the least expected places, transforming them.

The people in this collective imagine freely – they dream up wondrous ideas that shatter the templates of how things are done. They cherish curiosity for curiosity's sake. They strive not to do someone else's work well, but instead to heed their own inspired callings. Energized by others' vision and skill, they give those around them permission to free their imaginations, too. Their first instinct is not to compete, but to collaborate. This cooperative spirit allows ideas to self-assemble and bloom in beautiful patterns, often resulting in the creation of useful things that bring value – sometimes life-saving value – to people we will never meet.

The men and women you will meet in this book strive valiantly against many odds, swimming against the tide. All the while, they encourage and celebrate each others' vulnerabilities and humanity, honoring the whole person, not just what they've achieved. They are, above all, amazed to be embraced as their fullest, most brilliant and quirky selves – and when they come together, they feel welcomed home.

Welcome to the wonderful world of the TED Fellows.

WONDER

Camille Seaman, photographer

When I get up on a storm-chasing day, anything can happen.

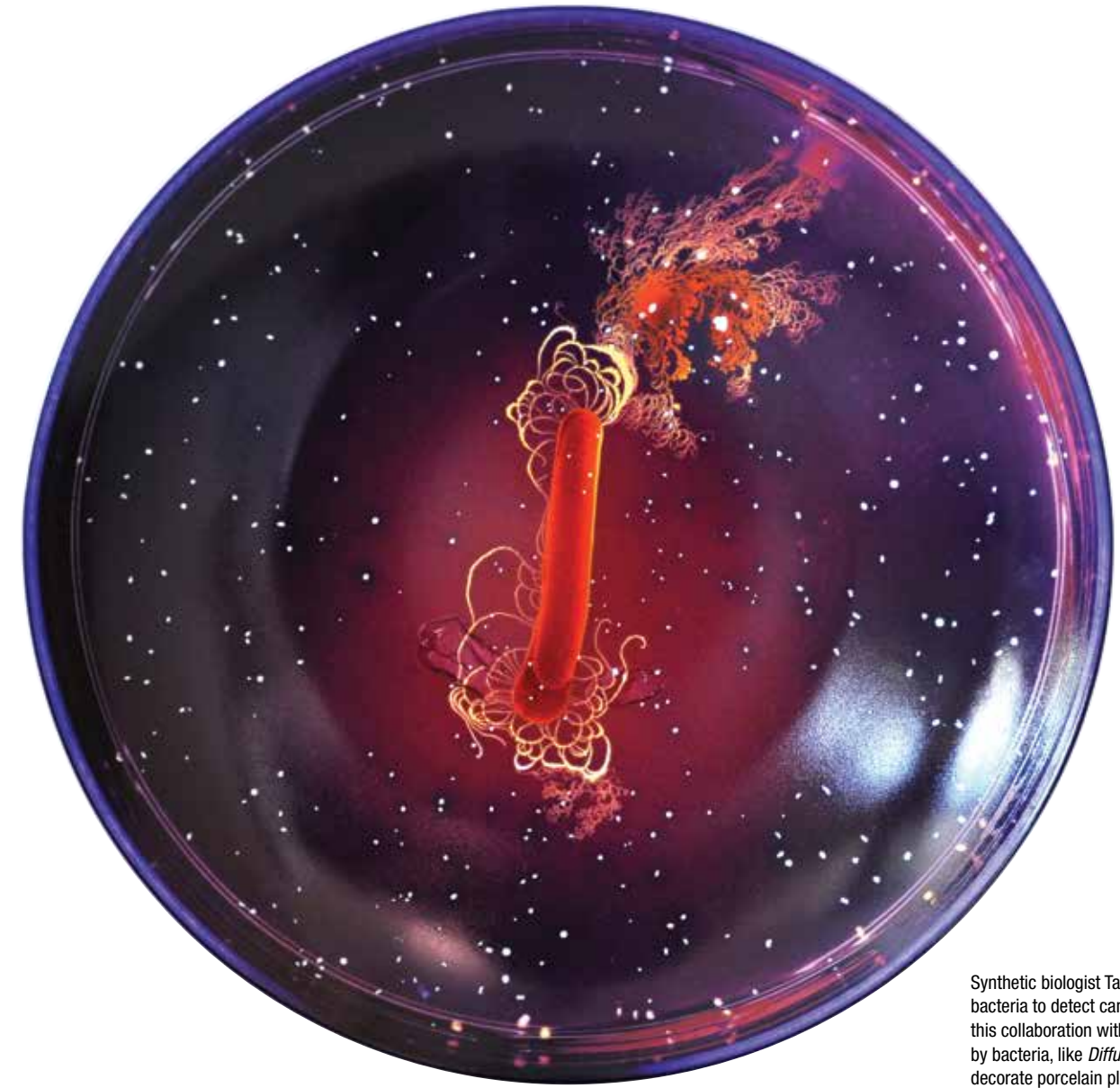
We're usually somewhere deep in Middle America, in a motel, like a set in a movie with cars parked out front. We pile into the meteorologist's room, sit on the bed, and he projects the day's weather from his computer onto the wall. We analyze the data and decide where we're headed.

The thing about these storms is that they take all day to form. All that warm, moist air has to hit a certain temperature in order for a storm to start up. A supercell isn't part of a storm front; it's an individual cloud up to 50 miles wide. It needs the perfect conditions to attract all that moisture, and blow up like a beautiful cotton ball in the middle of the plains.

Only 2 percent of supercells create tornadoes, but when one starts to form, we get into "chase mode." There are no bathroom breaks, no pulling over to get a drink, no chance to check the map. These storms are moving, sometimes at 20 miles an hour, sometimes at 60. The whole car is taken over by a euphoric silence. In movies, people yell, "Drive faster!" – but our cars are never like that. It's dark under the cloud, and the wind is blowing. The conditions aren't ideal for a photographer, and there is no time to set up a tripod. If you're too close, the cloud is so huge you can't fit it in your frame. We look for the sweet spot. Just far enough away to get the perfect image.

The experience of standing under a supercell storm for the first time was so much more than I could have imagined. I had seen storms on TV, but this was different. It was an incredibly tactile experience, with the smell of charged particles in the air and warm, moist earth. These storms create life by pulling soil up into the cloud and supercharging it. It comes back down with the rain and hail and makes the Great Plains incredibly fertile. The storms are like Shiva: they destroy and create life simultaneously. The same forces that created our planet are right there in front of you. We are used to feeling in control of every system – our homes, our cars, our bodies – but go outside to be shown otherwise, very quickly and efficiently.

We are minuscule.



Synthetic biologist Tal Danino genetically programs bacteria to detect cancer – and also to make art. In this collaboration with artist Vik Muniz, patterns made by bacteria, like *Diffuse Salmonella* pictured here, decorate porcelain plates. Photo: Bernardaud



In transmedia artist Lars Jan's project HOLOSCENES, performers in a large aquarium enact everyday activities while water levels swell and recede around them, asking audiences to reflect on the potential consequences of climate change.



Canadian photographer Kitra Cahana has captured nomadic youth in the US, her father's post-stroke struggle with locked-in syndrome and teens at a Texas high school, pictured here at a dance party.

East African soul/jazz vocalist and songwriter Somi is founder of MAMAFest, the first contemporary African arts festival in New York City. In 2014, she released her fourth album, *The Lagos Music Salon*, on Sony Music. Photo: Ryan Lash



Shadow artist and inventor Christine Marie creates large-scale cinematic shadow performances with non-digital 3D stereoscopic effects. This image is from the production *4TRAINS*.



With his studio The Bittertang Farm, Mexican architect Antonio Torres creates whimsical "living" structures with biological shapes and natural materials, such as this New York City pavilion, *Burble Bup City of Dreams*, crafted from thin balloon-like membranes and woodchips.



Sculptor Joey Foster Ellis works between the boundaries of cultures and politics. His 2009 installation *Tomorrow's Choice* in Beijing, China, displayed 100 life-size sculptures of children hand-carved from blocks of ice as a statement about the ways climate change threatens our collective future. Photo: Reuters



Designer Kellee Santiago creates video games that offer players affecting emotional experiences. In her award-winning game *Journey* (pictured), users wander through the desert, meeting others along the way. Santiago also fosters new talent and brings fresh perspectives into game development through her angel investment fund, Indie Fund.



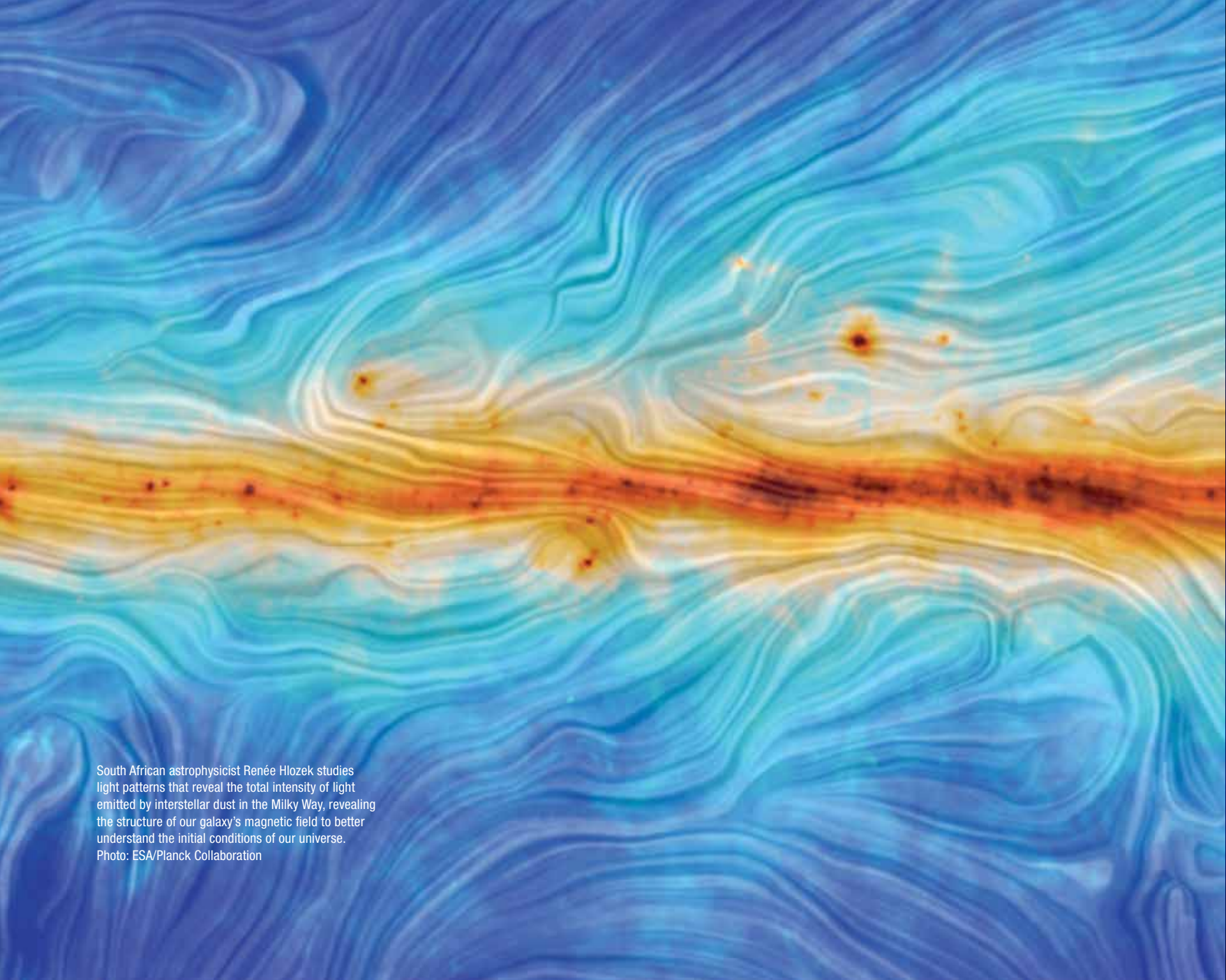
Moroccan architect Aziza Chaoui's Fez River Project is restoring the once concreted-over historic river, reconnecting the riverbanks with the rest of the city, creating open spaces and replacing parking lots and trash yards with parks and public pathways.



Sri Lankan marine biologist and educator Asha de Vos studies the unusual blue whale population of the Northern Indian Ocean and is building a movement to democratize ocean conservation. Here, she's pictured in her office in Santa Cruz, CA. Photo: Bret Hartman



The blue whale is the largest animal known to have lived on Earth. Asha de Vos's Sri Lankan Blue Whale Project is the first long-term study of the blue whales that inhabit the Northern Indian Ocean.



South African astrophysicist Renée Hlozek studies light patterns that reveal the total intensity of light emitted by interstellar dust in the Milky Way, revealing the structure of our galaxy's magnetic field to better understand the initial conditions of our universe. Photo: ESA/Planck Collaboration



Tharanga Goonetilleke abandoned plans to study medicine in college to pursue opera, eventually becoming the first woman from Sri Lanka to graduate from the prestigious Juilliard School. She made her New York City Opera debut in 2011. Photo: Ryan Lash



Inspired by marine biology, Taiwanese artist Shih Chieh Huang creates "living" sculptures out of reclaimed computer parts, plastic bags, bottles and common household materials.



Kenya-based ophthalmologist Andrew Bastawrous co-founded Peek, a low-cost smartphone ophthalmic tool that delivers eye care in some of the world's most challenging places, to those who need it most.



Native American visual and installation artist Jeffrey Gibson explores the traditional craft and modern arts of Native American cultures, including a series of Everlast punching bags adorned with wool blankets, glass beads, fringe and metal studs.



Palestinian photographer Eman Mohammed documents conflict in the Middle East, with special attention to its effects on children. This photograph shows a home, destroyed by an Israeli airstrike, in Jabaliya in 2009.



British filmmaker Kibwe Tavares co-founded Factory Fifteen, a film and animation studio exploring new methods of visual storytelling. In his 2011 sci-fi animation film, *Robots of Brixton*, a young robot workforce battles police against a backdrop of dystopian, inner-city London.



Inspired by the long tradition of painters as material innovators, artist Kate Nichols synthesizes nanoparticles to mimic structurally colored animals, grows artificial skin from microorganisms and makes her own paints following 15th-century recipes.



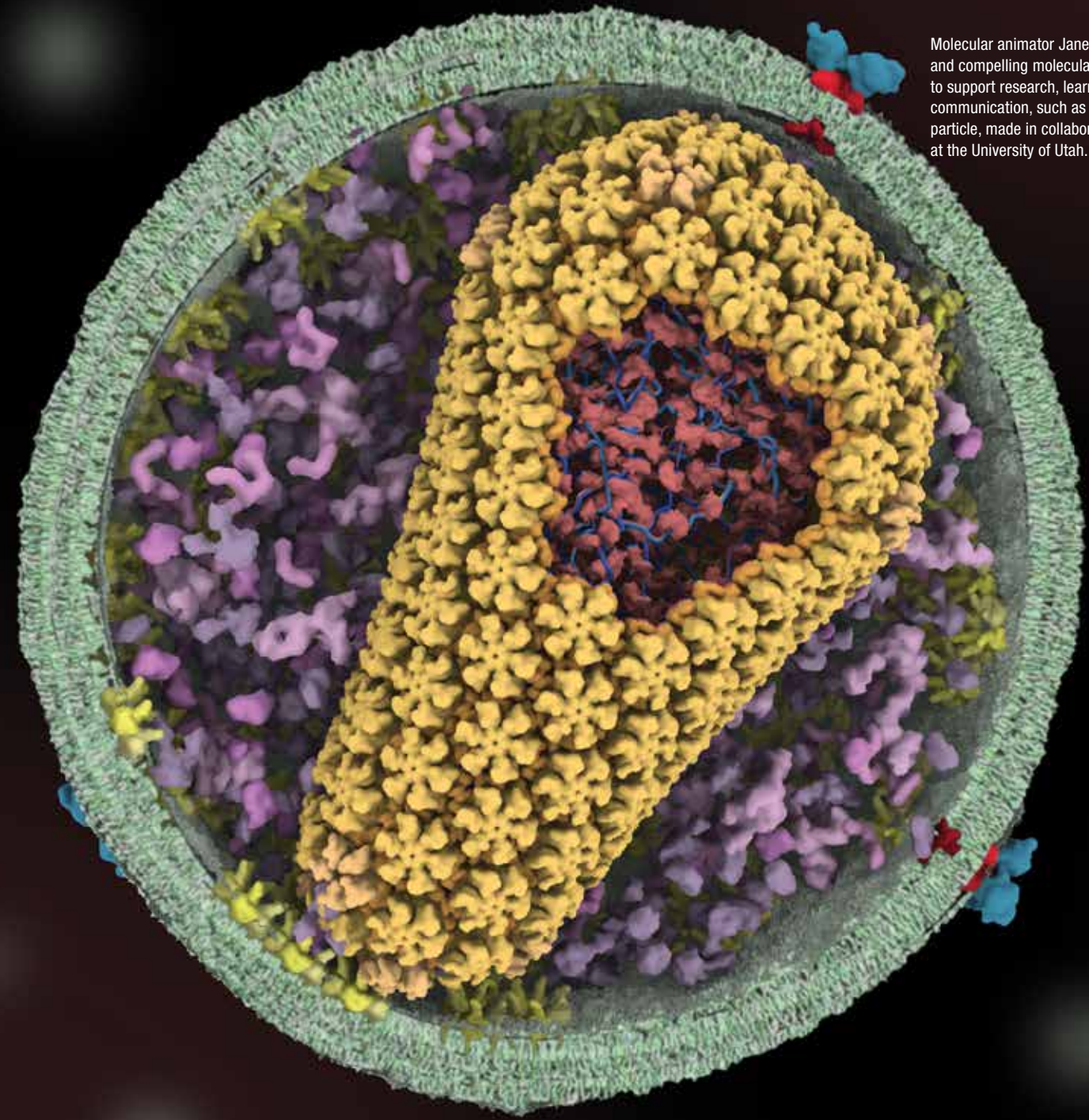
South Korean data-visualization designer Sey Min works with live data sets to creatively display information. In this 2013 collaboration with the band Planet Shiver, she created a responsive light installation and sound-visualizing software.



Spanish artist Jorge Mañes Rubio explores forgotten places around the world, creating site-specific political-social interventions and fictional narratives. "Mission: U-TOPIA" explores the life of Akitoshi Fujiyama, a Japanese engineer who discovered a lunar meteorite on a local golf course.



New media artist Gabe Barcia-Colombo's work includes vending machines that sell human DNA, super slow-motion video portraits – and sculptures like these, which preserve his friends and family in jars, blenders and suitcases using video mapping and projection.



Molecular animator Janet Iwasa creates accurate and compelling molecular and cellular visualizations to support research, learning and scientific communication, such as this 3D model of an HIV particle, made in collaboration with Wes Sundquist at the University of Utah.

When he was 10 years old, Nigerian-British composer and musician Tunde Jegede moved from the UK to The Gambia to learn how to play the kora – the West African 21-string bridge harp.



German artist Nathalie Miebach turns weather data into complex sculptures and musical scores, such as *O Fortuna, Sandy Spins* (2013), which incorporates weather and ocean data from Coney Island, NY, and Seaside Heights, NJ, during Hurricane Sandy.





Sarah Jane Pell creates new works of live art during occupational dives, alpine expeditions and the training of suborbital spaceflight mission-specialists to understand extreme performance and design.



Designer and artist Oliver Hess uses technology to rethink our relationship to the natural and synthetic world, as in this new 100-foot-long pergola in Los Angeles, CA, inspired by the city's seismic activity.



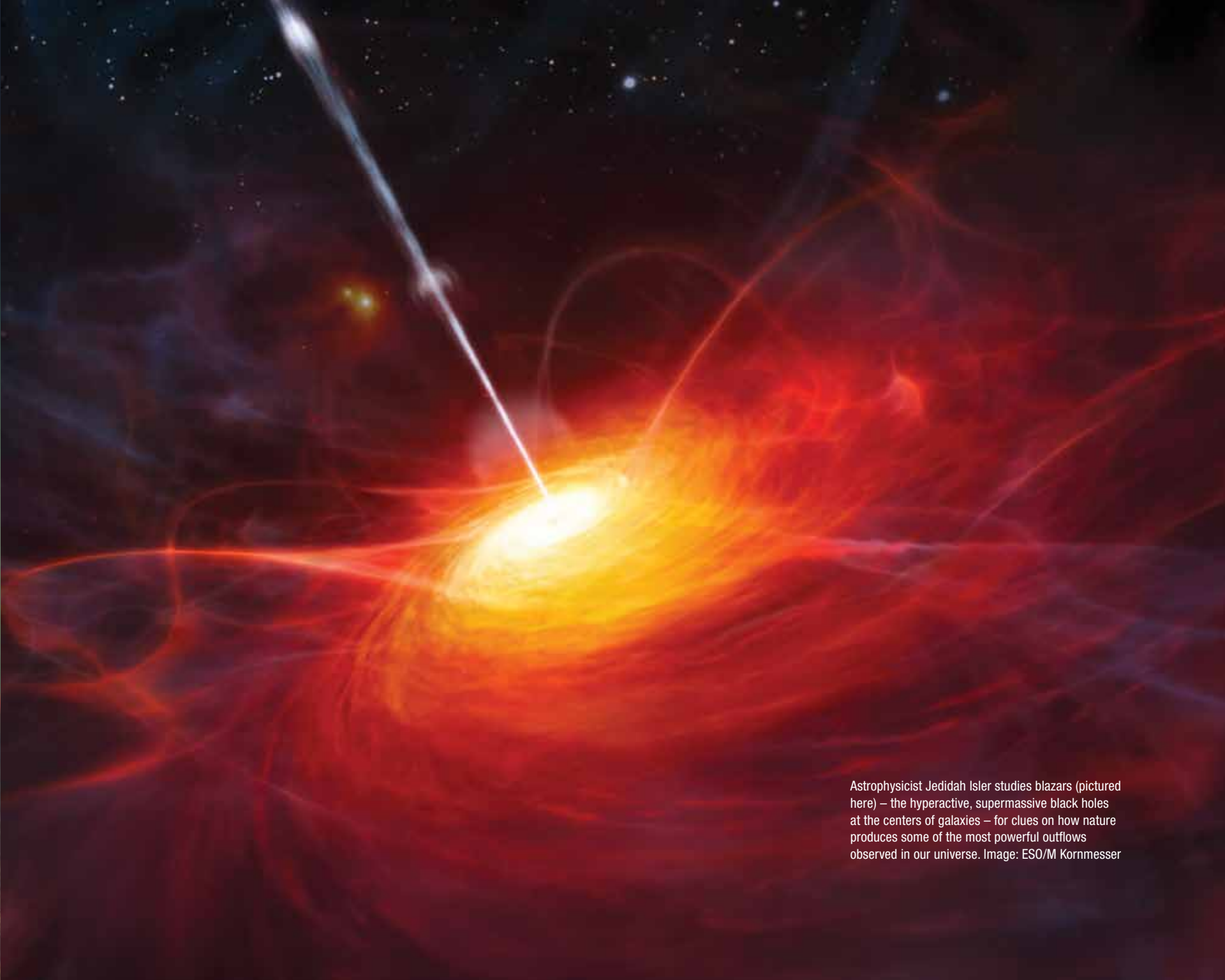
Native American photographer Camille Seaman captures the harsh beauty of remote Arctic landscapes and the effects of climate change, as well as epic tornados in the Midwestern US, like this 2012 supercell in Nebraska.



Photographer, filmmaker and writer Monika Bulaj captures beauty in the forgotten and often troubled corners of the planet – from Tajikistan (left) to Afghanistan (right).

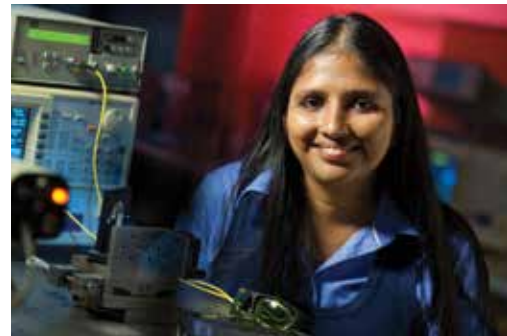


Russian artist Uldus Bakhtiozina creates elaborate, photo-based compositions that challenge gender and cultural stereotypes and reexamine classical narratives – such as this portrait of a 12-year-old boy who hides his aspirations to be a ballet dancer from his friends.



Astrophysicist Jedidah Isler studies blazars (pictured here) – the hyperactive, supermassive black holes at the centers of galaxies – for clues on how nature produces some of the most powerful outflows observed in our universe. Image: ESO/M Kornmesser

Laura Boushnak Shohini Ghose



Laura Boushnak is a Palestinian photographer based in Sarajevo, Bosnia and Herzegovina. She mainly works on documentary projects with a focus on Arab women and education. Quantum physicist Shohini Ghose’s research focuses on how to harness the laws of quantum physics to build quantum computers and design applications like quantum teleportation. She’s also founder of Centre for Women in Science, an organization based at Wilfrid Laurier University, Ontario, where Ghose is an associate professor.

Laura Boushnak: You’re the first woman in your family to study physics. What inspired you to do so?

Shohini Ghose: As a kid, my favorite books were detective stories and mysteries. I loved the thrill of collecting clues and using nothing but evidence and logic to solve complicated problems. I was also really inspired by Rakesh Sharma, who was the first Indian to go to space back in 1984. I wanted to be like him one day, and science showed me the way. When I first took a physics course, I realized that it was nothing but a grand detective story – scientists are nature’s detectives who try to solve the mysteries of the universe. I was hooked.

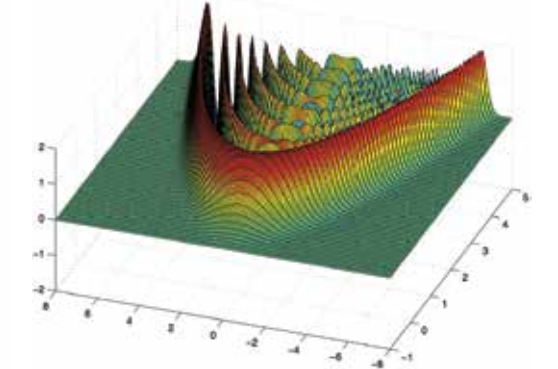
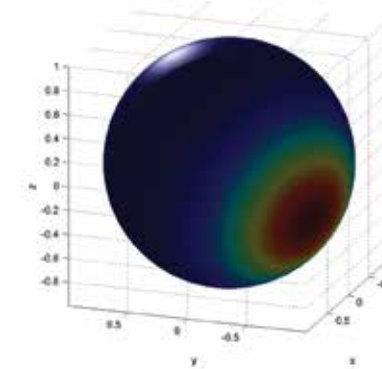
As a quantum physicist, I now explore the microscopic quantum world of atoms and electrons, which is just as mysterious and exciting as outer space. It is amazing to me that we humans can examine ourselves and the universe from the subatomic level to the grandest cosmic scales and find ways to solve the detective story of the universe. Nature is and always will be my inspiration.

LB: Tell me about your greatest achievement.

SG: One of the projects I worked on was to try to directly image the invisible quantum world of an individual atom. When you shine a laser beam at a cloud of atoms, the atoms interact with the laser light and leave their shadows in the light. By collecting the laser light after the interaction and analyzing it, we can reconstruct a picture of the atom. By constructing many such pictures over time and putting them together, we can actually make a movie of the atom. This had never been done before because it takes very high-precision control of the lasers and atoms. So this was the first time we directly observed an individual atom’s quantum evolution.

We saw some amazing effects, like quantum tunneling, where an atom “walks” through a seemingly impenetrable wall. We also observed the quantum butterfly effect – chaos theory acting on a quantum scale. And we found a connection between chaos theory and quantum entanglement.

Entanglement – a powerful connection between quantum particles – is one of the strangest predictions of quantum theory. It’s at the heart of the famous EPR paradox posed by Einstein and his colleagues. A change to one particle in a pair of entangled particles can instantly affect the other particle, no matter how far away it is! Entanglement between pairs of particles has been widely studied, but the problem becomes exponentially more challenging when we consider three or more particles in a network. Recently my team and I have found surprising new properties of entanglement in a multi-party network. Our work has led to new protocols for network quantum teleportation and security, and also raises questions about the very nature of reality.



LB: Our professions are mainly male dominated. Was it difficult to make a career in science as a woman?

SG: I used to joke that I picked physics to meet lots of guys! Being a woman of color in physics has had its challenges. As a student, I had professors walk into the class and say “Good morning, gentlemen.” At conferences, I have been mistaken for the secretary. As an instructor, I have faced some harassment. As a researcher, it’s hard to get your work recognized. And saying you are a physicist at almost any kind of social gathering is a tried and true way to be left drinking alone.

Being a white man is still the best way to have a successful career in physics. But I don’t get discouraged, because I know the universe does not care about my gender. The laws of physics work the same way and are equally accessible, no matter who you are. Also, as a woman professor who openly talks about gender in physics, I find that I am approached by many female students looking for a mentor or wanting to do a research project under my supervision. So I get to work with brilliant female and minority students who might otherwise have left physics. That’s a real opportunity, and I find it very fulfilling.

LB: Why are women discouraged from getting into science, and what do you think could be done to bring more women in?

SG: One thing that comes up a lot is this myth that women are somehow mathematically challenged. In fact, numerous studies and tests at every stage from infancy to high school have shown that there is no discernible difference in math and science abilities between boys and girls. Yet this stereotype persists, and it has an impact on female students, who judge themselves to be weaker at math than male students, even when they outperform them.

Perceptions, biases and environment all play a huge role in the choices we make in our careers. To fix this, all we have to do is challenge stereotypes, celebrate female role models, change culture and perceptions, create effective policies and change the world! Easy!



Shohini Ghose: I'm interested in your focus on Arab women and education. What are the most important insights on this subject your work has given you?

Laura Boushnak: It's vital to demonstrate that women's education is essential to achieving self-reliance and financial independence. I've noticed that the most successful situations are those where girls receive the support of not only the mother, but also the father. Knowledge is power, and it can only be gained by reforming the educational system so that both men's and women's view of women's rights – and human rights – changes.

SG: What's the story behind your favorite photo or moment in your work as a photographer so far?

LB: My favorite photo is from a project documenting cluster-bomb victims in South Lebanon. It shows the prosthetic legs of a boy called Mohammed. He had been on a motorbike with his father when they drove over a cluster bomb, near Tyre. I first met Mohammed three months after the accident. When I saw him again two years later, I was really happy to see him able to walk with these prosthetic legs. But he doesn't like to wear them; he finds them difficult to adjust to. He sat and we chatted a bit. But he wasn't in the mood to be photographed. I put down my camera and continued talking with his sister. Then he excused himself and said, "I want to go to my room." That's when he took off his legs. I didn't realize how shocking the image was until I did the editing. I see this image as an interpretation of war and violence without showing a drop of blood.

SG: I'm so inspired by your work with Rawiya, your female photography collective. What are the stories that only women photographers can tell? I am also interested in how visual stories might help more women participate in science.

LB: When it comes to stories about women, especially in conservative societies where men and women are segregated, we have access that male photographers do not. That doesn't mean we can publish all the images we take, but we can document more intimate details. The Arab Spring brought a lot of international coverage to the region. When we first formed Rawiya, the first all-female collective in the Middle East, it was our chance to create a platform where we could share stories from the region, told through local eyes.

When I work on stories full of problems and misery, I try to find a positive aspect that might inspire, prompt change and provide a solution. I've noticed that when I focus on successful stories of women from the region, it influences other young women. Offering role models proves to others it's possible to make it in certain fields despite obstacles. That's what we could do with women involved in science – bring their stories to the public.

SG: What is the one thing you would like the world to know about Arab women?

LB: They are not all oppressed, beaten by their husbands or forced to wear the hijab. There is this general tendency to portray Arab women in this superficial way. I get tired of this stereotypical image of Arab women, and women in general, in mainstream media.

I'm often asked how it feels being an Arab woman photographer. A friend of mine was once asked this by a journalist. Her reply was, "How does it feel being a male British journalist?" The point is, there are many problems concerning women's rights in the region, and that's where we need to put the focus. For example, my mother has a Jordanian passport, but when I travel to the Jordanian capital Amman for a visit, I have to get a visa. I'm treated as a foreigner because she cannot pass her citizenship to me as a woman.

Another example: When we mention Saudi Arabia, the first thing people say is, "Oh, women can't drive there." Of course women need to drive there, but the problem goes far deeper than that. A huge obstacle for Saudi women is male guardianship. Women cannot do anything – from opening a bank account to getting a job – without the approval of her male guardian, who might even be her teenage son.

SG: As a physicist, I think about the nature of reality and how to describe it. How do your photographs capture reality? Are there multiple realities in the images you present? What do you want people to see in your photographs?

LB: The images we take represent a small portion of reality. When I document certain scenes, I decide what I want to show and how to show it. We crop many parts of the reality during the process to reflect certain aspects of the story we consider important. When I manage to achieve an image that has many layers of information, that's when I feel that I've done a good job. When the audience starts asking questions, I feel I've achieved something.

However, the images I take are interpreted in different ways depending on the viewer's background. Sometimes I'm rather surprised. For example, I was showing a series of portraits of women, taken in Yemen, who were the first members of their families to go to university. But the women wear the niqab, the full face cover. I was approached by a woman during this exhibition, who said, "Thank God I was born in the UK." A journalist in Dubai presumed these women were illiterate because they were fully covered. Another journalist from the region asked, "So Laura, you're trying to show how backward the Arab world is?" This can be a bit scary. Is this the way people read the images? I see they are kind of provocative because they challenge people's preconceptions of women in the region. But it's also fascinating to see these reactions. As long as we keep exchanging our views, that's how we'll create real change.



KINSHIP

Eric Berlow, ecologist

Ever since the first hominids walked on Earth, humans have lived in relationship with each other. From pair bonds to families to tribes and villages, collaborative relationships have allowed groups of people to build amazing things that were impossible to achieve alone. It takes a village to build a village. Connections among people with different skills and experiences but common goals make human communities smarter and more productive than the sum of their parts. In ecology and agriculture, this phenomenon is known as overyielding – when the total production of a mixed crop yields more than the sum of each crop grown alone.

In the 1990s, the World Wide Web promised us a global village in which we would all become close neighbors with new possibilities of meeting each other to solve big problems at a global scale. The internet helped people with similar niche interests from disparate parts of the world find each other to form communities.

But one ironic, unintended consequence of the ease with which like finds like online has been the erosion of the global village into fragmented social silos and echo chambers. This “silozation” of society limits our potential to solve real problems that matter. Global energy security is not just an energy technology problem, for instance, but also one of food production, dietary culture, water resources, climate, transportation, geopolitics and socio-economics. Middle Eastern conflict is not just an ethnic/religious political issue. It is also driven by international politics, natural-resource conflict, nuclear proliferation, cultural narratives and media, to name a few. These and other multifaceted problems require that people who are different from each other discover points of complementarity to solve something bigger than they could solve independently.

And that’s why the TED Fellows program makes sense. An underwater robot inventor collaborates with an African technologist to leverage a political crisis reporting tool and build a first-ever open-source community of scientific explorers. An ophthalmologist meets an ocean conservation scientist, who helps him create a marine alphabet for the blind. A magazine editor/designer meets a computational biologist and helps him create an infographic about rare genetic diseases. A Jordanian social entrepreneur and philanthropist collaborates with a strategist/advisor to help open the door for the evacuation of tens of thousands of injured civilians during the 2011 Libyan revolution. A tissue engineer and an architect write a book together about the future of building with biology.

These are just a few examples of how the TED Fellows program builds kinship – not by gathering like with like, but by creating a village where unusual encounters create unusually interesting, overyielding results.



Choreographer and dancer Camille A Brown uses the language of dance to carve out a self-defined identity as an African-American female, sparking dialogue about race, culture, gender and social justice. Here she performs an excerpt from *BLACK GIRL: Linguistic Play* at TED2015. Photo: Ryan Lash



Brazilian chef David Hertz's socio-gastronomic organization Gastromotiva offers free culinary training for favela residents and other socially excluded communities to create employment, empower people and build bridges between social groups. Photo: Angelo Dal Bó

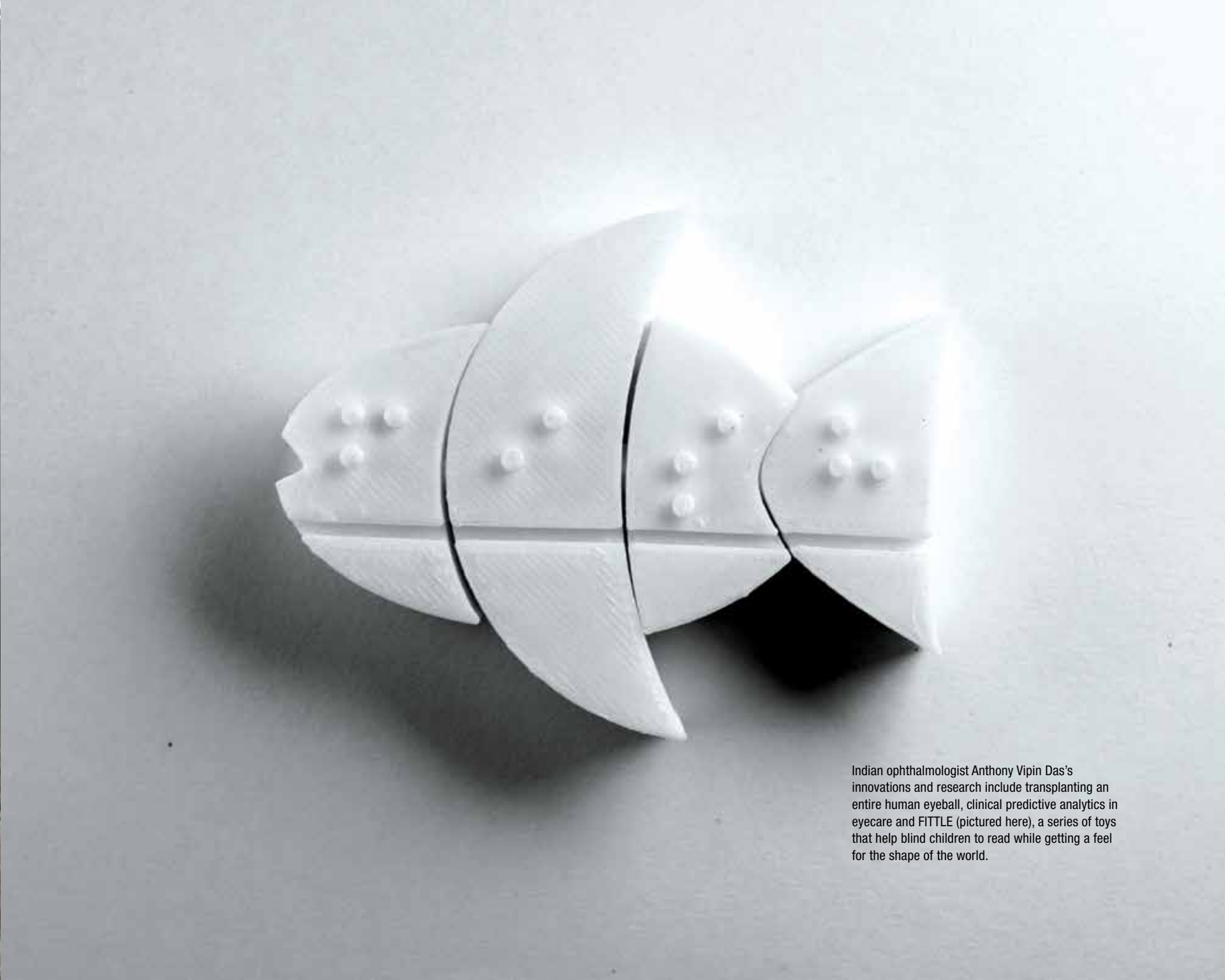


Chilean-American queer artist Constance Hockaday makes large-scale installations on open water, celebrating creative freedom and counterculture communities while defying gentrification. Her floating peep show (pictured) launched in the San Francisco Bay in June 2014.

French/Tunisian artist eL Seed blends the art of modern graffiti with the ancient art of Arabic calligraphy, spreading universal messages of peace with his "calligraffiti" – from his homeland of Tunisia, to Cape Town, to Rio's favelas and beyond.



British marine conservationist Alasdair Harris works with coastal communities to rebuild tropical fisheries by demonstrating that fishing less can increase catches – helping to protect marine ecosystems and the livelihoods they support. Photo: Garth Cripps/Blue Ventures



Indian ophthalmologist Anthony Vipin Das's innovations and research include transplanting an entire human eyeball, clinical predictive analytics in eyecare and FITTLE (pictured here), a series of toys that help blind children to read while getting a feel for the shape of the world.

Applied mathematician Max Little develops apps for predicting, detecting and monitoring Parkinson's disease, using voice recordings over mobile phones and balance tests using smartphone accelerometers. Photo: Spencer Lowell / Wired © The Condé Nast Publications Ltd.



Andrew Mendelson is an Emmy-winning editor and filmmaker, as well as a devout student and performer of the sitar, a plucked stringed instrument used mainly in Indian classical music. His 2009 film A Cricket in the Court of Akbar tackles critical issues facing traditional Indian music in today's shifting economy. Photo: Ryan Lash

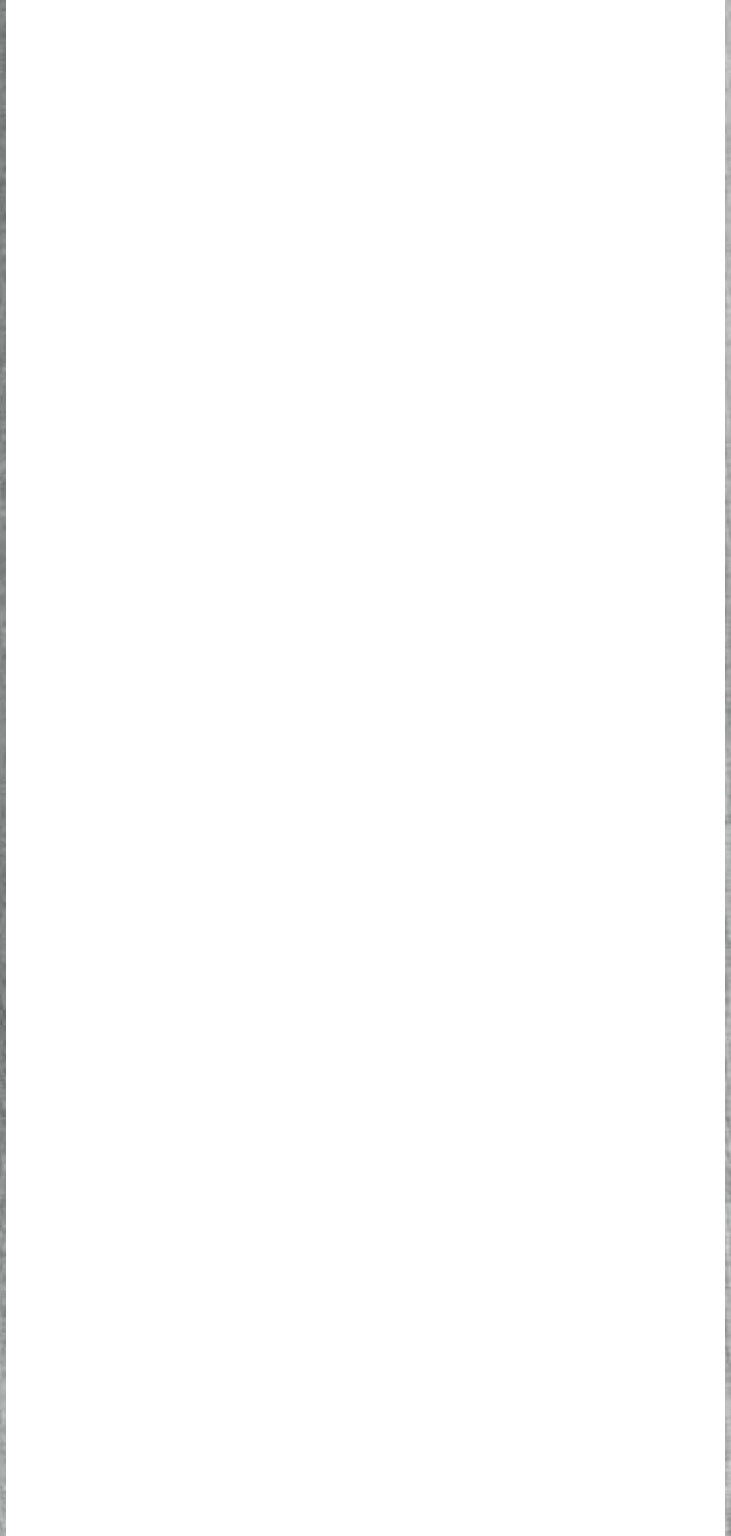




Award-winning photojournalist Boniface Mwangi unflinchingly captured the 2007-2008 post-election violence in Kenya. The horrors he witnessed propelled him into a career as an activist, artist and founder of creative workspace Pawa 254.



Graffiti artist and activist Mundano explores social and political issues – like the 2015 water crisis in São Paulo – with his work. His crowdfunded Pimp My Carroça campaign invites civil society to offer services and respect to *catadores*, Brazil's rubbish pickers. Photo: Andre Delia



Bosnian photojournalist Ziyah Gafić photographs the aftermath of conflict around the world. He also catalogs the belongings of Bosnia's genocide victims – everyday objects exhumed from mass graves – to bear witness to the human cost of war.

Cambodian interdisciplinary artist Prumsodun Ok reinterprets the gestural vocabulary and ritual function of Cambodian classical dance as a tool to question, explore and inspire transformation.



Darius Weems, rapper and star of the documentary *Darius Goes West* (directed by TED Fellow Logan Smalley) lives with Duchenne Muscular Dystrophy and is committed to raising awareness about the disease around the country. Photo: Dylan Wilson

Tokyo-based Cameroonian artist and designer Serge Mouangue blends African and Japanese design for visually arresting and useful objects – such as kimonos using traditional African prints.



Ethiopian-American singer-songwriter Meklit Hadero fuses her East African heritage with jazz, soul and hip-hop to celebrate the space between cultures. She's also co-founder of the Nile Project, a music-led cultural exchange of the 11 countries situated along the river. Photo: Ryan Lash



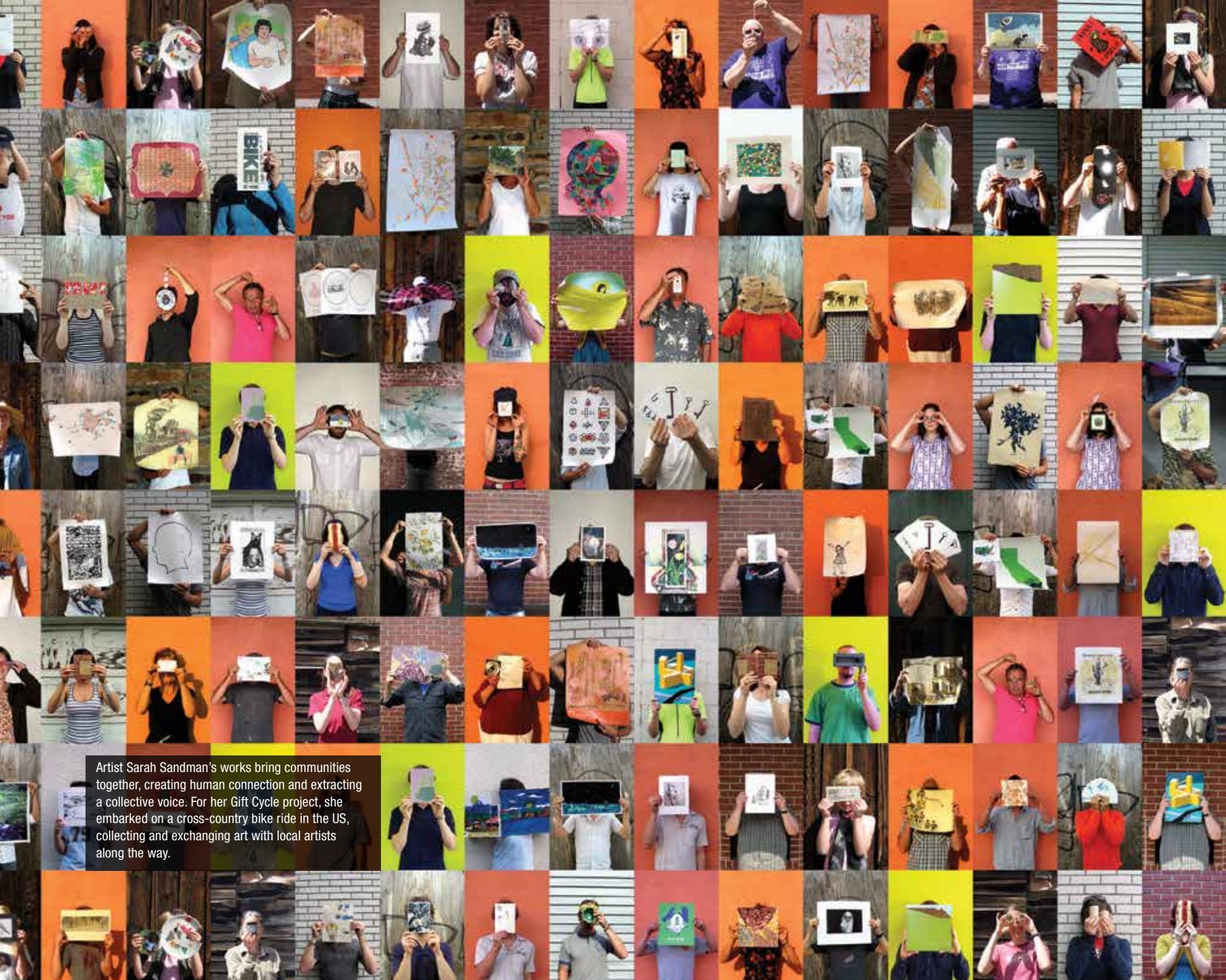
Trang Tran's enterprise Fargreen empowers Vietnamese farmers to use recycled rice straw as a substrate for growing gourmet mushrooms, reducing emissions from the traditional practice of burning straw as agricultural waste.



Shivani Siroya is the founder and CEO of InVenture, a mobile technology and data science company that's flipping the traditional credit scoring system on its head, providing instantaneous loans via mobile phones.



Jordanian social entrepreneur Suleiman Bakhit creates comic books featuring Middle Eastern superheroes to change not only how the West sees Arab youth, but also how Arab youth see themselves.



Artist Sarah Sandman's works bring communities together, creating human connection and extracting a collective voice. For her Gift Cycle project, she embarked on a cross-country bike ride in the US, collecting and exchanging art with local artists along the way.



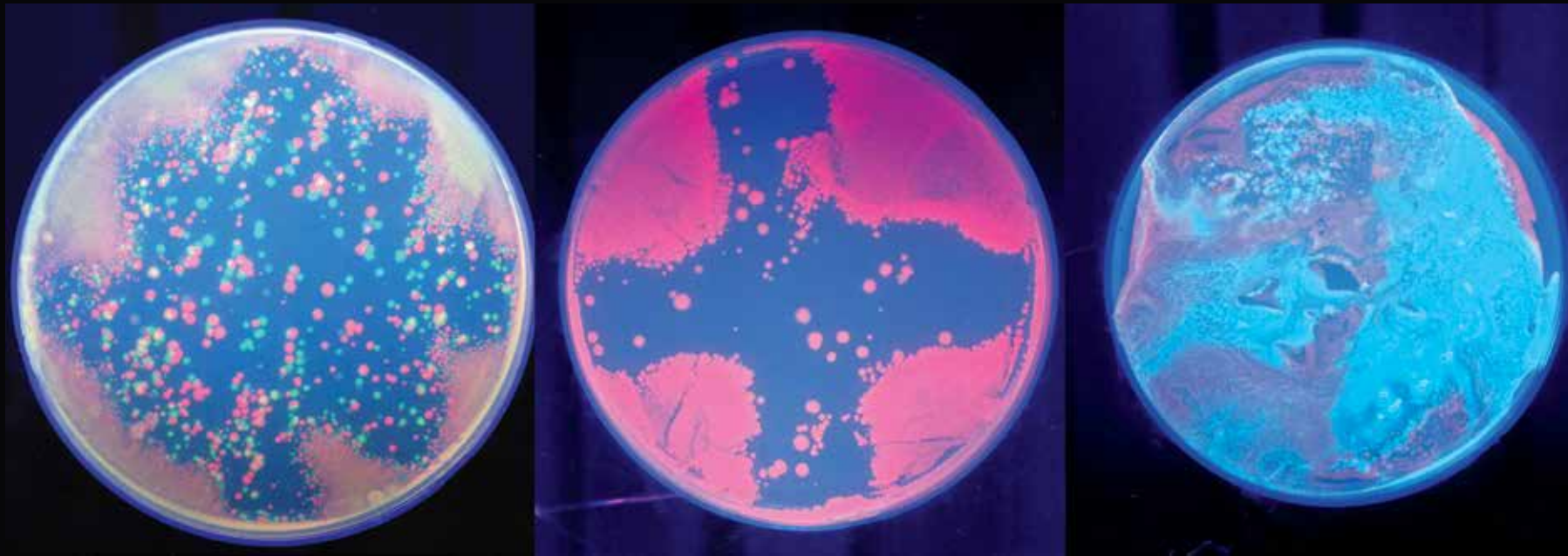
Musical artist Ryan Holladay creates site-specific sound installations, interactive concerts and GPS-based compositions with his brother Hays. In 2014 they organized and curated FERMATA, a gallery exhibition dedicated entirely to sound. Photo: Caitlin Teal Price



Engineer and health entrepreneur Zubaida Bai develops health products – such as the \$2 Clean Birth Kit available to this mother in Karnataka, India – designed to reduce maternal and infant mortality in underprivileged communities around the world.

When revolution swept through Egypt in 2011, Lebanese-Egyptian art historian Bahya Shehab sprayed stencilled images incorporating the Arabic word for “no” in the streets of Cairo to protest military rule and violence.





Synthetic biologist Oliver Medvedik co-founded Genspace, the world's first fully equipped community biolab where citizen scientists meet to explore and conduct experiments – such as this one, in which genes from jellyfish and coral were used to program bacteria to turn fluorescent.



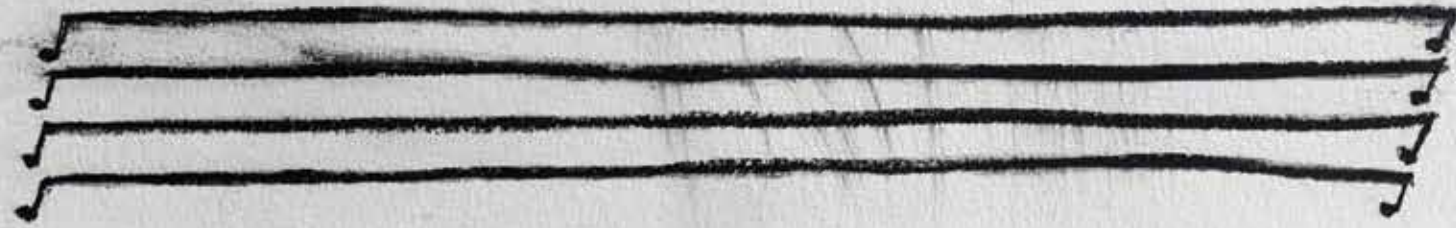
Artist and entrepreneur Perry Chen founded crowdfunding platform Kickstarter in 2009, forever changing the landscape of funding. In his 2014 Mexico City installation *Lunar*, an ocean of discarded objects merges with the moon.



In her 2014 book *The Notion of Family*, artist LaToya Ruby Frazier chronicles the historic steel town of Braddock, PA, while creating an intimate portrait of her own family, exploring the interplay of race, class and environmentalism. Pictured: *United States Steel Mon Valley Works Edgar Thomson Plant*, 2013 (left) and *Grandma Ruby and Me*, 2005 (right)



Through visual art, technology, composition and performance, deaf artist Christine Sun Kim explores ways of transmuting sound and silence to come to terms with her relationship with sound and spoken languages.



NOT EXACTLY A SCORE



Filipina-American composer and percussionist Susie Ibarra creates live, immersive music that explores rhythm in indigenous practices and the natural world. Photo: Ryan Lash

Chilean entrepreneur José Manuel Moller helps low-income customers like this woman save 40 percent on food costs at corner stores with his company Algramo – which installs vending machines that dispense bulk staples in reusable containers.



Palestinian activist Aziz Abu Sarah runs MEJDI Tours, a company that seeks to bridge cultural divides with tourism, as well as Project Amal ou Salam, a camp program for Syrian refugees. These young boys participated in the very first summer camp in 2013.



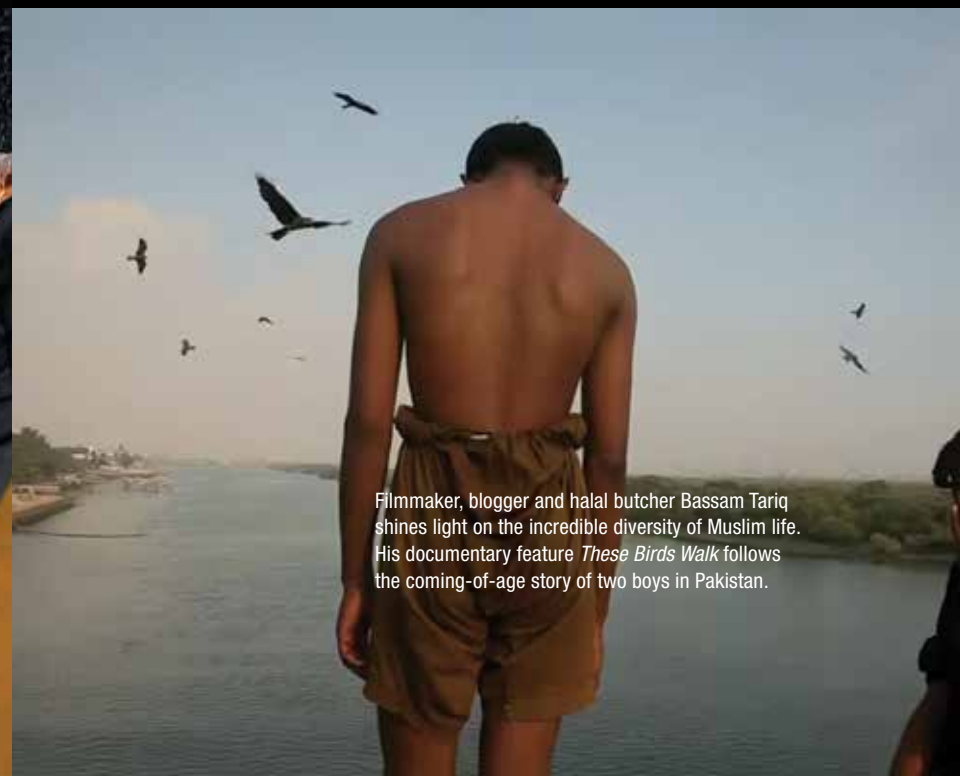
Afghan-American artist Amanullah Mojadidi, who grew up in the American South, uses performance art, fashion and photography to explore identity politics and personal history. His photographic series *Afghan by Blood, Redneck by the Grace of God* is an experiment in self-identity.



Iranian-American comedian and filmmaker Negin Farsad challenges the mainstream narrative about Muslims through comedy, as well as with films like *The Muslims Are Coming!* and *3rd Street Blackout*. Photo: Ryan Lash

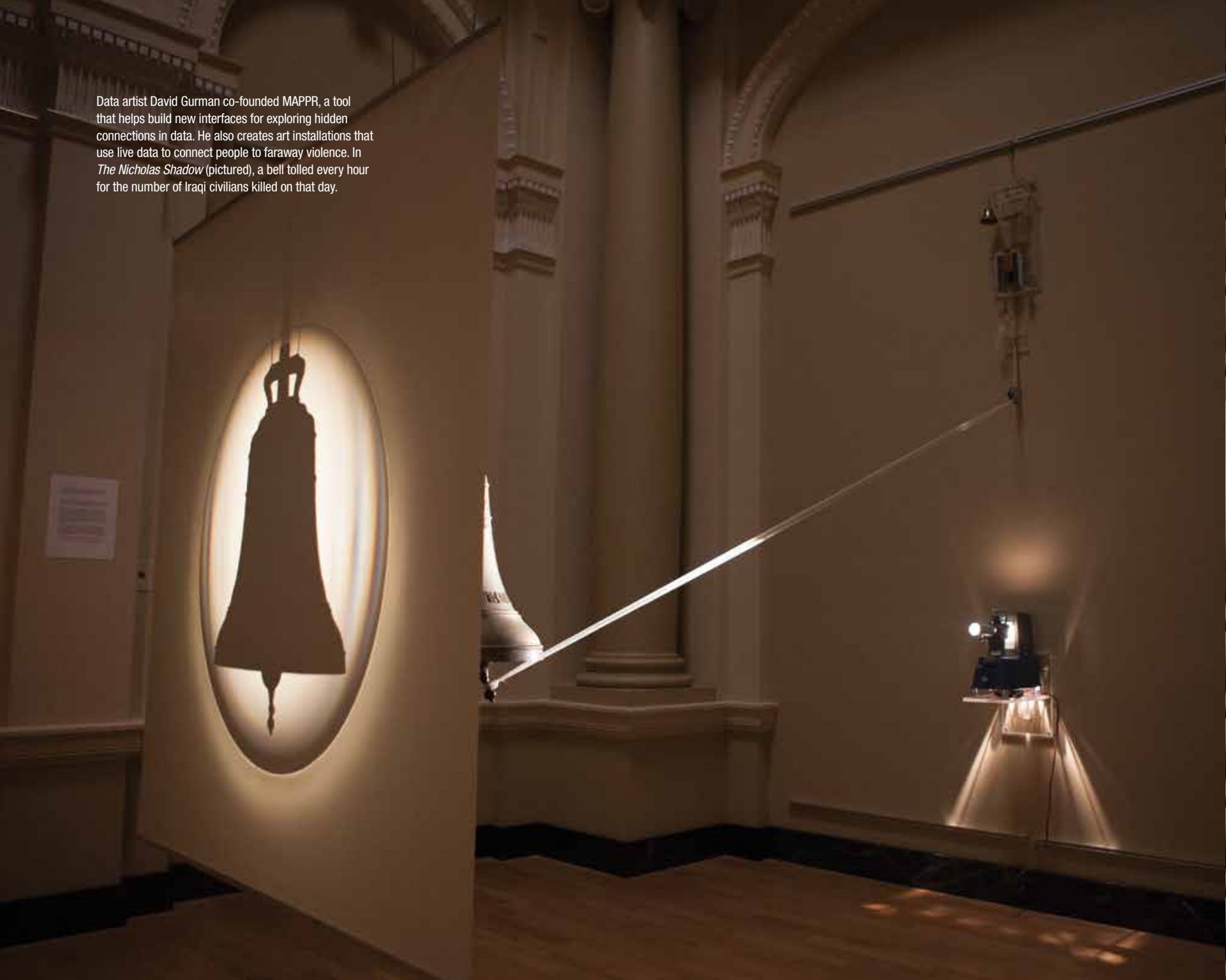


Human rights activist Yana Buhner Tavanier protects and promotes the rights of children and adults with intellectual and mental health disabilities. Her organization Fine Acts connects global activists and artists to achieve greater impact for human rights campaigns.



Filmmaker, blogger and halal butcher Bassam Tariq shines light on the incredible diversity of Muslim life. His documentary feature *These Birds Walk* follows the coming-of-age story of two boys in Pakistan.

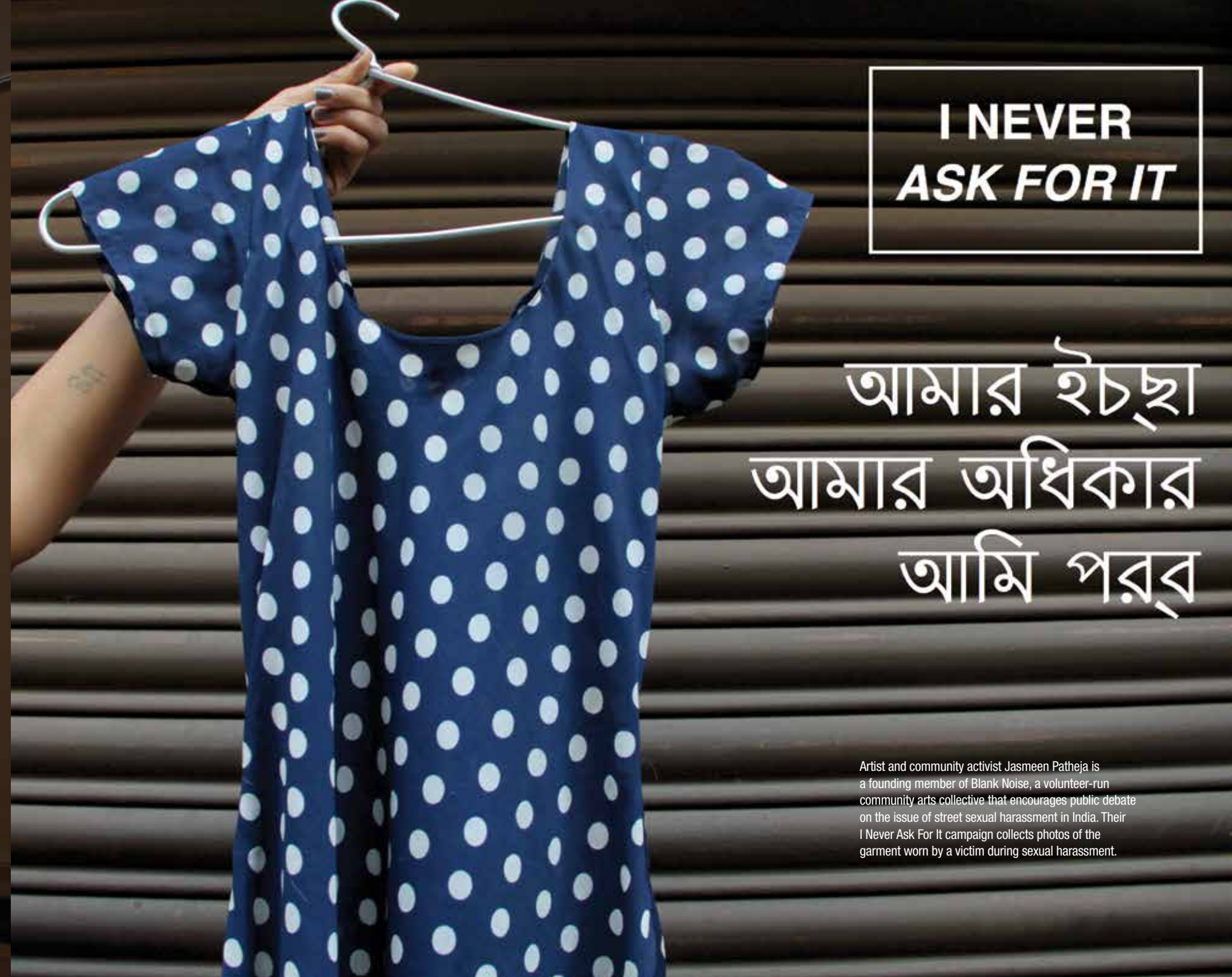
Data artist David Gurman co-founded MAPPR, a tool that helps build new interfaces for exploring hidden connections in data. He also creates art installations that use live data to connect people to faraway violence. In *The Nicholas Shadow* (pictured), a bell tolled every hour for the number of Iraqi civilians killed on that day.



**I NEVER
ASK FOR IT**

আমার ইচ্ছা
আমার অধিকার
আমি পরব

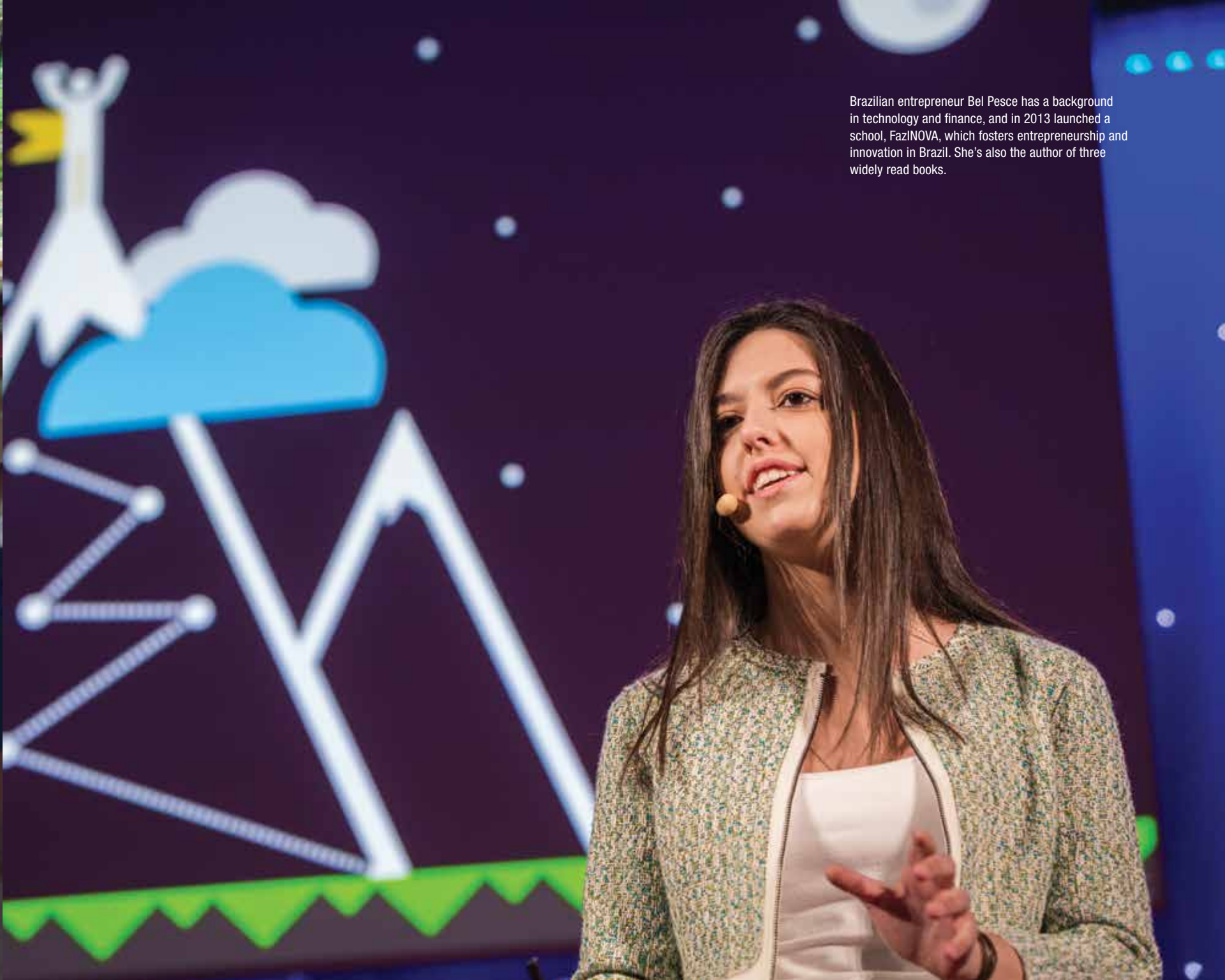
Artist and community activist Jasmeen Patheja is a founding member of Blank Noise, a volunteer-run community arts collective that encourages public debate on the issue of street sexual harassment in India. Their I Never Ask For It campaign collects photos of the garment worn by a victim during sexual harassment.

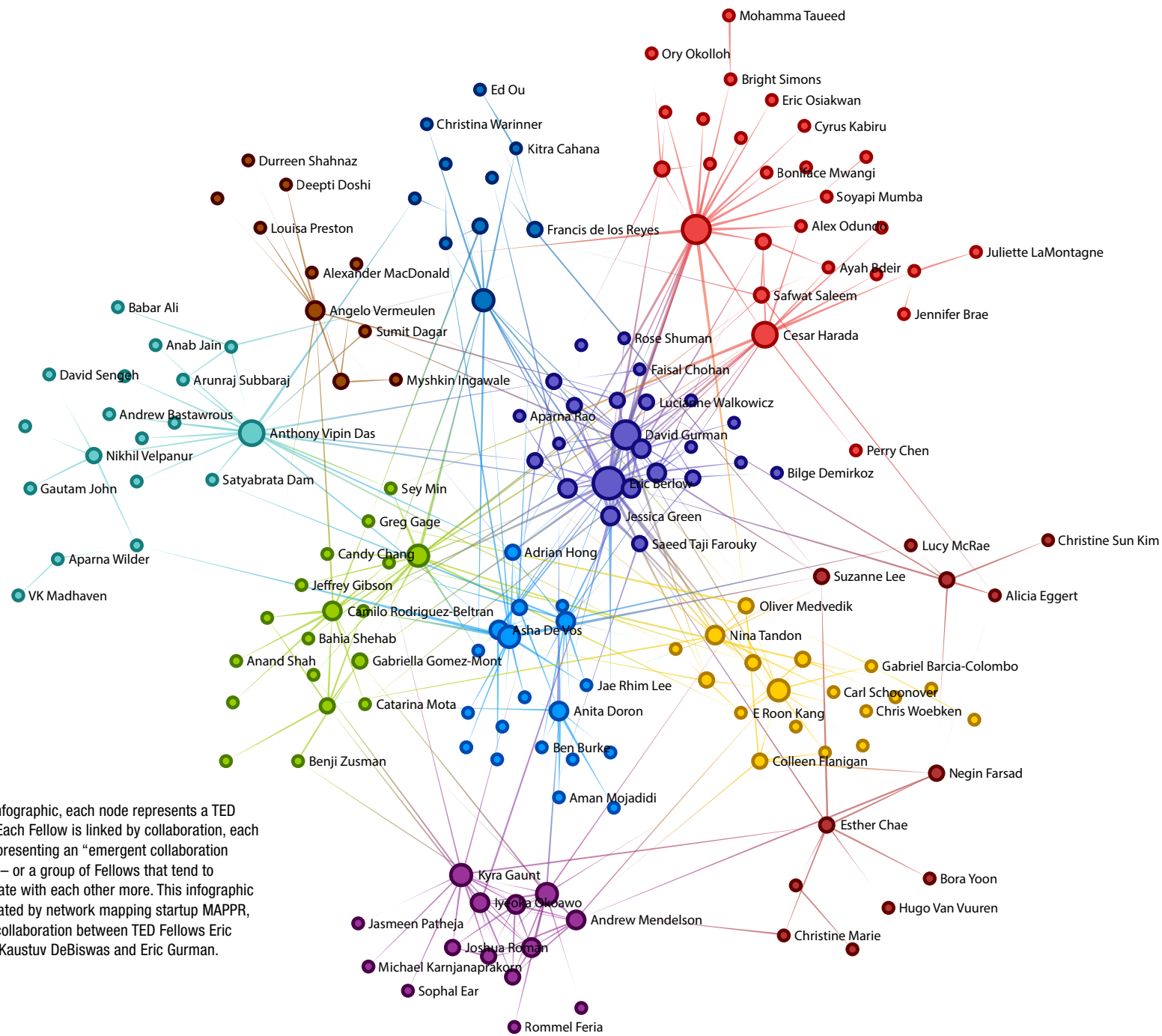


Political economist, author and educator Sophal Ear examines the detrimental effects of foreign aid dependence in his book *Aid Dependence in Cambodia: How Foreign Assistance Undermines Democracy*. Photo: Eric Wang



Brazilian entrepreneur Bel Pesce has a background in technology and finance, and in 2013 launched a school, FazINOVA, which fosters entrepreneurship and innovation in Brazil. She's also the author of three widely read books.





In this infographic, each node represents a TED Fellow. Each Fellow is linked by collaboration, each color representing an “emergent collaboration cluster” – or a group of Fellows that tend to collaborate with each other more. This infographic was created by network mapping startup MAPPR, itself a collaboration between TED Fellows Eric Berlow, Kaustuv DeBiswas and Eric Gurman.



At artist Candy Chang's School of the Future, visitors reflect on what they wished they had learned in school. Responses included how to be yourself, the value of travel, and how to handle an existential crisis.



Hungarian-Canadian filmmaker Anita Doron tells stories that investigate the depth of human joy and suffering, including *The Breadwinner*, an animated movie about a young girl in Afghanistan.



US Congresswoman Kyrsten Sinema (front row, third from left) built her political career by seeking shared values with her colleagues, while looking out for the interests of families in need. Formerly an Arizona state senator, she has served in the US House of Representatives since 2013. Photo: Flickr/ Nancy Pelosi

Fellows in Collaboration



Skylar Tibbit's Self-Assembly Lab at MIT helped Naomi Natale create prototypes for her One Million Bones project – which aimed to raise awareness about genocide worldwide – by producing paper-pulp bones and guiding fabrication techniques.

José Gómez-Márquez and Camilo Rodriguez-Beltran are working together to research novel ways to develop low-cost, replicable environmental and health sensors in rural and coastal communities to detect and forecast things like pollution, weather conditions and infectious diseases.



Greg Gage and Ayah Bdeir worked together on the EMG SpikerBox module for littleBits, which teaches neuroscience by letting users control littleBits modules with their muscles.

Erik Hersman helped David Lang use Ushahidi's simple map-making tool Crowdfunder for Lang's new OpenExplorer platform, a digital field journal for explorers around the world.



Andrew Bastawrous is bringing his smartphone-based eye examinations system Peek to hard-to-reach patients in Botswana with the aid of Steve Boyes.

Julie Freeman used metadata from Robert Simpson's citizen-science site Zooniverse to create *We Need Us*, a project that explores the artistic possibilities of big data.

The very first Fine Acts commission was *The Future*, a sculpture that debuted at TED2015. It was the result of a collaboration between Safwat Saleem and Alicia Eggert.

Naomi Natale
Arts Activist



José Gómez-Márquez
Medical Device Designer



Greg Gage
Neuroscientist



David Lang
Maker



Steve Boyes
Conservation Biologist



Robert Simpson
Astronomer + Web Developer



Yana Buhner Tavanier
Human Rights Activist



Louisa Preston
Astrobiologist



Skylar Tibbits
Artist + Computational Architect



Camilo Rodriguez-Beltran
Arts + Science Collaborator



Ayah Bdeir
Robotist



Erik Hersman / Juliana Rotich
African Tech Entrepreneurs



Andrew Bastawrous
Ophthalmologist



Julie Freeman
Artist



Safwat Saleem / Alicia Eggert
Graphic Designer / Artist

Skylar Tibbits and José Gómez-Márquez share a large lab space at MIT and have collaborated on many projects, including "biosensing" furniture – such as an intelligent chair that can share information about our health as we interact with it.

Camilo Rodriguez-Beltran and Greg Gage worked together at the Universidad del Desarrollo in Chile to establish Factoria, a makerspace at the university.

Ayah Bdeir introduced David Lang to eventual investors in his company OpenROV, which produces low-cost underwater robots.

Steve Boyes is using Erik Hersman and Juliana Rotich's BRCK – a rugged, cloud managed, full-featured modem and router – on his 1,700-kilometer expedition across the Okavango Delta.



Andrew Bastawrous is working with Robert Simpson's Zooniverse to crowdsource retinal data – allowing anyone, anywhere to participate in diagnosing eye diseases.



Julie Freeman and Yana Buhner Tavanier together created Fine Acts, an organization that seeks to create and commission art for social change.

Safwat Saleem is designing the cover of astrobiologist Louisa Preston's upcoming book "Goldilocks and the Water Bears: The Search for Life in the Universe," which explores questions surrounding the search for life.

Jessica Green Anita Doron



Engineer and ecologist Jessica Green specializes in biodiversity theory and microbial systems. She wants people to see the vital roles microbes, ecology and evolution play in every facet of our lives. When filmmaker Anita Doron was a kid, her dream was to make people laugh. Now her job is to make people feel more and think less. Or think *by* feeling. And then laugh. The two of them are currently collaborating on a sci-fi graphic novel, “Noli Timere,” which tells the story of a bacterium that infects five strangers in a Parisian building.

Jessica Green: My first exposure to magical realism was the film *Mystico Fantástico*, which you wrote, shot and directed. The moment I saw clips from this film, I was on a personal mission to collaborate with you, to use this genre to convey complex and non-intuitive concepts about the invisible world of microorganisms. What does magical realism mean to you?

Anita Doron: In 1928, René Magritte painted a picture of a pipe with the following text: “This is not a pipe.” He labeled it *The Treachery of Images*. His body of work supposed that if some part of the world can be shown to be irrational but coherent, nothing is certain. And if nothing is certain, we’re triggered to question our assumptions. This is the gift of magical realism: it destabilizes us and forces us to look at the world with questions instead of answers. I’m excited by anything that breaks up rigidity, anything that wakes us up from the tyranny of our knowledge. We need constant reminders that we’re clueless explorers in this world, and no one has the answers.

I think you and I are drawn to magical realism for the same reason. “The marvelous real” allows us to externalize the invisible internal. For me, this invisible internal is the emotional life of my characters. For you, it’s the microbiome. I think you’ve discovered fundamental, life-altering truths about humans and our microbes, but neither the language of science nor floating, colorful blobs are adequate to represent the intricacy of it all. Logic, facts and information don’t always penetrate deeply enough into the mind. Sometimes we have to feel things in order to understand greater truths. “Complex and non-intuitive concepts” of emotions and microbes led us both to magical realism.

JG: Beyond being internationally recognized for your films, you have professional experience as a science fiction writer. What is your connection to science fiction?

AD: Science fiction is as close as we can get to the Great Law of the Iroquois – a way of examining what kind of world we stand to bequeath to the seventh generation ahead with the decisions we make today. It’s a great diagnostic tool for life. Are we creating heaven, or hell? And if it’s hell we’re creating, let’s see it. Let’s imagine living in it and see how it would feel.

JG: If you had the ability to transform into a microorganism, what would it do?

AD: I would be a bacterium that makes “infected” people dream the dreams of others, remember their memories and feel their feelings. For example, let’s say I infect a world leader who has questionable morals. My host would begin to realize that the borders of his self are not as clearly defined as he thinks and that he’s a part of something much greater. He would realize how closely he’s linked to people near and far. Their pain would be his pain – their joy, his joy.



JG: What are the funniest and most memorable experiences you’ve had while directing a movie?

AD: The funniest directing experience was my very first, at age 12, when I got in trouble for attempting to make a documentary with a friend about the pollution of a river in my hometown. It’s absurd. The local authorities thought we caused such a serious threat that we were called into the deputy mayor’s dusty offices. We were pressured to stop filming – or else our parents would be fired from their jobs.

The most memorable? Hard to pick one. Maybe it was walking through a crowd of militant neo-Nazis demonstrating for a Jew- and Gypsy-free Hungary, pointing my camera at them, witnessing their hatred through the eyes of my Romani main character. My actress was terrified; I was obviously focused on getting the shot. Most of Budapest was shut down, windows barricaded. No one except the ultra-right-wing, the police and the army ventured outside.



JG: What do you think we can do – and I mean something substantial and revolutionary – to encourage and support women choosing to follow a path in science, engineering or film directing?

AD: I cry every time I walk down the pink aisles of princesses, kiddie makeup and sparkly stuff. (I cry just as much when I see the guns and robots and cars of the boy’s toy aisle.) Play gives children the freedom to imagine themselves being anything they wish to be. Instead, what is mainstream and assumed to be profitable are items that box children into boring, closed, limiting roles. We need to revolutionize the toy industry and retail, take it out of profit mode, because the future of humanity depends on it.

Let’s build new kinds of toys, like GoldieBlox by Debbie Sterling. Let’s make these toys widely accessible and affordable. Being a woman engineer, scientist, plumber or construction worker does not stand in opposition to femininity. In fact, femininity is desperately needed in these traditionally male-dominated areas. I hope one day we can intensify the debate about the binary breakdown of gender we’ve got going on now. I don’t know how to do this yet, but I really want to.





Anita Doron: How does all you've discovered about the human microbiome affect your sense of self? While shopping for groceries, picking up your kids from school and having deep scientific discussions with your lab partners, do you see yourself and others as moving, interacting, busy ecosystems of endless beings, and not as individuals with defined boundaries?

Jessica Green: Yes! I feel intimately connected to my surroundings, so much so that I sometimes feel mildly insane. I know that when I touch any surface, I am picking up an uncountable number of viruses, bacteria and fungi and taking them to a new destination. As I transport microbes from my desktop to my face, or from my front door handle to my dog, I wonder how those tiny creatures will fare in their new habitat. Will they have the nutrients they need? Or will they go dormant? Or even worse, will they die? I dive even deeper with these thoughts when I remember that we each have a microbial "cloud" or aura that extends beyond the boundaries of our skin. We don't even need to touch to exchange our microbial DNA.

AD: If I make a movie about your life one day, do you think it should be an action adventure, a sci-fi fantasy, a romantic comedy or a pondering, silent art film with stunning imagery? Why? Although I can't promise to take your casting choices seriously, I want to know: Which world-famous star should play you?

JG: My preference would be a sci-fi fantasy action adventure with some romance sprinkled in. Lots of explosive running (between meetings, as I'm often late), microbes hurling and twirling among my coworkers and me – and some intermittent, saucy exchanges with my husband Steve Green. I don't think I look like Franka Potente, but I often feel like the woman in *Run Lola Run*.

AD: What would your life be like if you suddenly decided to live and love full time as your roller derby alter ego, Thumper Biscuit?

JG: I would work less and play more. I would spend time with my girlfriends. I would be quick and nimble. I would jump the apex. I would grab your hand and whip you safely past upcoming obstacles. I would take your hand, even if you knocked me down.

AD: As women, we are both minorities in our respective fields. Can you share a funny story from the time of your rise to becoming an engineer and scientist as a rare species of non-male?

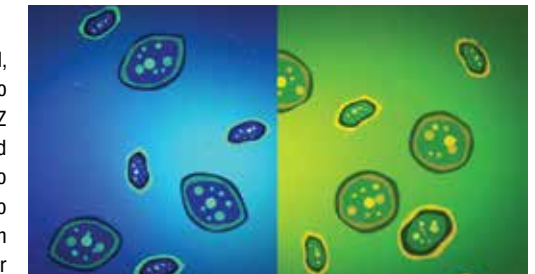
JG: As a young professor, I was invited to give a talk at a small, prestigious conference in Prague. The conference happened to fall on the projected delivery date of my beautiful son, Mauro Z Green. I came up with what I thought was a brilliant plan: I would attend the conference and give birth in Prague! We traveled to Prague six weeks before my due date. (I wore an overcoat onto the plane so as not to alert the flight attendants.) I didn't mention to the conference organizers that I was pregnant, and I never considered how I, the only female at the conference, would be perceived by the group.

At first I couldn't figure out why I was being shuttled into taxis throughout the conference when the attendees needed to get from point A to point B – along with the one senior citizen at the conference. He was a Nobel laureate, and at first I naively assumed they put us together because we were both very clever. It wasn't until the third ride that I realized they were afraid I would go into labor walking on the cobblestone roads!

The day I gave my talk, I could feel most everyone in the room holding their breath. All eyes were on my enormous belly. I'm not sure they heard many of the words coming out of my mouth. The message probably resonated something like this: "Microbes, blah, contractions, blah, water breaking, blah blah. Thank you." I gave birth to Mauro the next morning.

AD: What do you think we can do to encourage and support women choosing to follow a path in science, engineering or film directing?

JG: I don't know if this is revolutionary, but it's substantial. We should actively sponsor women in our respective fields. My use of the word sponsor is that defined by Sylvia Ann Hewlett as "a powerfully positioned champion – to help them escape the 'marzipan layer,' that sticky middle slice of management where so many driven and talented women languish." I got to where I am today because of many incredible sponsors, and I am doing my best to give back in the same way.



CURIOSITY

David Lang, maker

I have a theory that every person builds their life around one specific trait. Some people optimize for love or happiness. Others revolve around success, or health, or freedom, or some other sense of purpose. Of course, everyone aspires to all of these virtues, but time forces our hand, and whatever we refuse to let go of ends up defining our lives. The magnitude of these choices – the benefits and drawbacks – only becomes evident after we've travelled sufficiently far down a particular road.

I'm a prisoner of curiosity. With my back against the wall, whether consciously or not, I'll choose that direction every time. It's become the GPS navigation device of my soul.

In many ways, this has been a tragic revelation. My restlessness will never go away. Curiosity is neither the question nor the answer, rather the ethereal space between the two. It's a place of perpetual dissatisfaction and yearning. Places, people and familiarity get left behind because the journey toward uncharted territory must always continue. Like the shark who needs to keep swimming to stay alive, it simply must go on.

This is also the good news. In the ruins of disaster, the wake of immense loss or the face of improbable odds, the journey continues. In these situations, the capacity for curiosity becomes more than a luxury – it becomes a life support system. Curiosity is indefinitely and unshakably hopeful. It has to be.

In the early days of OpenROV, the idea for an accessible underwater robot was a pipe dream between me and a friend. We made it through this fragile period solely drawn by the lore of an underwater cave filled with gold, and the sense that we were on the edge of something special. Neither was certain. Both of our worlds fell apart outside of our garage, but inside, we were on a quest. We had an unanswered question.

Learning to live with eternal curiosity has taken time. My big breakthrough came with the realization that this path isn't as lonely as it first appeared. There are other explorers in the world, and you will eventually find them. You'll recognize them as soon as you meet them. As I get older, I've noticed that the bond among these companions has grown stronger, even if we don't always have enough time together. It's a deep respect born from understanding.

For me, that's been the greatest gift of the TED Fellows program: finding a community of like-minded searchers. It's made the journey infinitely more beautiful.



Archaeological geneticist Christina Warinner analyzes DNA from the bones and teeth of ancient people to study how humans have co-evolved with their environments – bridging the gap between archaeology, anthropology and the biomedical sciences.

Artist Naomi Natale's One Million Bones project, in which thousands of volunteers laid out handmade "bones" on the National Mall in Washington, DC, called attention to the ongoing problem of genocide around the world. Photo: Teru Kuwayama



South African conservationist Steve Boyes is devoted to the preservation of wilderness ecosystems – particularly the pristine Okavango Delta of northern Botswana. He is now exploring the remote river catchment in Angola to secure the future of this enigmatic wilderness. Photo: James Kydd

“Space archaeologist” and Egyptologist Sarah Parcak uses infrared technology coupled with satellite imagery to discover previously hidden ancient structures and cities, including one beneath the Giza Plateau in Egypt, pictured here. Photo: Digital Globe



Ecuadorian architect Veronica Reed's Sustainable Design Studio specializes in sustainable architecture, environmental research and community development – as with this healing and cultural preservation center for the Sápara people, a community indigenous to the Amazon.



Maker David Lang's OpenROV – an open-source, low-cost underwater robot – makes investigating the mysteries of the ocean accessible to anyone curious and adventurous enough to dive deep.



Astrophysicist Aomawa Shields studies the climate and habitability of planets (such as Kepler-62f, pictured) around low-mass stars and is passionate about engaging young girls in astronomy using theater and writing. Image: NASA Ames/JPL-Caltech

Maker Dominic Muren's lab The Humblefactory pursues research into new materials, processes and tools, extending the capacity of makers around the world to create things like the SSG Tricorder (pictured), a simple 3D-printed case for Arduino projects.



Investigative journalist Trevor Aaronson reports on the FBI's misuse of informants in counterterrorism operations, asking whether the United States is catching terrorists or creating them.



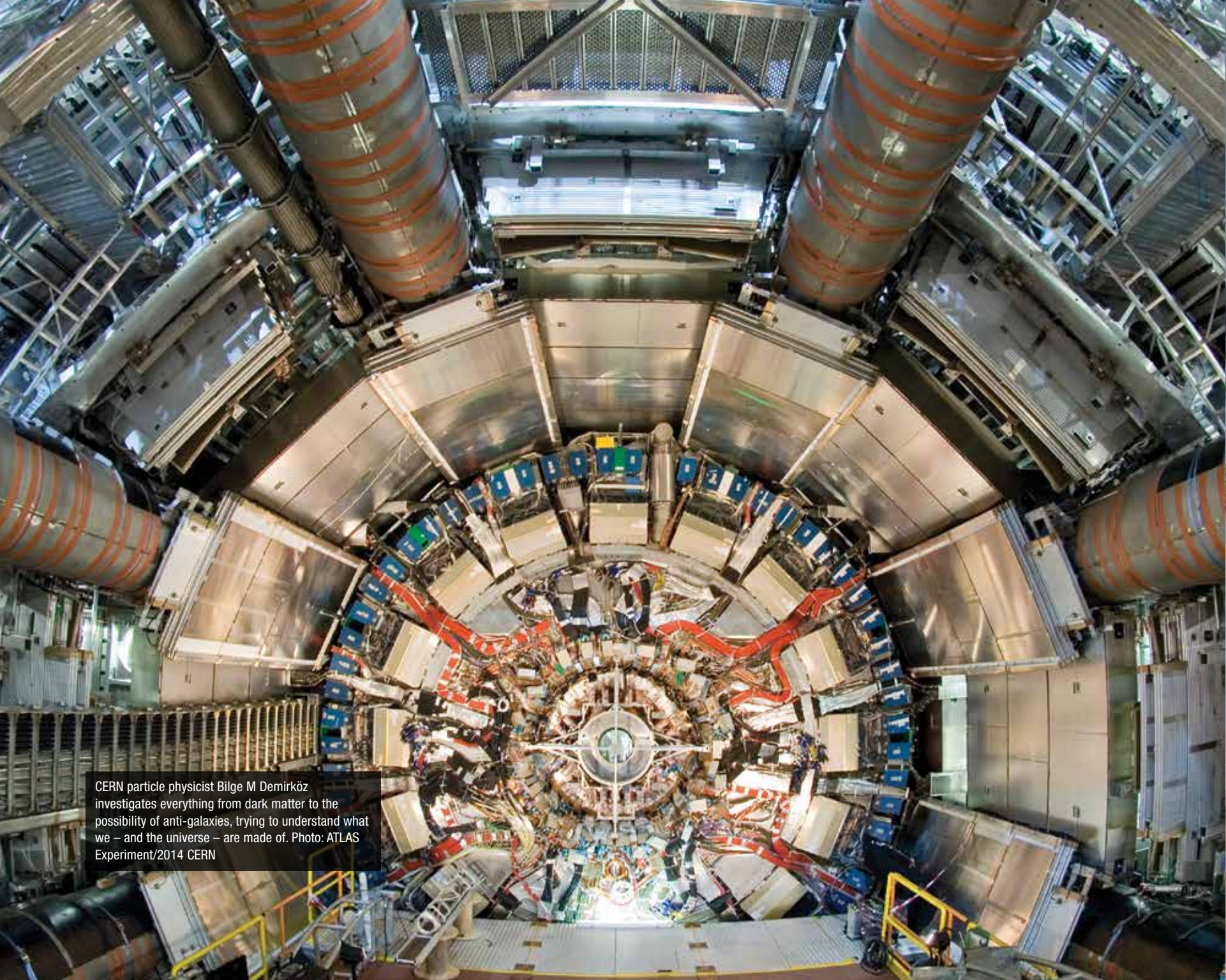
In a new documentary, Canadian filmmakers Ed Ou and Kitra Cahana explore Inuit life in northern Canada, touching on polar bear hunting, global warming and the postcolonial experience.



Around the world, millions of children are too poor to receive a proper education. At 16, Babar Ali took matters into his own hands, setting up a school in his family's yard in the village of Murshidabad, West Bengal.



Computational geneticist C Jimmy Lin's Rare Genomics Institute puts hope and empowerment into patients' hands by connecting them with researchers, doctors and community support, as well as a crowdsourced funding platform. Photo: Daniel Shea

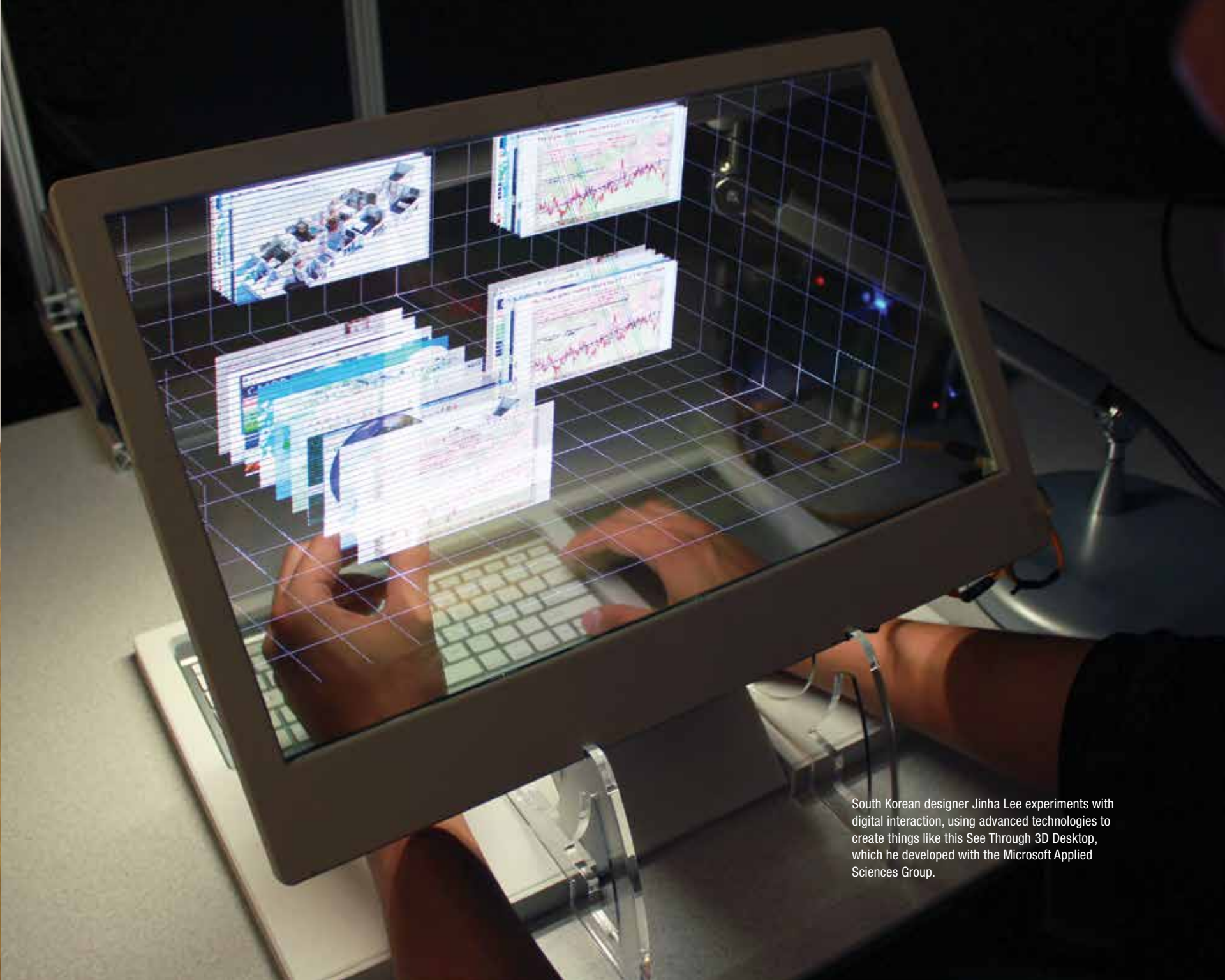
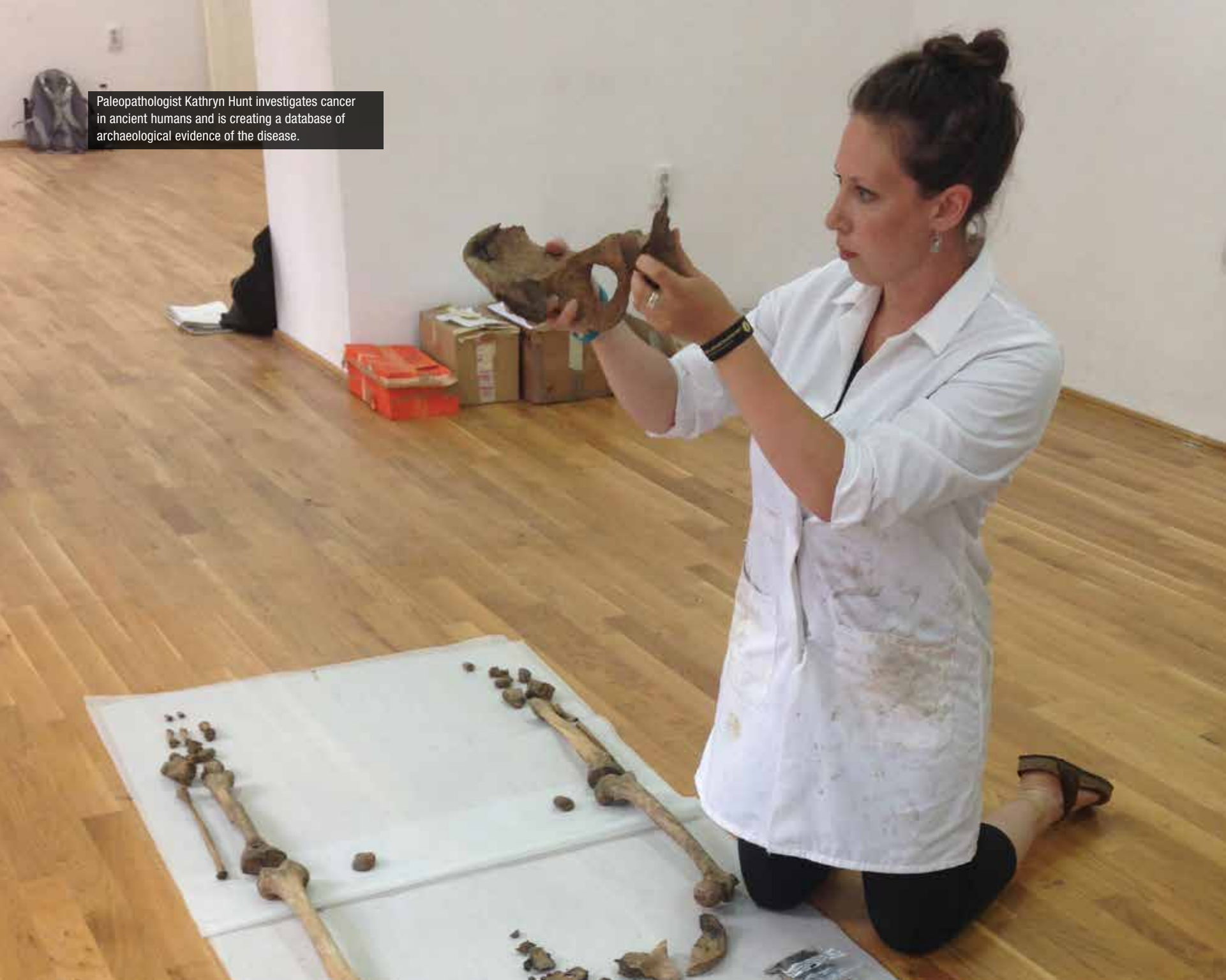


CERN particle physicist Bilge M Demirköz investigates everything from dark matter to the possibility of anti-galaxies, trying to understand what we – and the universe – are made of. Photo: ATLAS Experiment/2014 CERN



To power his family's home in Malawi, young William Kamkwamba built an electricity-producing windmill from spare parts and scrap – a journey detailed in his book *The Boy Who Harnessed the Wind*. Kamkwamba graduated from Dartmouth College in 2014 and is an IDEO.org Fellow working on design for the developing world. Illustration: Elizabeth Zunon

Paleopathologist Kathryn Hunt investigates cancer in ancient humans and is creating a database of archaeological evidence of the disease.

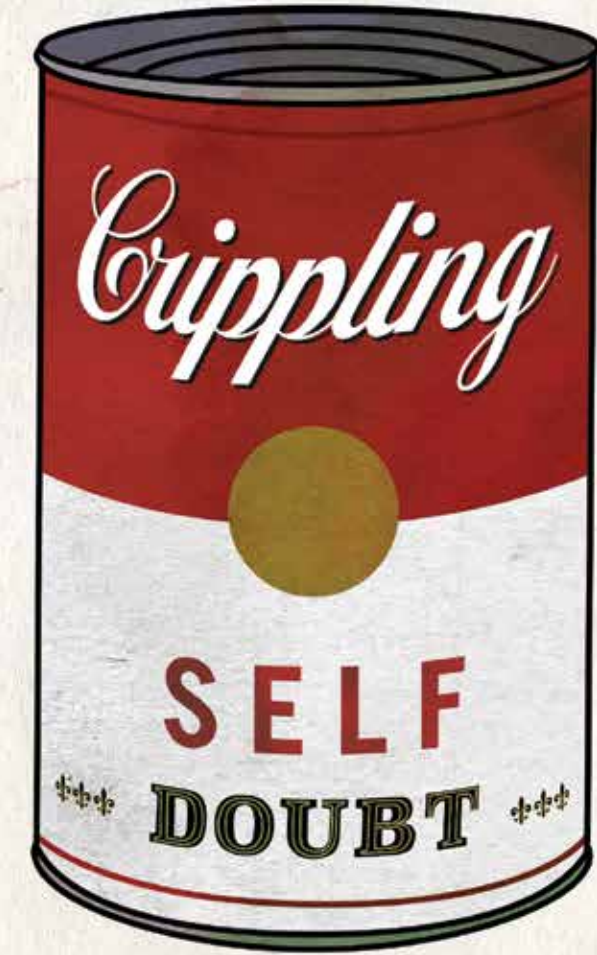
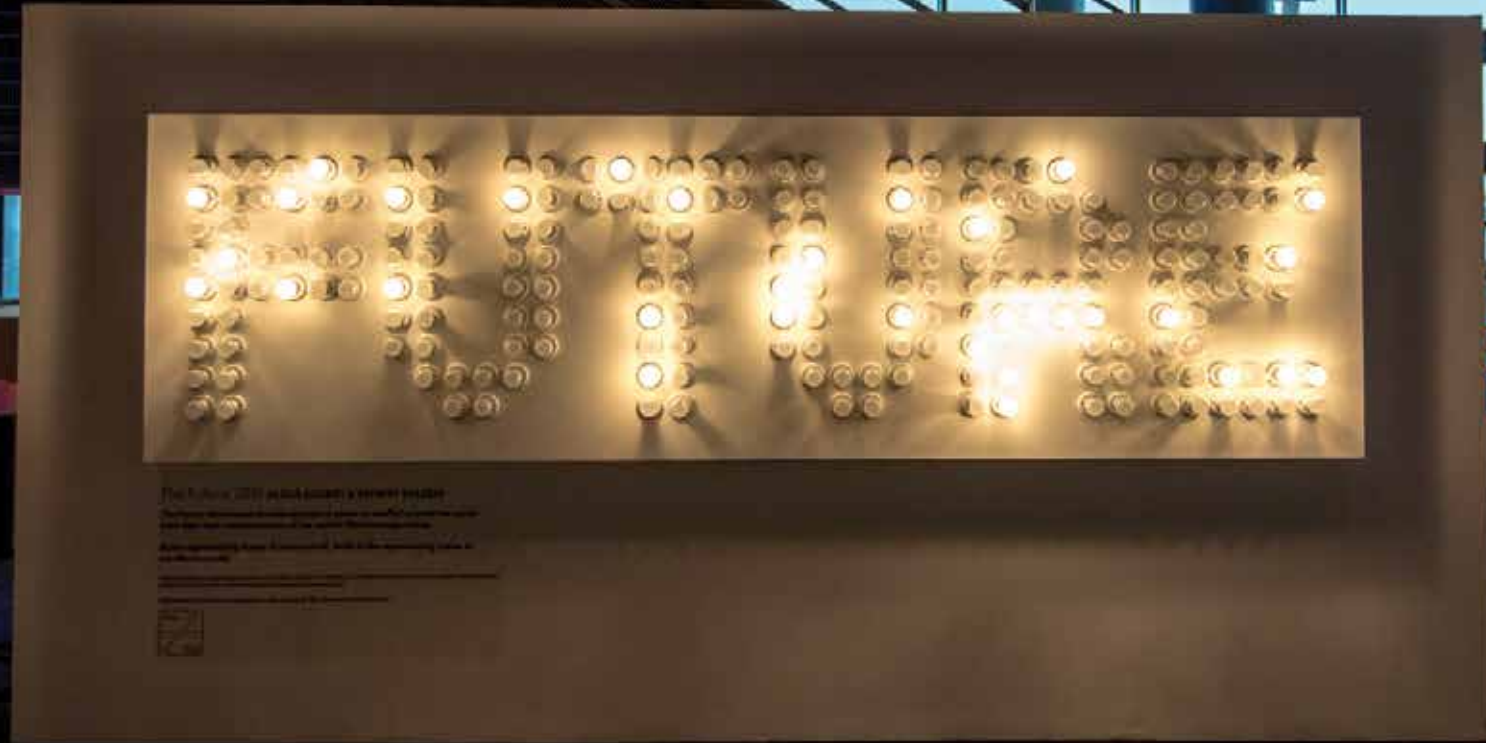


South Korean designer Jinha Lee experiments with digital interaction, using advanced technologies to create things like this See Through 3D Desktop, which he developed with the Microsoft Applied Sciences Group.



Cave art researcher Genevieve von Petzinger examines Ice Age art – like this image found in Las Chimeneas Cave in Puente Viesgo, Spain – as well as the culture and behavior of the period, working to figure out how our ancestors perceived the world.

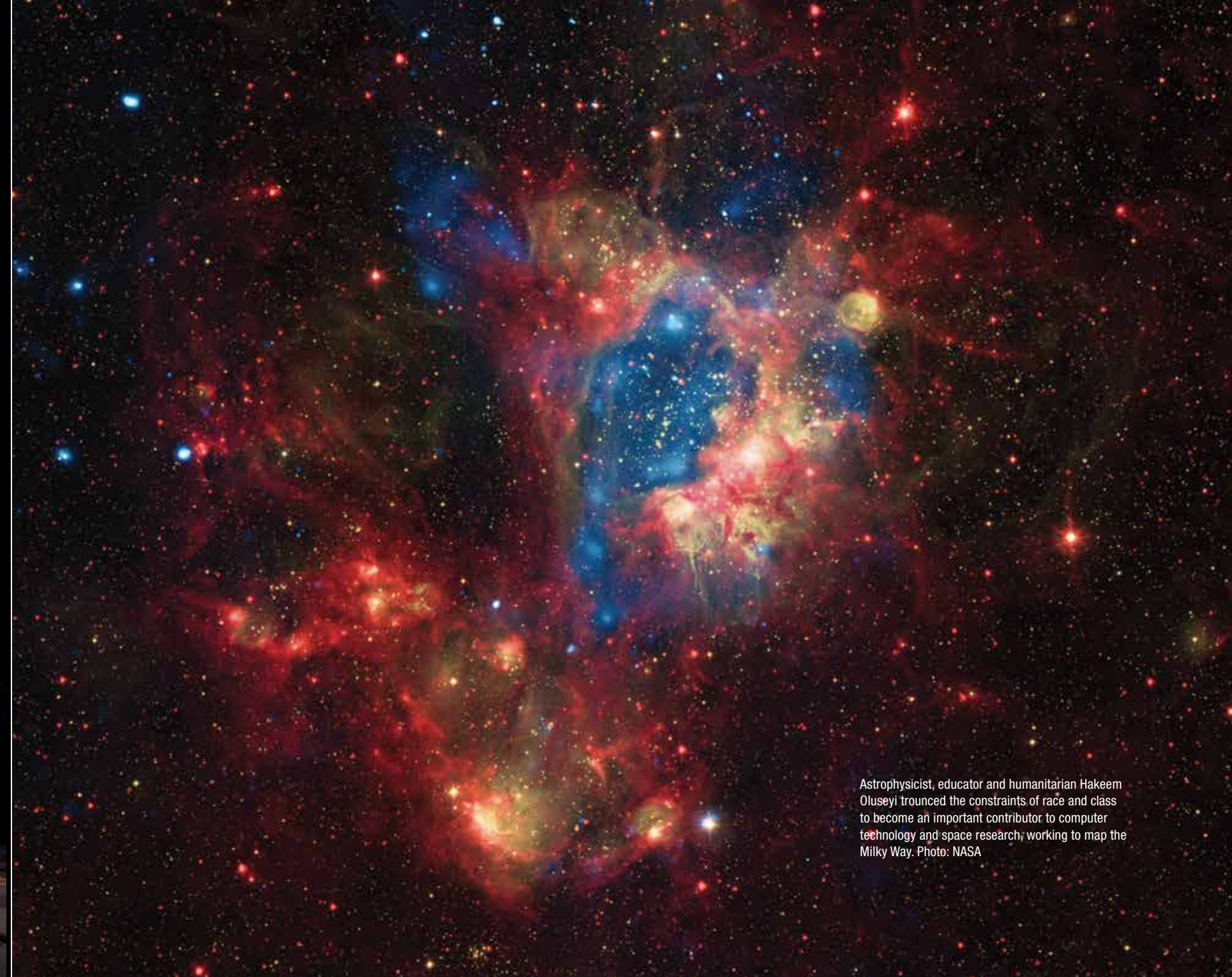
For TED2015, artist Alicia Eggert and graphic designer Safwat Saleem created *The Future*, a sculpture composed of 206 light bulbs, each representing a sovereign state. If the state is at peace, the bulb is on. If the state is in conflict, the bulb is off. Photo: Ryan Lash



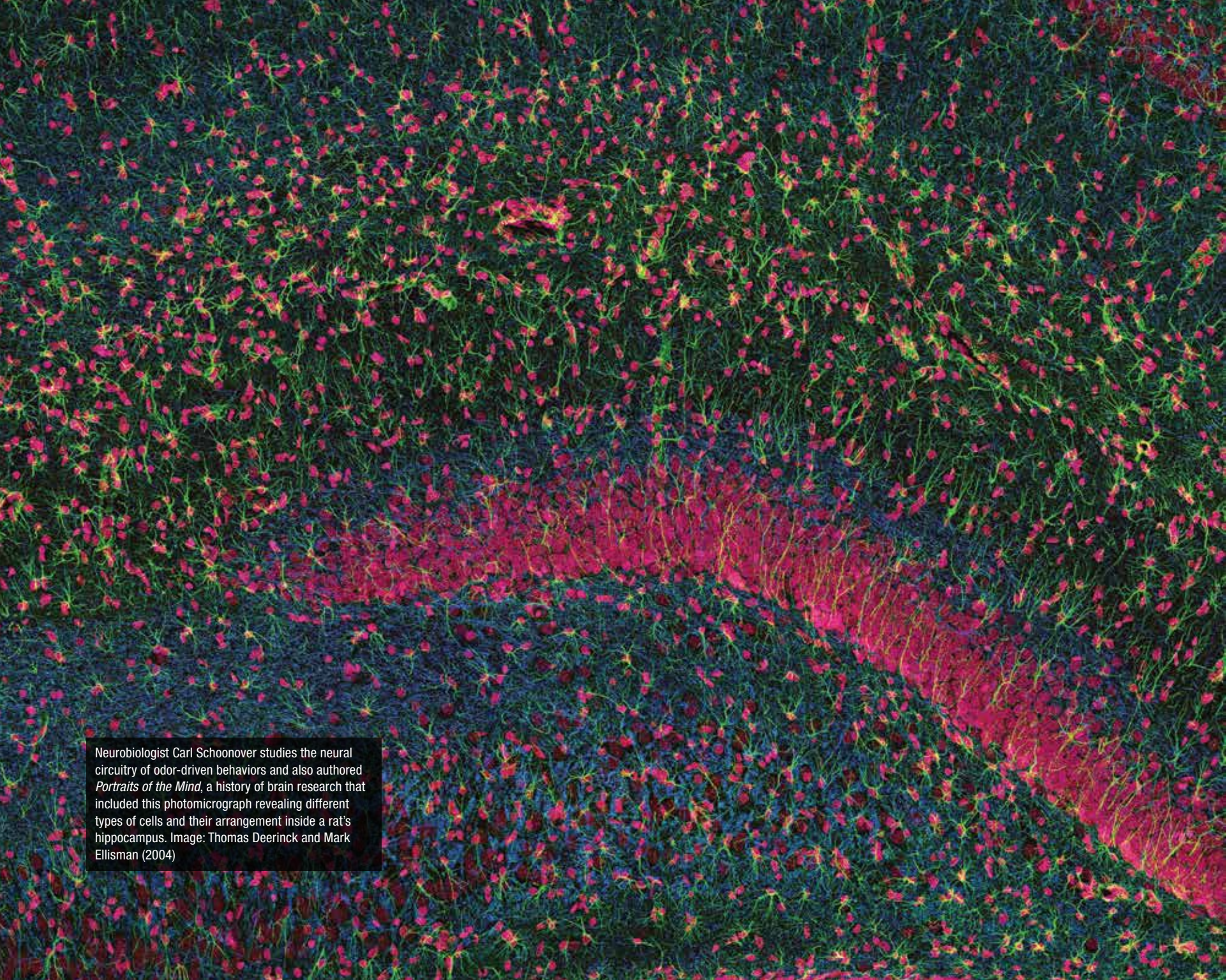
Artist and graphic designer Safwat Saleem's satirical and profane posters and animated shorts skewer racism, the absurdity of politics, petty dishonesty and general stupidity.



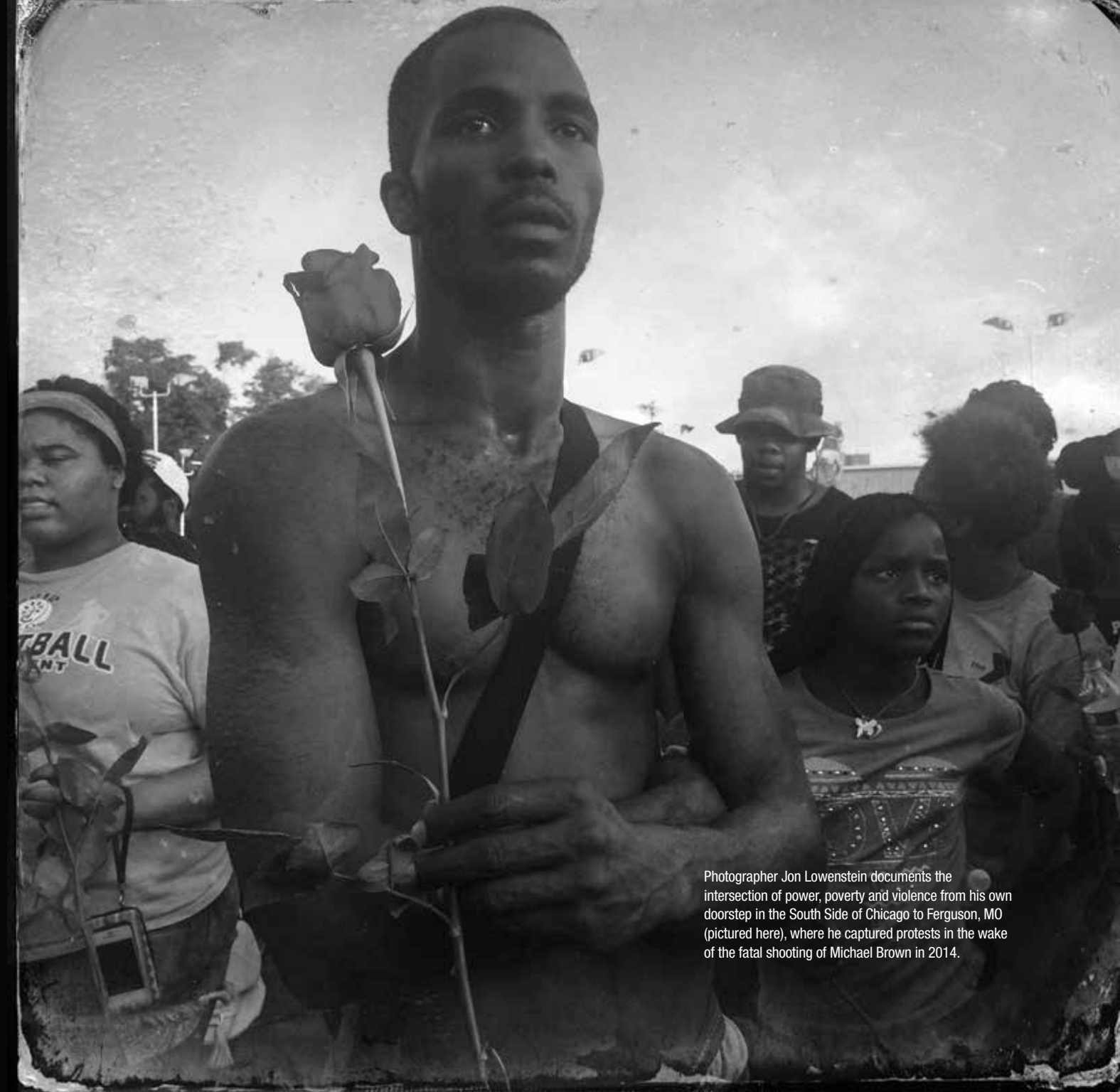
Paleontologist Nizar Ibrahim scours the Sahara desert in search of fossils to reconstruct ancient ecosystems from the Cretaceous period. He also spearheaded the search for the giant semiaquatic dinosaur Spinosaurus (pictured). Photo: Mike Hettwer/*National Geographic*



Astrophysicist, educator and humanitarian Hakeem Oluseyi trounced the constraints of race and class to become an important contributor to computer technology and space research, working to map the Milky Way. Photo: NASA



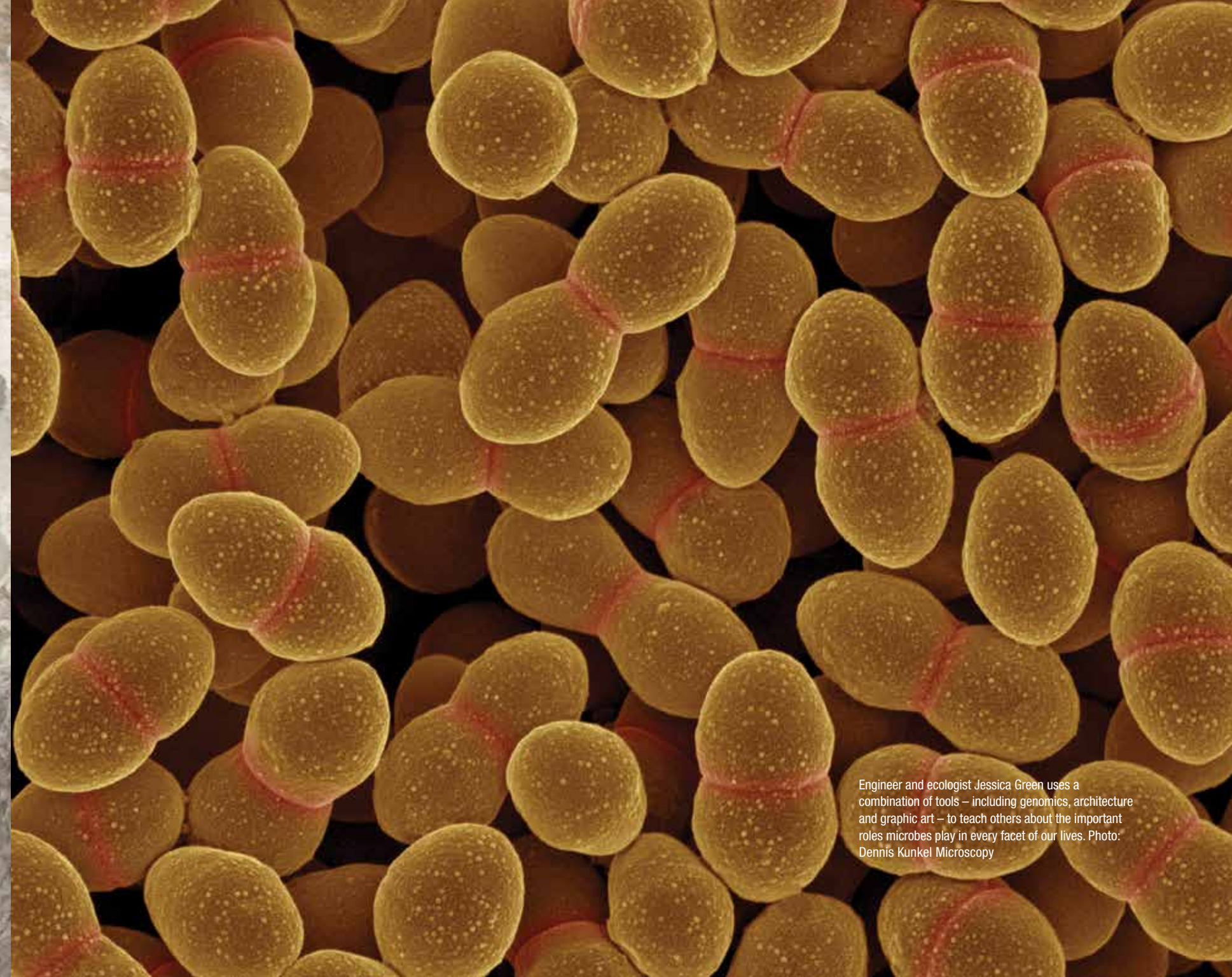
Neurobiologist Carl Schoonover studies the neural circuitry of odor-driven behaviors and also authored *Portraits of the Mind*, a history of brain research that included this photomicrograph revealing different types of cells and their arrangement inside a rat's hippocampus. Image: Thomas Deerinck and Mark Ellisman (2004)



Photographer Jon Lowenstein documents the intersection of power, poverty and violence from his own doorstep in the South Side of Chicago to Ferguson, MO (pictured here), where he captured protests in the wake of the fatal shooting of Michael Brown in 2014.



Bioarchaeologist Christine Lee reconstructs lives from ancient human remains – like this husband and wife from 1900 BC, excavated from the Gansu Province, China – looking for clues as to how they lived, fought and died.



Engineer and ecologist Jessica Green uses a combination of tools – including genomics, architecture and graphic art – to teach others about the important roles microbes play in every facet of our lives. Photo: Dennis Kunkel Microscopy



Neuroscientist Greg Gage is on a mission to make neuroscience education fun and accessible to young people with his low-cost DIY kits. The RoboRoach (pictured) lets users wirelessly control the movements of a cockroach using microstimulation.



Pakistani filmmaker Sharmeen Obaid Chinoy explores human rights issues in her extensive body of work, including the Academy Award-winning *Saving Face*, as well as *3 Bahadur* (pictured), Pakistan's first feature-length animated film.



With his tethered quadcopter Fotokite, Russian-born inventor Sergei Lupashin plans to put aerial photography and the power of unmanned aerial vehicles in the hands of journalists, architects and artists. Photo: Ryan Lash



Ghanaian entrepreneur Fred Swaniker founded the African Leadership Academy in Johannesburg, South Africa, to educate and support the next generation of Africa's leaders. Pictured: the graduating class of 2014. Photo: ALA



Korean-American actor and playwright Esther Chae explores complex political and social issues in her one-woman play *So the Arrow Flies* (pictured).



Nigerian-American poet and recording artist Iyeoka Okoawo has released three albums and performed at the Sullivan Honors Awards at the Kennedy Center as well as Russell Simmons' *Def Poetry Jam* on HBO.



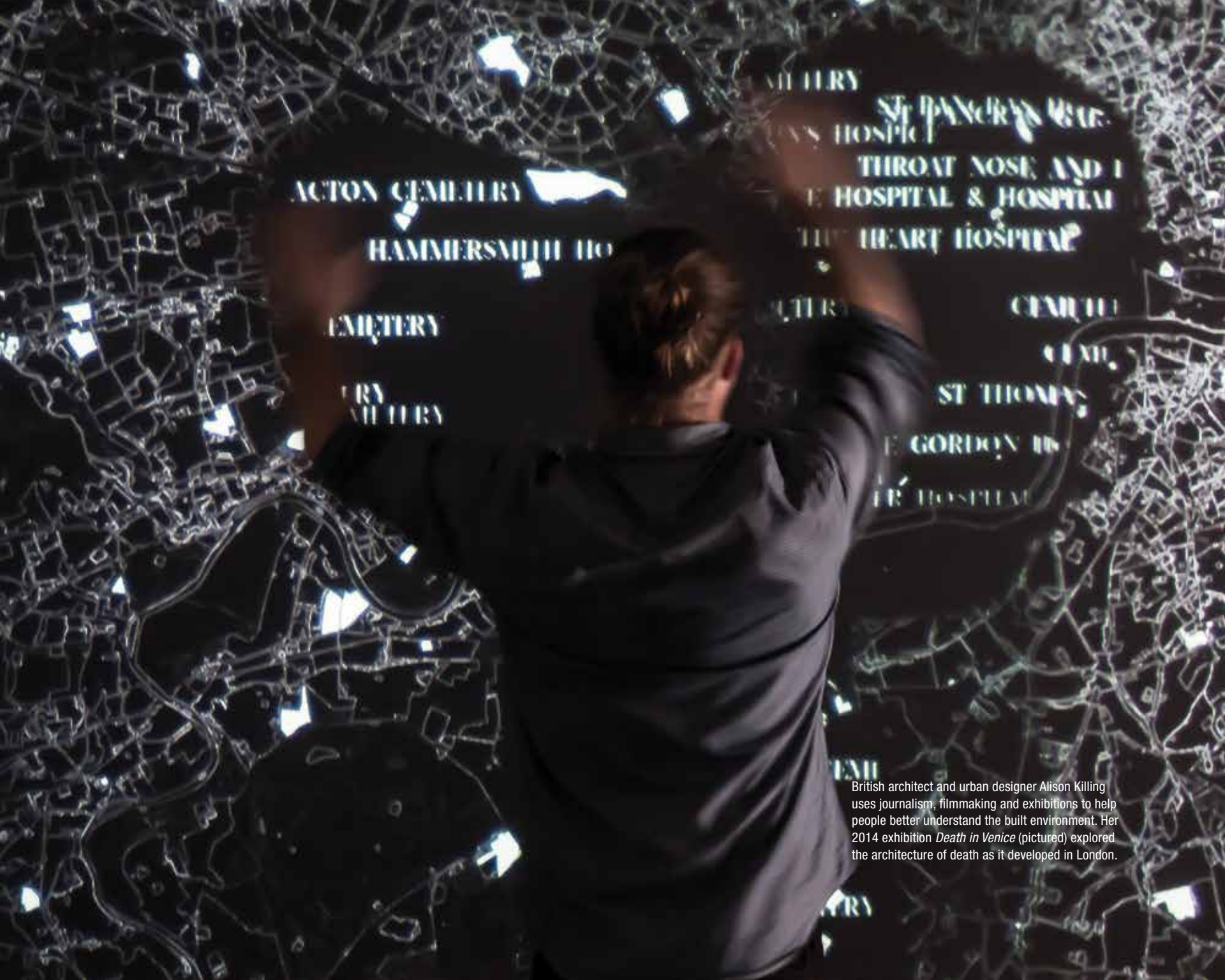
Indian artist Sharmistha Ray explores gender and sexuality through paintings, drawings, installations and public works. She also curates cultural salons out of her Mumbai studio, providing discursive and alternative modes of artistic engagement.



Ethnomusicologist, professor and singer Kyra Gaunt examines race, gender and sexuality through the lens of children's privacy on YouTube and is the author of *The Games Black Girls Play*. Photo: Ryan Lash



Indian mountaineer and polar explorer Satyabrata Dam is the only person in the world who has successfully led expeditions to the "Three Poles": Mount Everest and the North and South Poles.



British architect and urban designer Alison Killing uses journalism, filmmaking and exhibitions to help people better understand the built environment. Her 2014 exhibition *Death in Venice* (pictured) explored the architecture of death as it developed in London.



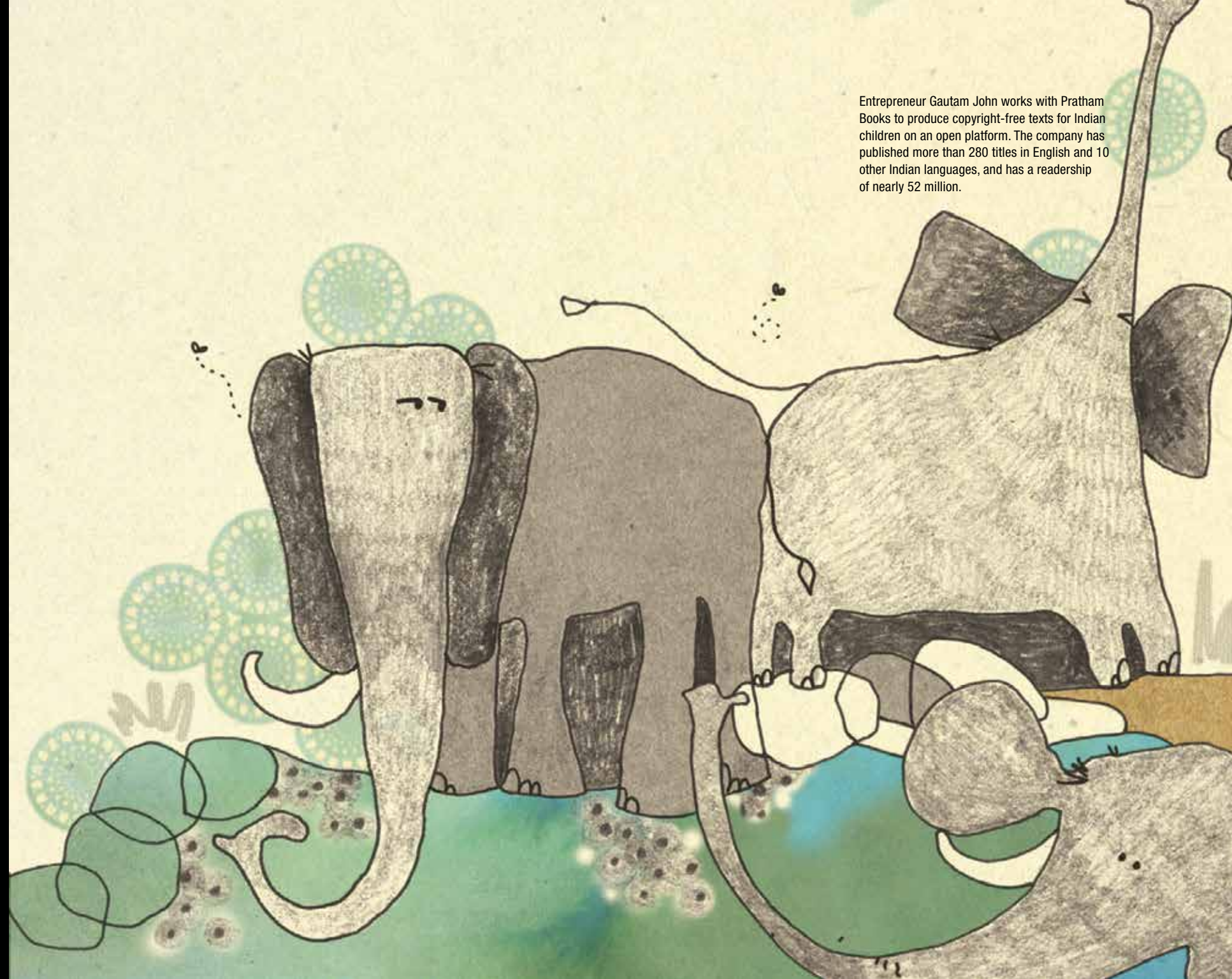
French-Japanese inventor and environmentalist Cesar Harada is developing Protei, a sailing robot aimed at collecting ocean data. He recently built MakerBay, the largest regional makerspace in Hong Kong for inventors, scientists and artists.



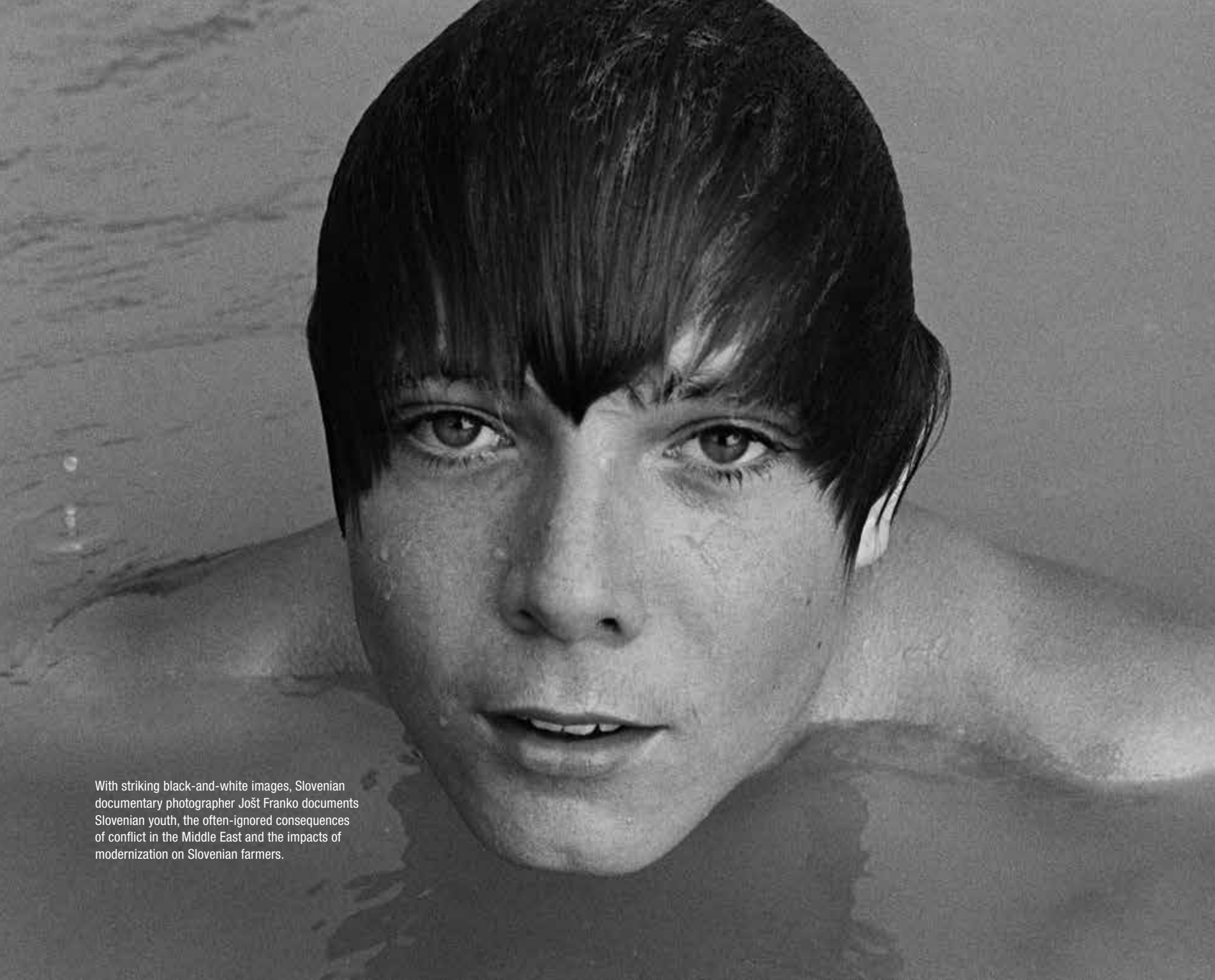
Astronomer Lucianne Walkowicz looks for life in the universe with NASA's Kepler Mission, studying how stars influence the habitability of the planets that orbit them and searching for potential signals from intelligent life.



Based in Curaçao, marine biologist Kristen Marhaver researches how corals reproduce, as well as what young corals need to thrive and build the healthy reefs of the future. Pictured: star coral embryos divide on spawning night.



Entrepreneur Gautam John works with Pratham Books to produce copyright-free texts for Indian children on an open platform. The company has published more than 280 titles in English and 10 other Indian languages, and has a readership of nearly 52 million.



With striking black-and-white images, Slovenian documentary photographer Jošt Franko documents Slovenian youth, the often-ignored consequences of conflict in the Middle East and the impacts of modernization on Slovenian farmers.



Glaciologist Michele Koppes travels to the coldest places on Earth to measure glacial changes in response to the warming climate and oceans, as well as how these changes affect the landscape and water resources.

Belgian artist and scientist Angelo Vermeulen thinks about how technology and biology connect – particularly how we might someday live in space. In 2013, he commanded NASA's HI-SEAS mission (pictured), a Mars simulation study aimed at improving the nutritional value of space food.



The Global Impact of TED Fellows



Nizar Ibrahim – The Sahara
Paleontologist Nizar Ibrahim led a team that discovered new remains of *Spinosaurus*, a 50-foot-long carnivore that hunted its prey in rivers 97 million years ago.

Sarah Parcak – Egypt
Archaeologist and Egyptologist Sarah Parcak has found 3,100 settlements, thousands of tombs and 17 possible pyramids.

Sanga Moses – Kampala, Uganda
Sanga Moses's Eco-Fuel Africa has helped 2,500 smallholder farmers save \$3.4 million in energy-related expenses by converting their organic waste to charcoal, mitigating 500,000 tons of CO2.

Erik Hersman + Juliana Rotich – Nairobi, Kenya
Ushahidi, founded by Erik Hersman and Juliana Rotich, had 45,000 users in Kenya when it first launched during election violence in 2008, helping to document incidents of violence as well as peace efforts.

Zubair Abubakar – Lagos, Nigeria
With his Nigerian Constitution app, Zubair Abubakar has helped more than 1 million Nigerians access the Constitution for free.

Mohammed Dalwai – Cape Town, South Africa
Mohammed Dalwai's apps, created with The Open Medicine Project South Africa, have been accessed more than 1 million times in 193 countries around the world by 60,000 healthcare workers.

Patience Mthunzi – Pretoria, South Africa
Dr. Patience Mthunzi, who is working in biophotonics to discover medical applications for laser technology, was the very first South African PhD student at the School of Physics and Astronomy of the University of St Andrews, Scotland.

Aziz Abu Sarah – Israel
Aziz Abu Sarah's MEJDI Tours, which is focused on building cultural bridges with tourism, curated multicultural trips for over 600 people in 2014, and is now operating in Northern Ireland, Israel, Turkey, Jordan, Oman and UAE.

Faisal Chohan – Pakistan
There have been more than 70,000 successful hires through Faisal Chohan's BrightSpyre. With 1.2 million users, it's Pakistan's largest online recruitment portal.

Suleiman Bakhit – Amman, Jordan
In 2015, Jordanian comic book author Suleiman Bakhit was invited to the White House to attend the Summit on Countering Violent Extremism.

Esra'a Al Shafei – Bahrain
Today there are more than 1,400 bands and 7,300 original tracks on Esra'a Al Shafei's Mideast Tunes, a platform for underground musicians in the Middle East and North Africa who make music for social change.

Walid Al-Saqaf – Yemen
Since launching in 2010, Walid Al-Saqaf's Alkasir, software that circumvents website censorship, has counted more than 86,000 unique downloads of the program from 143 countries – with the majority of downloads from Iran and Syria.

Zubaida Bai – Chennai, India

Zubaida Bai's \$2 clean birth kit JANMA contains six essential tools for safe and sterile childbirth conditions. It has reached more than 100,000 mothers in India, Haiti, Laos, Afghanistan and Africa.

Shubhendu Sharma – Bangalore, India

Shubhendu Sharma's company Afforestt, which creates native wild forests at the lowest possible cost, has planted 55 urban forests in 18 cities – a total of 60,450 trees.

Jane Chen – Bangalore, India

Jane Chen's Embrace infant warmer – which costs a fraction of the price of a standard incubator – has so far saved the lives of more than 150,000 babies in 10 countries.

Laura Boykin – Perth, Australia

Laura Boykin's Whiteflybase has collected genetic information from 605 individual whiteflies from more than 70 countries. This data will help scientists prevent the insect from devastating staple crops like cassava.

Trang Tran – Hanoi, Vietnam

Since 2014, Trang Tran's Fargreen has helped farmers recycle 15 tons of rice straw to help grow 200 kilograms of mushrooms – preventing 15 tons of toxic greenhouse gases from entering the atmosphere.

Durreen Shahnaz – Singapore

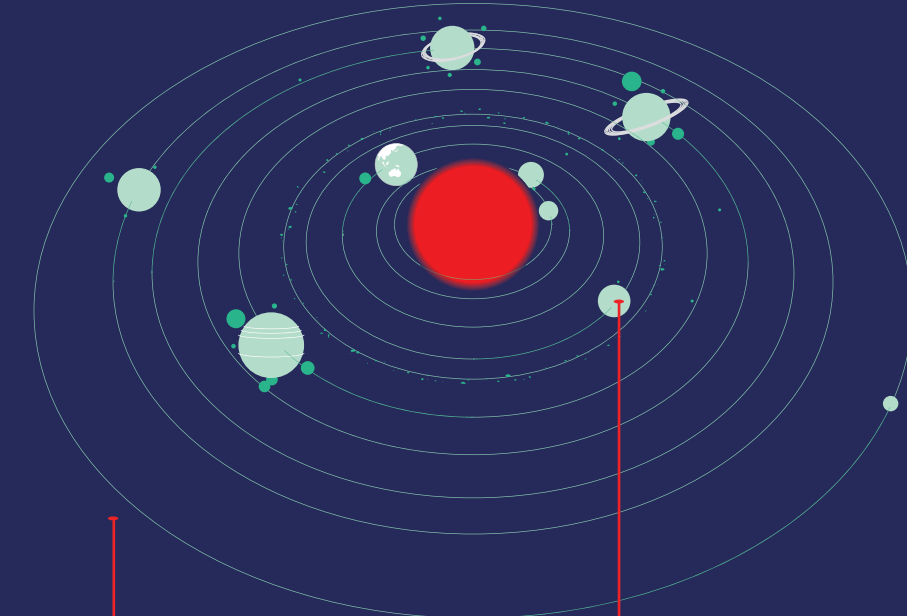
Durreen Shahnaz's Impact Investment Exchange Asia has raised millions of dollars of investment capital for social enterprises through its private placement platform, reaching the lives of over 10 million people across Asia.

Jedidah Isler

Astrophysicist Jedidah Isler studies blazars – supermassive, hyperactive black holes that can be 1 to 10 billion times the mass of the sun, and which can shoot powerful jet streams of particles in our direction.

Renée Hlozek

Using the Atacama Cosmology Telescope in northern Chile, Renée Hlozek studies the oldest visible light in the universe, emitted when the universe was about 400,000 years old.



Aomowa Shields

Astrophysicist Aomowa Shields studies the climate of Kepler 62f – a planet 1,200 light years away from Earth – with an eye toward its potential habitability.

Louisa Preston

Louisa Preston studies Mars-like environments on Earth, such as the Dry Valleys of Antarctica, which at -20 °C is still 35 degrees warmer than Mars (-55°C).

Angelo Vermeulen

Angelo Vermeulen spent 2,800 hours in isolation as crew commander of NASA's 2013 HI-SEAS simulated Mars mission, which took place on Mauna Loa in Hawaii.



On Hope

A kite
is singlehandedly the most hopeful thing.
It waits for the promise of the wind
hidden behind the sun,
the clouds
and the morning filled with dew.
The kite.
It waits for the tapestry of the sky to grow weary
of the sunlight.
To pack up and go home
to invite the breeze to work
and blow in any which direction it wishes.
It will lie on the hands of a child,
impatient,
steadily swaying with the potential of flight.
It will mimic the birds in the sky.
Watch as its wingspan catches the breeze. Right on time.
Jealous, it will go back to hoping again,
will shimmy across the child's palms,
willing itself to be active,
to be great.
This is before it becomes beautiful.
This is before the child is in awe of its brilliance. This is before
it knows its real purpose.
A kite
rests on the whispering of the clouds,
the dancing of the breeze.
It reminds us,
even without permission,
we can exist
in anticipation of our dreams.
Despite
the clouds,
the sun,
we will take flight with the tiny promise
of the wind.
And that, singlehandedly, is the most hopeful thing.

Lee Mokobe, poet



Lee Mokobe is an award-winning slam poet who explores social injustice and gender identity issues. He is also the founder of Vocal Revolutionaries, a volunteer-run literary organization focused on empowering African youth.



Violinist Vijay Gupta – who joined the Los Angeles Philharmonic at the age of 19 – runs Street Symphony, a nonprofit that organizes classical music concerts for overlooked populations such as the homeless and prisoners. Here he rehearses for TEDGlobal 2012. Photo: Ryan Lash

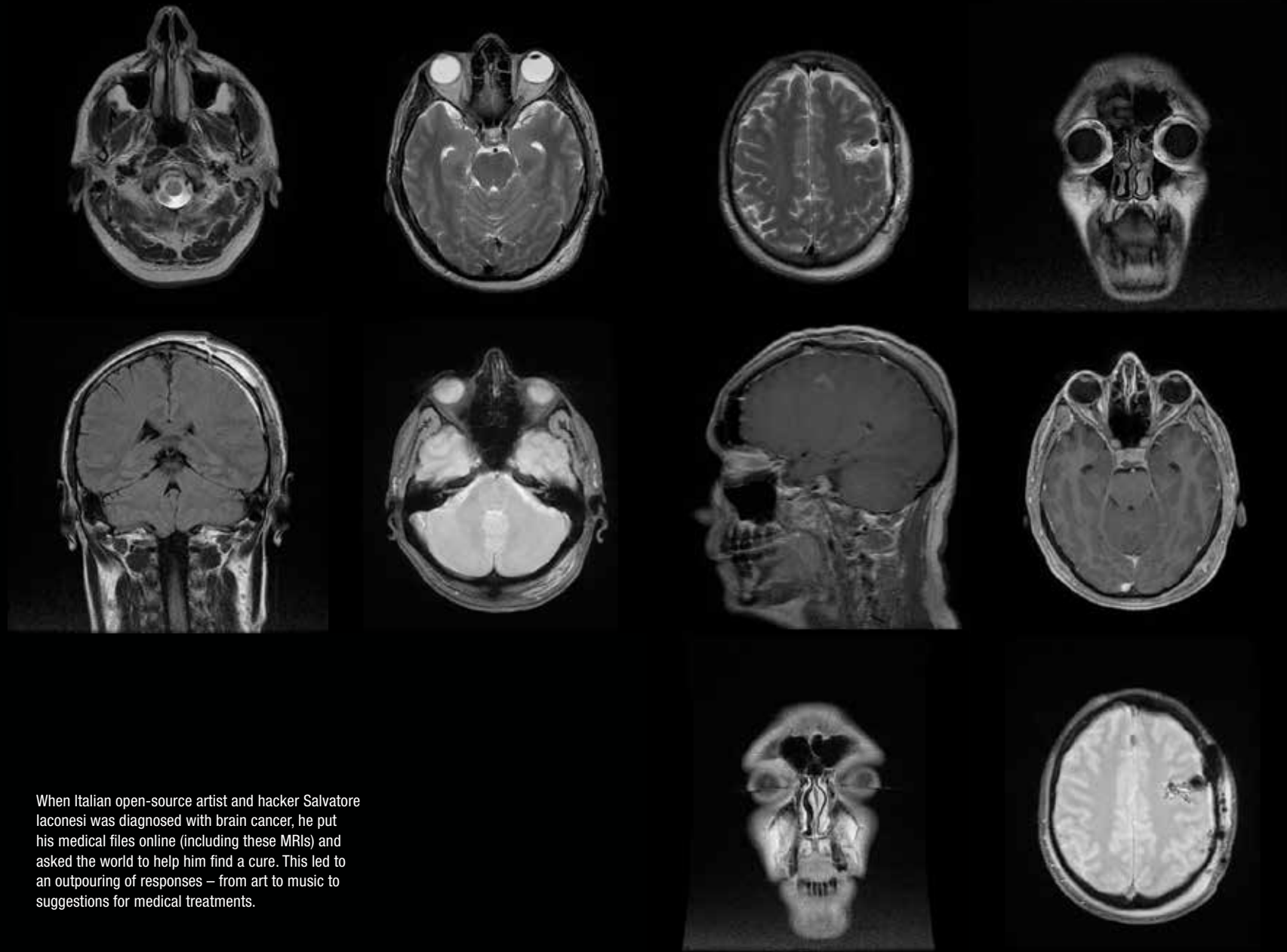


Kuwaiti-born Palestinian photographer Laura Boushnak focuses on women, literacy and education reform in the Arab world. She is also the co-founder of the Rawiya collective, a cooperative of female photographers from the Middle East. Pictured: young Yemeni first graders in school.

Brazilian conservation biologist Patricia Medici studies tapirs – elusive, threatened herbivores vital to the health of forest ecosystems in South America, Central America and Southeast Asia.



German-born artist Chris Wobken runs The Extrapolation Factory, a studio devoted to developing future scenarios. In *Pawn Tomorrow*, the studio designed physical objects based on these futures, including "The Gold Oyster" (pictured), a floating device that filters and extracts gold particles from seawater.

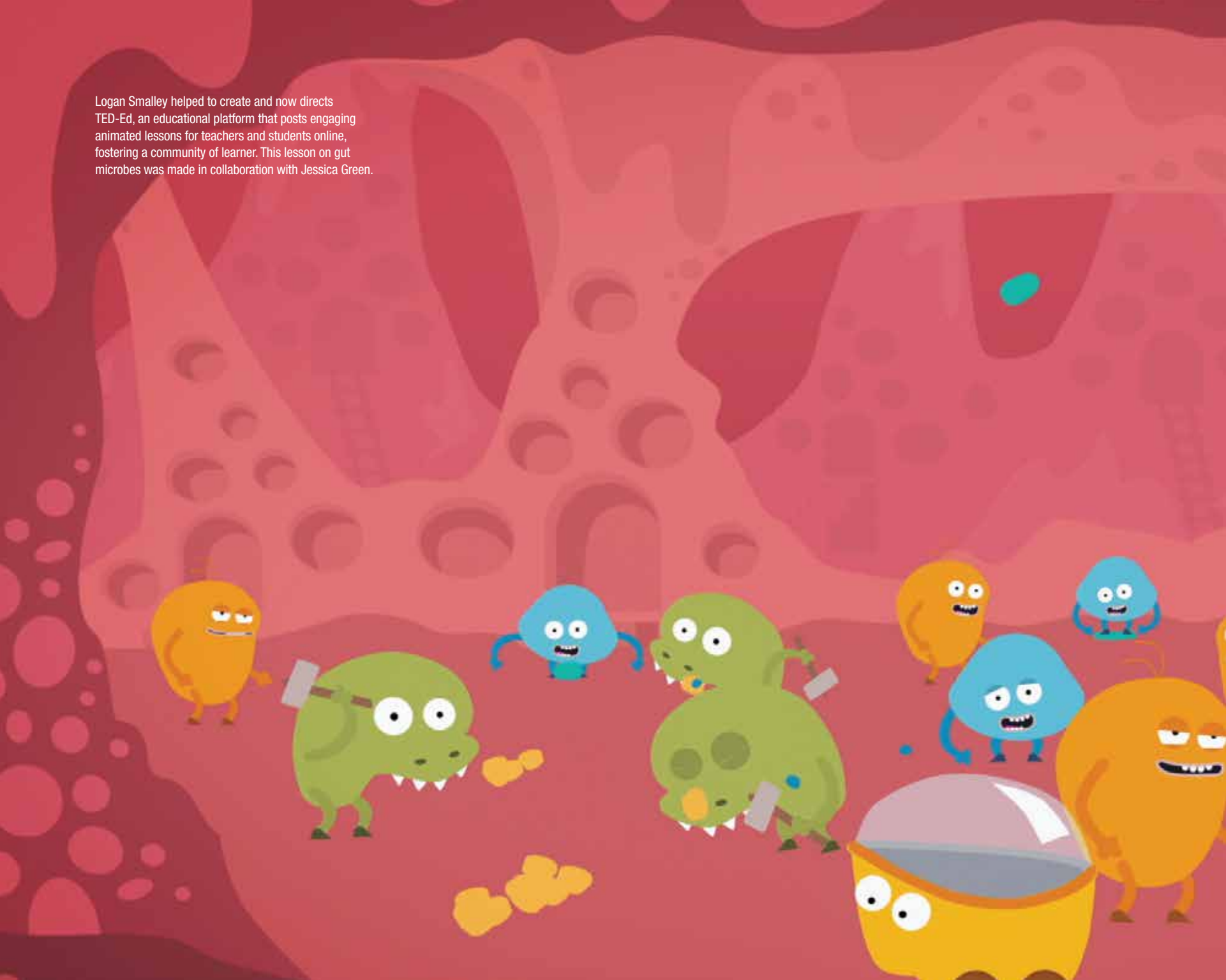


When Italian open-source artist and hacker Salvatore laconesi was diagnosed with brain cancer, he put his medical files online (including these MRIs) and asked the world to help him find a cure. This led to an outpouring of responses – from art to music to suggestions for medical treatments.



Iranian-British filmmaker Taghi Amiran has made more than 35 documentary films on topics ranging from astronomy to the Middle East.

Logan Smalley helped to create and now directs TED-Ed, an educational platform that posts engaging animated lessons for teachers and students online, fostering a community of learner. This lesson on gut microbes was made in collaboration with Jessica Green.



Israeli artist Raffael Lomas creates sculptural work exploring topics such as the iconography of the wheel and the craftsmanship of ancient wooden chair making.



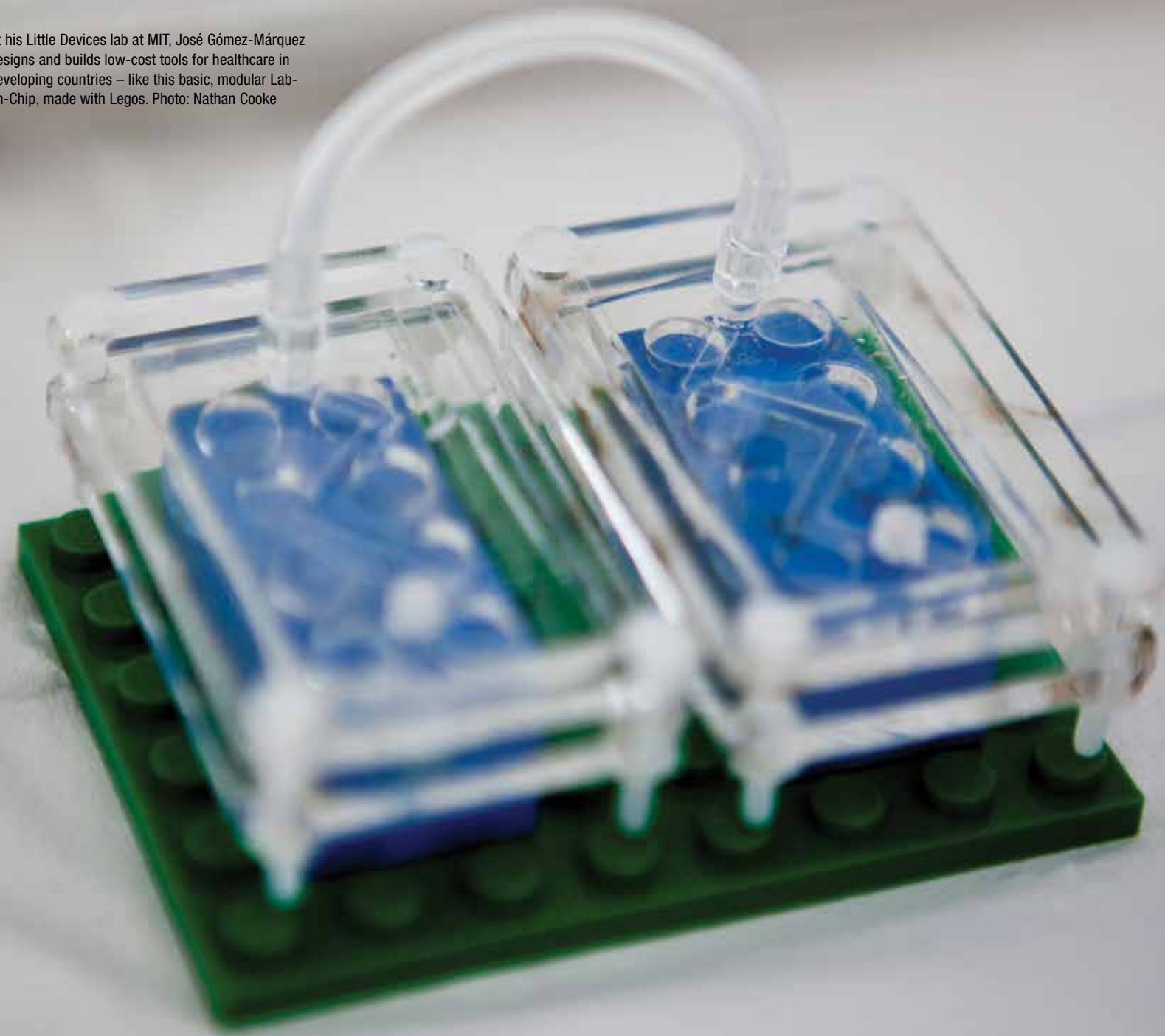


Israeli designer Adital Ela incorporates indigenous knowledge into innovative sustainable design with CRIATERRA, a startup creating industrial products – like these stools made of earth, natural fibers and minerals – that are easily returned to earth at the end of their useful life.



Based in the UK and Uganda, Alexander McLean's African Prisons Project uses education, health and justice to improve the lives of those living in African prisons. The maximum-security prisoners pictured here are studying law in Nairobi, Kenya. Photo: Nelson Guda

At his Little Devices lab at MIT, José Gómez-Márquez designs and builds low-cost tools for healthcare in developing countries – like this basic, modular Lab-on-Chip, made with Legos. Photo: Nathan Cooke



Based in India, Mohan Kandaswamy's Oriental Aquamarine Biotech commercializes the Nitrifying Bioreactor, a device that cleans water without the use of chemicals and helps develop a closed-loop recirculating aquaculture system.



Lebanese artist Zena el Khalil explores issues of violence, gender and religion with mixed media paintings, installations and performance – such as this ongoing Hashtag Virgin project, a riff on online activism.



Social entrepreneur Susan Kahumbu-Stephanou creates solutions for small-scale farmers across Africa. Her mobile app iCow helps farmers increase their agricultural knowledge, reduce farming risks and increase incomes. Photo: Martin Storey



Iranian-American physician and novelist Nassim Assefi curates TEDMED, the health and medicine edition of the TED conference.



Social entrepreneur Sanga Moses is restoring Uganda's rapidly disappearing forests with Eco-Fuel Africa, in which farmers turn agricultural waste into sustainable charcoal. Photo: Jon Lowenstein



South African emergency medicine doctor Mohammed Dalwai co-founded TOMPSA, which builds mobile apps – including triage, HIV, TB and primary health care apps – for health care workers in developing countries.



With his Tap Legacy Foundation, Lebanese-American tap dancer Andrew Nemr is using technology to augment oral tradition, passing on the craft he learned at the knees of the old masters.



With his company Afforestt, Indian eco-entrepreneur Shubhendu Sharma is creating mini-forest ecosystems around the world – even urban areas – using an accelerated method based on the practices of Japanese forester Akira Miyawaki.



Ghanaian entrepreneur and clean-water activist Sangu Delle eschews traditional aid and microfinance platforms with Golden Palm Investments, which focuses on supporting high-growth businesses like Stawi Foods and Fruits Limited (pictured here) based in Nairobi, Kenya.



American photojournalist Teru Kuwayama covered humanitarian crises and complex emergencies in Afghanistan, Pakistan, Kashmir and Iraq. In this series of portraits of special operations forces in Afghanistan, he asked subjects to black out as much of their face as they wanted. He now works as a photographer, journalist and advisor at Instagram.



Software developer Erine Gray is the founder of Aunt Bertha, a search engine that allows people in need to find and use social services – such as Medicare, food stamps, and housing – anywhere in the US.



Brazilian conservation biologist Juliana Machado Ferreira fights illegal wildlife trafficking in Brazil with her organization FREELAND Brasil. It is helping to establish a Wildlife Enforcement Network in South America, allowing for transnational collaboration, stronger environmental legislation and more.



Francis de los Reyes works with cutting-edge microbiological techniques in environmental biotech. His passion is to help improve the plight of the world's 2.5 billion people living without adequate sanitation.

Sierra Leonean biomechatronics engineer David Sengh is developing wearable mechanical interfaces that improve prosthetic comfort for amputees while reducing costs, making the devices affordable in the developing world. Photo: Lynn Johnson



Nashville-based singer-songwriter Abigail Washburn combines clawhammer banjo and Appalachian musical traditions with Chinese melodic inflections – and even sings in Mandarin.



Jane Chen's social enterprise Embrace helps vulnerable babies born in developing countries stay warm with a portable, low-cost infant warmer. Embrace incubator-replacements require no electricity, have no moving parts and are safe and intuitive to use.



Documentary photographer Anastasia Taylor-Lind investigates issues relating to women, depopulation and post-conflict regions. For her 2014 project *Maidan – Portraits from the Black Square* (pictured), she photographed anti-government protesters and the women who mourned those who died in the revolution in Kiev, Ukraine.

Venezuelan cultural manager and urban innovator Lope Gutiérrez-Ruiz is interested in the future of cities and its relationship to media, design, data and cultural management. Pictured here is a street festival in Caracas he co-founded, which attracts more than 40,000 people each year.



Alexander Petroff founded Working Villages International, an organization investing in agricultural interventions to raise the incomes of farmers like this one in the Democratic Republic of Congo.



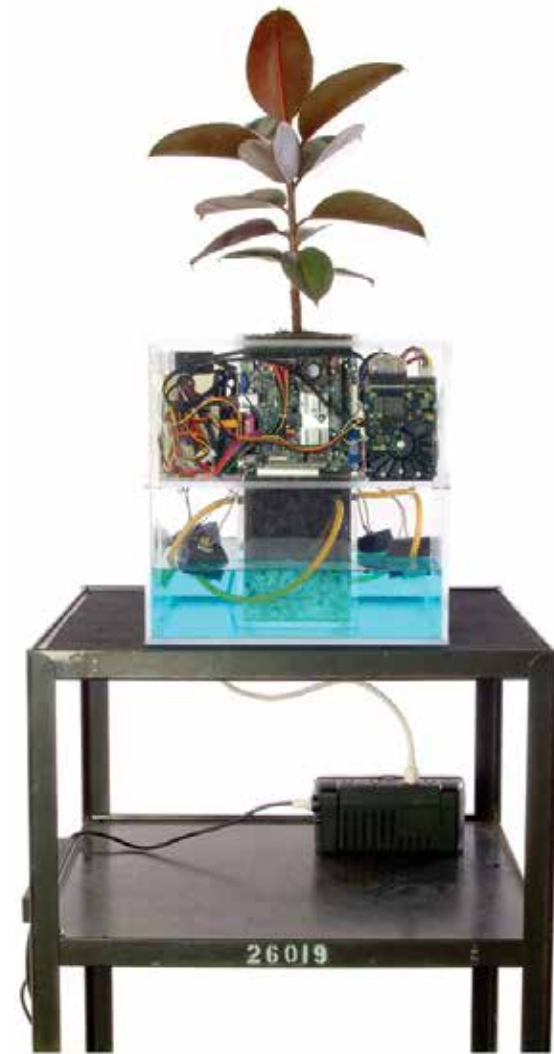
Father Xavier Alpasa is a Jesuit social entrepreneur in the Philippines who founded Rags2Riches, a social enterprise that helped local women connect with top designers to create high-end fashion pieces.



Computational biologist Laura Boykin uses genomics, supercomputing and phylogenetics to study the speciation of whitefly, which can devastate staple crops like cassava around the world.

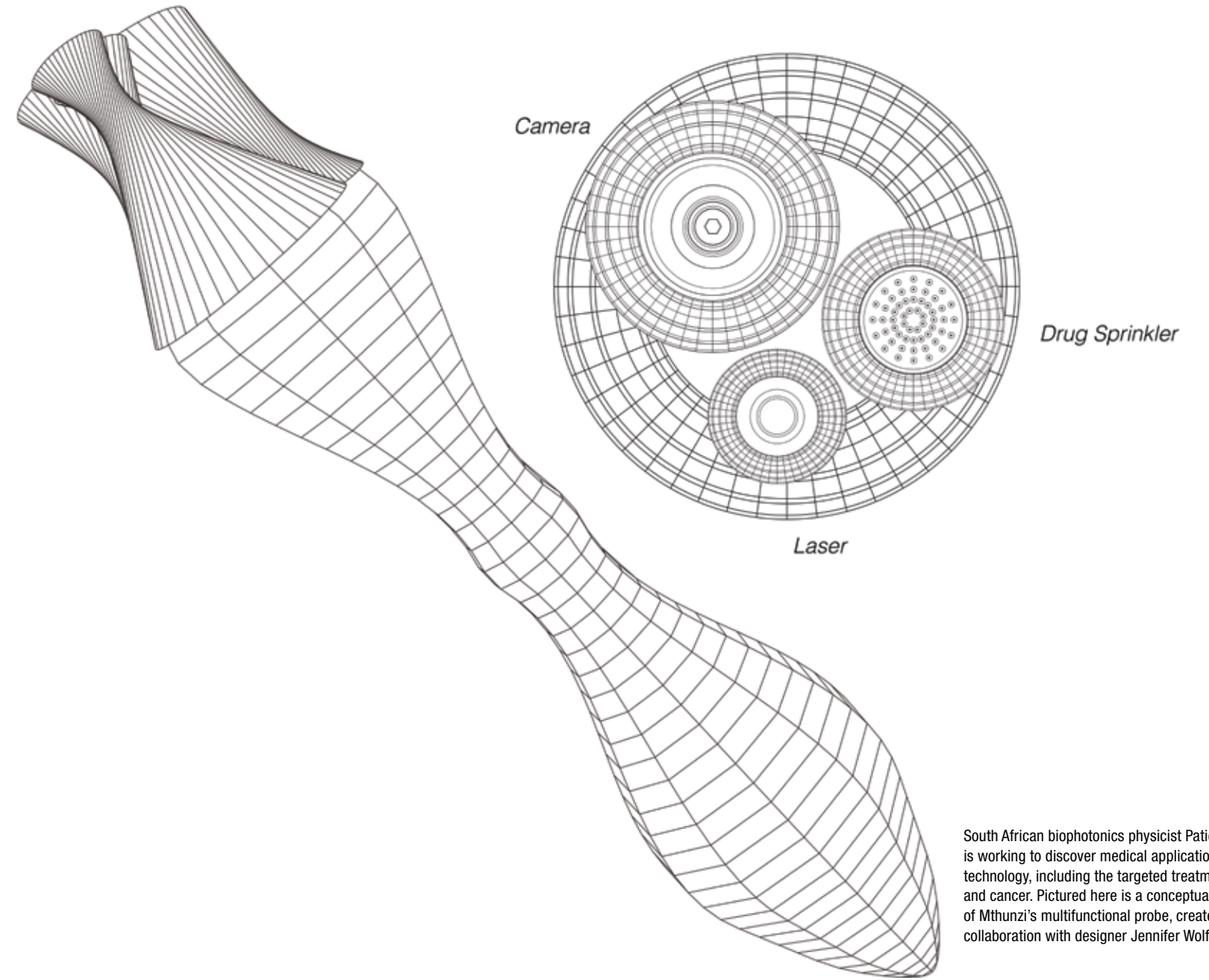


British entrepreneur Joel Jackson's Mobius Motors builds affordable and functional vehicles in an effort to empower Africa's middle-income entrepreneurs, who can use them for transport services, delivery and medical care.



Artist Matt Kenyon explores the effects of military-industrial complexes, the line between human and artificial life and global corporations. In *Spore 1.1* (pictured), a rubber tree plant purchased from Home Depot is only watered if the company's stock value grows.

Behavioral biologist and blogger Danielle N Lee studies the African giant pouched rat – an unlikely hero in the fight against the scourge of landmines. Lee gathers information about these creatures' social structure, reproductive cycles and behavior. Photo: Lieve Bancquaert



South African biophotonics physicist Patience Mthunzi is working to discover medical applications of laser technology, including the targeted treatment of HIV and cancer. Pictured here is a conceptual illustration of Mthunzi's multifunctional probe, created in collaboration with designer Jennifer Wolfe.



Designer E Roon Kang works in print, web and interactive installations – such as this exhibit for the International Center of Photography, which invited viewers to directly engage with the ICP’s vast archive of photos.



Fellows by the Numbers

Number of Fellows

378

Countries Represented

86 

Female

45% 

Male

55% 

Number of Fellows' talks on TED.com

98

Collective Views

87M+

Personal and Professional Impact

Fellows report a number of significant changes to their personal and professional lives as a result of the TED Fellows program. Here's a statistical snapshot of the program's influence.



Alexander McLean David Hertz



Alexander McLean's African Prisons Project helps prisoners in Uganda and Kenya access legal education, and develops leaders among prisoners and prison staff. David Hertz's Gastromotiva offers free culinary training in Brazil for favela residents and workshops on healthy cooking to favela communities. Both are transforming the lives of underserved communities and building bridges between social groups.

Alexander McLean: Yesterday I was visiting a women's maximum security prison in Kampala, recruiting women for our law degree program. My colleague identified one young prisoner as a potential student because this woman had some anger. She said that to make change, one needs to be sufficiently angry. Do you agree? And what are you angry about?

David Hertz: I partly agree. I believe anger is very strong and indeed can help build the courage to attempt change. But I also believe that courage can come from love and empathy.

When I went to a favela the first time, I had this image of a dangerous place, full of bandits. But what I understood right away was that these people were just like me. In the beginning, I was angry at myself, at my blindness. I blamed Brazil's history of slavery and how behind Europe we are as a society, when it comes to equal opportunity. But most of all, as I came to understand the bigger picture, I became angry with the Brazilian elite and our politics – the lack of compromise, the greed and corruption. Now I am trying hard to let anger go and accept that we all need to make a common effort to bring consciousness to the world – by action, by example, from the inside out.

AM: Most people sent to prison are poor, and most of those who make and enforce the laws have wealth. Both our projects serve some of the most vulnerable people in society, and those whom others might overlook. What draws you to them?

DH: I visited a prison for the first time three years ago, after working for eight years with youth from the favelas. When I got there, I noticed three things. First, I had already seen these people, in the faces of many of Gastromotiva's students. Second, the prison cooking system didn't contribute to the transformation of anyone's life. There is not a cook but "the person who cooks rice," "the person who cooks beans" and so on. Activities are systematized and are always done by the same people. Creativity, empowerment, sense of accomplishment – forget about it! Prison kitchens demonstrate that the prisoner is nobody. And when we are "nobody," we can't think about being somebody and doing something useful one day.

I believe everyone deserves a second chance. Everyone gets lost once in a while. OK, these people did something bad, so now they are in prison. But we can give a hand to help them face the future once they are out. Create bridges. Entice them with the magic of the kitchen.



AM: Since I was 16, I have been involved with palliative care, in hospices in London and Uganda. This was when I first looked after prisoners. I've learned a lot from the dying. They taught me that my calling in life was serving those who've been rejected by their communities. What would you like to be said of your life once you are dead? Who would you like to remember you?

DH: I dedicated my life to help people free themselves. I use my passion and talent for "cooking" to build responsibility, courage and interaction, but most of all, self-awareness and self-confidence. I want people to remember me as someone who trusted in the individual, in society, in the values of humanity – and helped them "taste" an inclusive world.

I believe the next generation of cooks and all of those in the food chain have an enormous responsibility for the way we feed ourselves and how we take care of Mother Earth. I hope our Social Gastronomic Movement will have a ripple effect in the long term and will become the norm. If I can serve as an inspiration for the next generations of cooks, consumers and politicians, I will be eternally grateful.



AM: My grandmother, Aileen, has been my biggest influence. She gave me the sense I could do anything I set my mind to. The Civil Rights and Anti-Apartheid movements showed me how the oppressed could challenge the status quo, using unconventional tools, often with great dignity. Who or what have been your greatest influences and inspirations?

DH: I was mostly inspired by my seven years of travelling, my experience of the values in the societies I visited. When I heard in India that having a visitor come to your home is like greeting the presence of God, it completely blew me away. The meanings and rituals around food in various religions and countries gave me a sense of brotherhood – and I wanted to "cook" that idea into the world.

I am also very inspired by the perseverance and strength of my first trainee, who I met in a favela. She has two brothers who are the main drug dealers there. They are always in and out of jail, and she competes with them on recruiting youngsters for her catering business. I think if I were in her place, I'd just leave the favela and start again elsewhere. She has this option, but she says that she has a calling to bring jobs to the community. My problems are so small when I remember the lives of the people I am surrounded by.



AM: African Prisons Project believes that none of us is perfect, that forgiveness is necessary. I, for one, am not the world's greatest manager and can sometimes overwhelm those around me. What is your greatest flaw? How do you manage it?

DH: Oh man. There are so many flaws... I am completely nuts. I was devastated to realize that I lost staff members because I took the hierarchical chef's screaming power to the office. I was transferring my own frustration and fears. In recent years, I've learned how to appreciate people's work more, and delegate in a way that also coaches them. I have also been working a lot on my own issues. What I face now is the succession moment. I am learning so much about letting go. It's amazing to see your organization grow and become more independent.



David Hertz: Why do you do what you do? What made you give up being a barrister to start an organization to educate African prisoners?

Alexander McLean: I believe that I can have a far greater impact by equipping others to bring change than by doing the work myself as a practicing barrister. I guess I'm trying to master the art of delayed gratification.

I do this work because I want those silenced behind bars to be heard. I want to use my time to cultivate great leaders from unlikely backgrounds. And in this work I hope to remind us all of our shared humanity and responsibility to each other. I also want to provide education for others, as it was provided for me. I come from a family that had little materially. The British government had a scheme to pay for poor children to go to expensive private schools, and I benefitted from it.

I'm motivated by my faith, too, in a very practical way. Jesus was prepared to defy the powers that be to do what was right by those seen as outcasts. His example challenges me to think twice before I write others off because they are different from me. It also helps me see how I can reach out to offer a hand, in the same way many people have invested in me.



DH: What is your vision for the future of African Prisons Project?

AL: I'd ultimately like to establish a university. It might be called Saints Dismas and Longinus College. Dismas was the thief who was executed on the cross beside Jesus. I think he's a role model because Jesus said to him, "This day, you'll be with me in heaven." A lot of people, including Christians, dismiss and are unforgiving towards those who've committed offences. I think it's pretty cool that he's the only person that Jesus explicitly confirmed would be in heaven. And Longinus was the centurion who speared Jesus in the side when he was on the cross, and then later said he was the son of God. I think he's a nice example to prison staff – he's an executioner, yet he realizes his mistake and becomes a saint.

This university would run in prisons around the world and include a program for prisoners to get a law degree in social justice. It would also have a fellowship rewarding senior prison staff who have a track record of bringing radical penal reform, giving them access to postgraduate training, visits to remarkable prisons around the world and intensive personal leadership development. Both programs would build courage, resilience, integrity, perseverance, advocacy skills and so on, which would allow graduates to more effectively change prison policy and practice.

DH: What would you tell the world's leaders about what you've learned via African Prisons Project that might inspire them to help you do this transformative work?

AM: I'm not sure that the lessons I've learned are very radical. One is: Invest more in opportunities for poor people. Why aren't the best schools in the poorest neighborhoods rather than the wealthiest ones? Education is the fundamental, number one crime prevention method. I sometimes wonder whether it benefits governments not to educate the poor too much because then they might start shaking up the status quo.

I think we need to go to the root causes of inequality, which are the root causes of crime. I think we need to not be afraid to invest deeply in healing those who are hurting – whether the homeless, ex-soldiers, those with addictions, the sexually abused. So long as we look at the fruits rather than the roots of injustice, our prisons will be full.

DH: Where do you get your positive energy and persistence?

AM: I feel I have less these days than I had before. I look to myself when I was 18 and just starting this work. In many ways I was a fool. I was totally green. I didn't know anything about prisons, about Uganda, about how you create change. But I had a strong sense of right and wrong. This got me into many tricky situations.

But my wife shares my sense of calling and keeps pushing me, even when I want to give up, which is regularly. I keep going because it's an amazing privilege to see people shine, realize their potential, serve others, understand the special contribution that they may make to society. I want to look back on my life and feel it counted for something.





CREATION

Gabriella Gómez-Mont, culture curator

Nearly four years ago, during a time when my epicenter was still firmly placed in my arts and culture studio Tóxico in Mexico City, a writer threw a series of thought-provoking questions my way during the course of an interview. I rambled on about the possibility of synthesizing the means and mechanisms of culture with a wider range of disciplines – plus art’s inherent capacity to shape reality and create new social blueprints. We slipped into musings about the unmapped gray areas between disciplines and the need for more experimental territories, beyond definition.

“What would it mean to take this even further and to help generate a creative ethos in Mexico City that traverses many different territories?” I asked myself, out loud, that day.

Little did I know that this interview would be my blueprint for what was to come.

I became, of all things, a civil servant. After I hosted TEDxMexico City, the newly elected mayor of the city gave me a call. He invited me to invent a new government office from scratch: a laboratory for my very favorite city in the world, the largest, most fascinating, most complex, most surreal urbanscape in the western hemisphere. Life said blatantly, joyfully and provocatively: “OK then. Go on and put your money where your mouth is.”

I now run Laboratorio para la Ciudad, the experimental office and creative think tank of the Mexico City government, reporting directly to the mayor. The city itself has become the mental space to explore. We are a lab. We ponder and prototype. We investigate possibilities that lie at the edges of disciplines and between the silos of government. We provoke relationships between amazing people from civil society and government. We work in mobility, health, public space, economic development, civic tech and, yes, contemporary culture, too. We do fun, tiny, urban interventions as well as create sweeping, strategic agendas for the whole city.

I never would have thought government would turn out to be one of my wildest adventures, even more deliciously and disconcertingly varied than my former life. It of course helps that the Lab’s team is a young, multidisciplinary and motley crew – artists, architects, designers, filmmakers, urban geographers, historians, journalists, artificial intelligence experts, techies, a lawyer and a couple of policy wonks, all of us embedded at the very heart of government.

Suddenly, with just one small mental flip, government can turn into a city-making machine, a way of conjuring up more imaginative forms of collective reality.

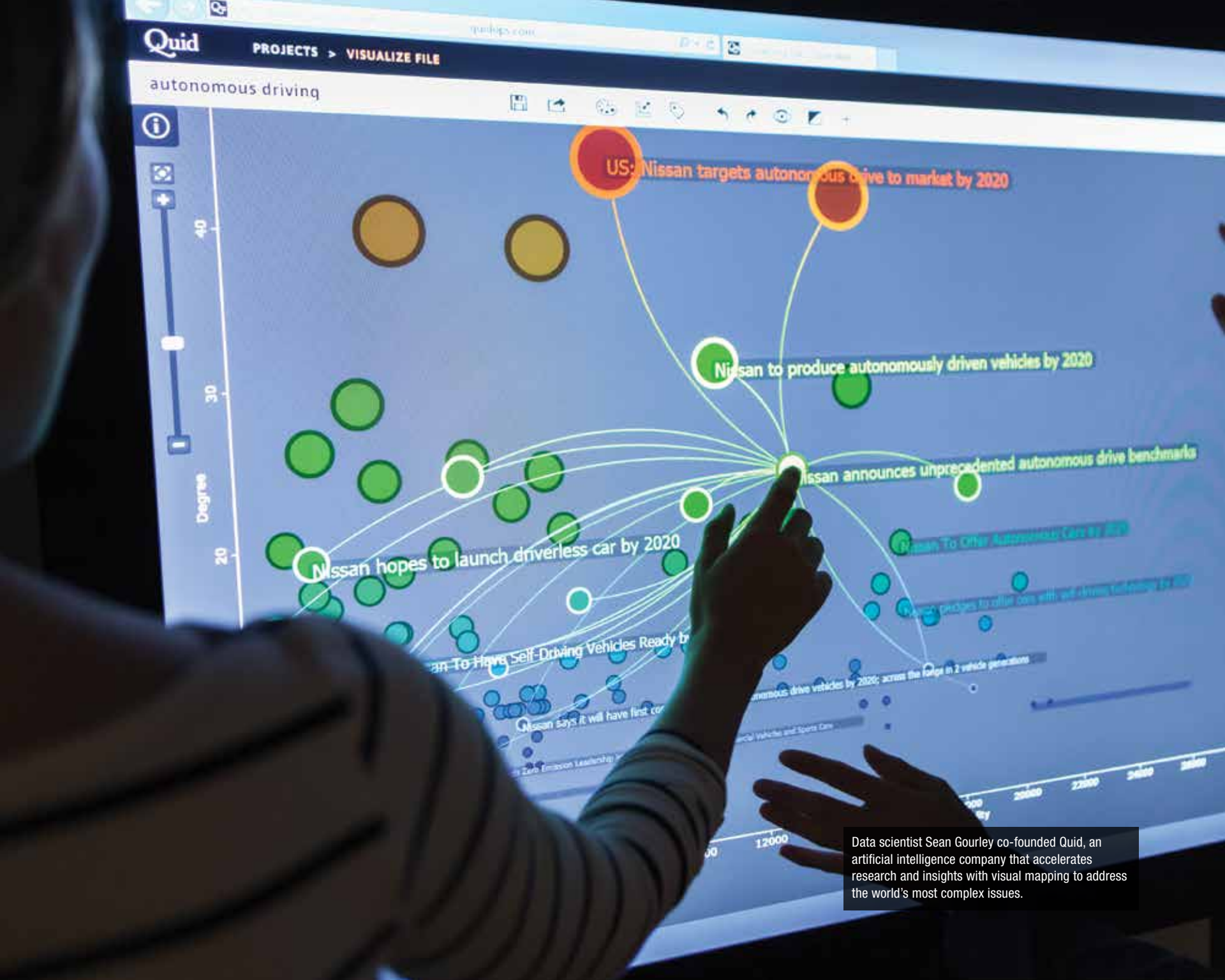
So yes. Yes to learning what it means to work in a truly multidisciplinary way, to what we can experience from each other when we import thought structures from elsewhere, to learning to “speak” in different languages. Yes to a creative ethos for a whole megalopolis. Yes to the fact that imagination is not a luxury – in art nor government – and never will be.



Australian body architect Lucy McRae explores the relationship between the body and technology using synthetic and organic materials. This project, *Germination Day 8*, was created from pantyhose, sawdust and grass seed.



NASA economist Alex MacDonald serves as principal economic adviser on private and commercial space endeavors, including the flight of Cygnus CRS Orb-1 (pictured here) to resupply the International Space Station. Photo: NASA



Data scientist Sean Gourley co-founded Quid, an artificial intelligence company that accelerates research and insights with visual mapping to address the world's most complex issues.



Serbian conductor, pianist and composer Daniela Candillari is the founder and artistic director of the New York-based Chamber Orchestra Gravity Shift, pictured here in rehearsal. Photo: Bruno Savoca Albors



Jen Indovina is the CEO of Tenrehte Technologies, a company that designs and manufactures energy-efficiency products, including this controller board used to save megawatts of electricity in data centers.



Dancer, choreographer and filmmaker Richard Move works at the intersection of the human body and media, and is internationally known for his work exploring the dance of Martha Graham. Photo: Josef Astor



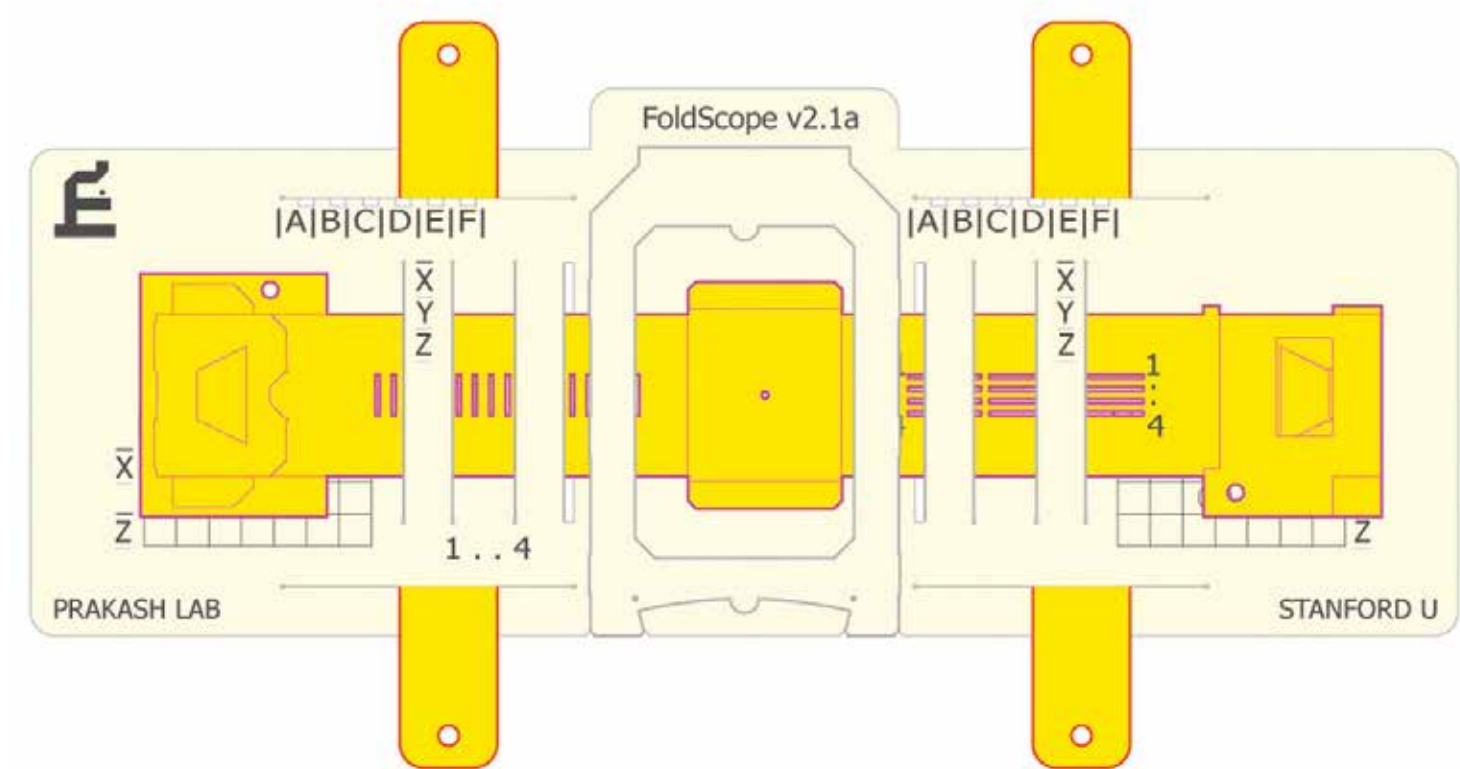
Indian artist Aparna Rao works with lifelike movement to create installations like *Decoy*, an attention-seeking creature that moves frantically as viewers get closer.



Spanish architect Xavier Vilalta adopts and updates traditional design principles to construct modern buildings that suit their environment. This multistorey shopping mall in Addis Ababa, Ethiopia, draws on fractal patterns in traditional Ethiopian dress.



Artist Cyrus Kabiru turns recyclables and found materials into art. These spectacles are crafted from recycled materials found around his home in Nairobi, Kenya.



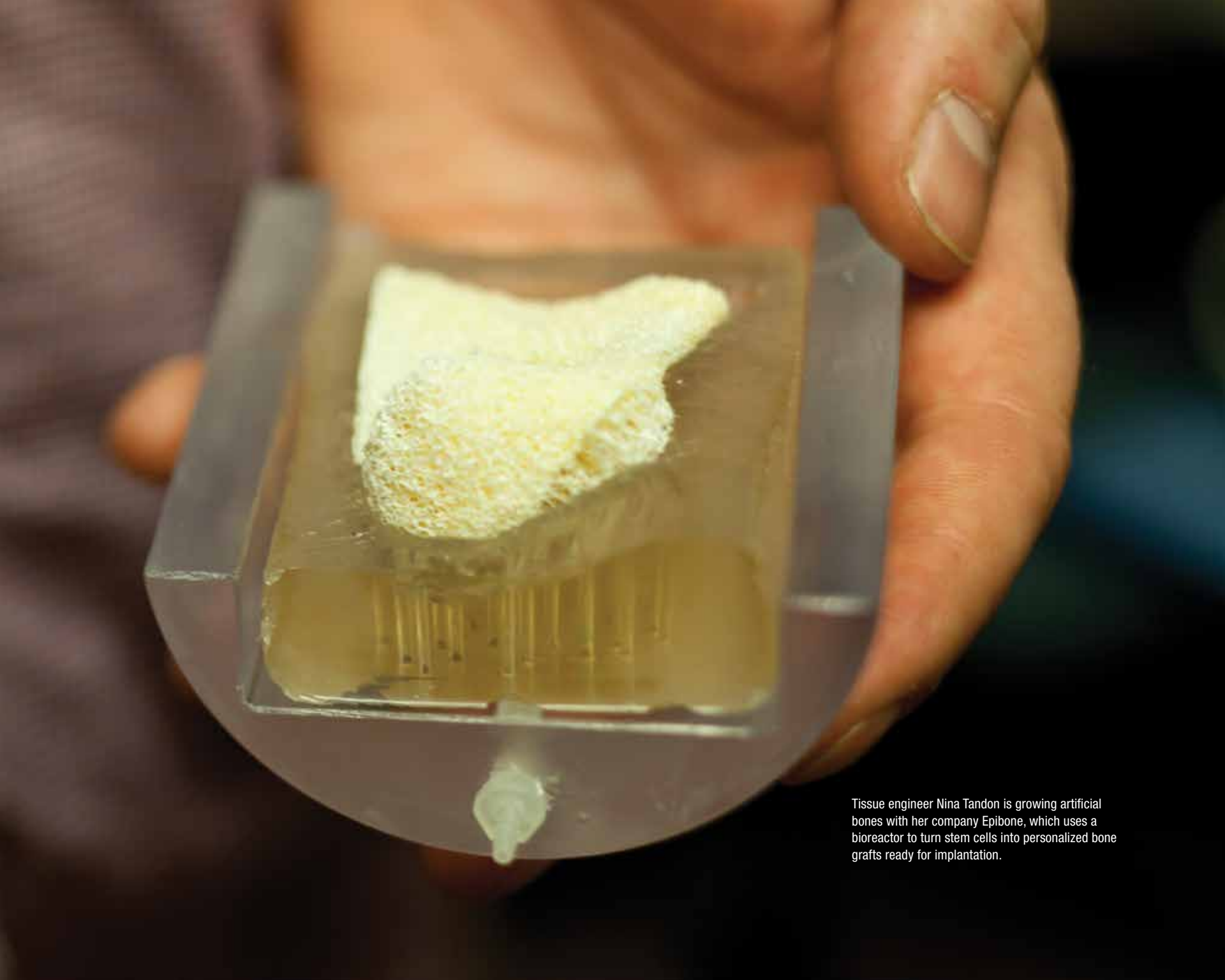
Physicist and inventor Manu Prakash runs a curiosity-driven lab at the Department of Bioengineering at Stanford University, where he focuses on bringing scientific tools to people around the world. Opposite, Tanzanian children use his origami-based Foldscope microscope – designed to cost less than \$1 – to learn germ theory.

Concert cellist Joshua Roman spent two seasons as principal cellist of the Seattle Symphony and is the artistic director of Town Music, an experimental chamber music series in Seattle with a vision to engage and expand the classical music audience. Photo: Bret Hartman



British astrobiologist and geologist Louisa Preston looks for analogues to possible life on Mars in the most extreme environments on Earth, such as here in Iceland.

Erik Hersman and Juliana Rotich create technology to improve the daily lives of Africans – from Ushahidi, a free and open-source platform for crowdsourcing information, to iHub, Nairobi’s innovation hub for the technology community, to BRCK (pictured), a wireless, rugged, battery-powered modem ready for any environment.



Tissue engineer Nina Tandon is growing artificial bones with her company Epibone, which uses a bioreactor to turn stem cells into personalized bone grafts ready for implantation.

In an effort to address the major environmental issues around garment and fiber production, fashion designer Suzanne Lee grows her own fabrics. She's pictured here with a piece of dyed biomaterial grown by cellulose-producing microbes. Photo: AEG



In 2009, inventor Bre Pettis founded MakerBot Industries, which produced the first affordable 3D printer, and Thingiverse, the first online marketplace dedicated to sharing user-created digital design files. Photo: Flickr/Creative Tools

Joe Landolina is the inventor of VETIGEL, a gel that can instantly stop traumatic bleeding without the need to apply pressure. This may someday be used for healing battlefield wounds and accident-related injuries.



Artist Julie Freeman's work spans visual, audio and digital art forms and explores how science and technology change our relationship to nature. Her Frozen Respite project captured frozen animals "waiting for the taxidermist's hand."

Smart materials designer Elaine Ng Yan Ling merges textiles, electronics and biomimicry in her studio THE FABRICK LAB, creating accessories like this body-extension jewellery, crafted from layers of hardwood and thermoplastic with sculptural pieces that shift shape and color.



Pakistani multi-instrumentalist, composer and filmmaker Usman Riaz began playing classical piano at the age of 6, and taught himself to play a variety of instruments via the internet – including percussive guitar, for which he is known internationally. Photo: Ryan Lash



At his Self-Assembly Lab at MIT, computational architect Skylar Tibbits is pioneering 4D printing, in which smart materials are used to make objects that change shape and evolve. In this "fluid crystallization" experiment, 350 hollow spheres were submerged in a tank, self-assembling as the water grew turbulent.

Architect and designer Mitchell Joachim is a leader in ecological design and urbanism and co-founder at Terreform ONE and ONE Lab. Here, he reimagines New York City as a network of green walkways and smart transportation systems, featuring a light rail in Midtown Manhattan to curb traffic congestion.

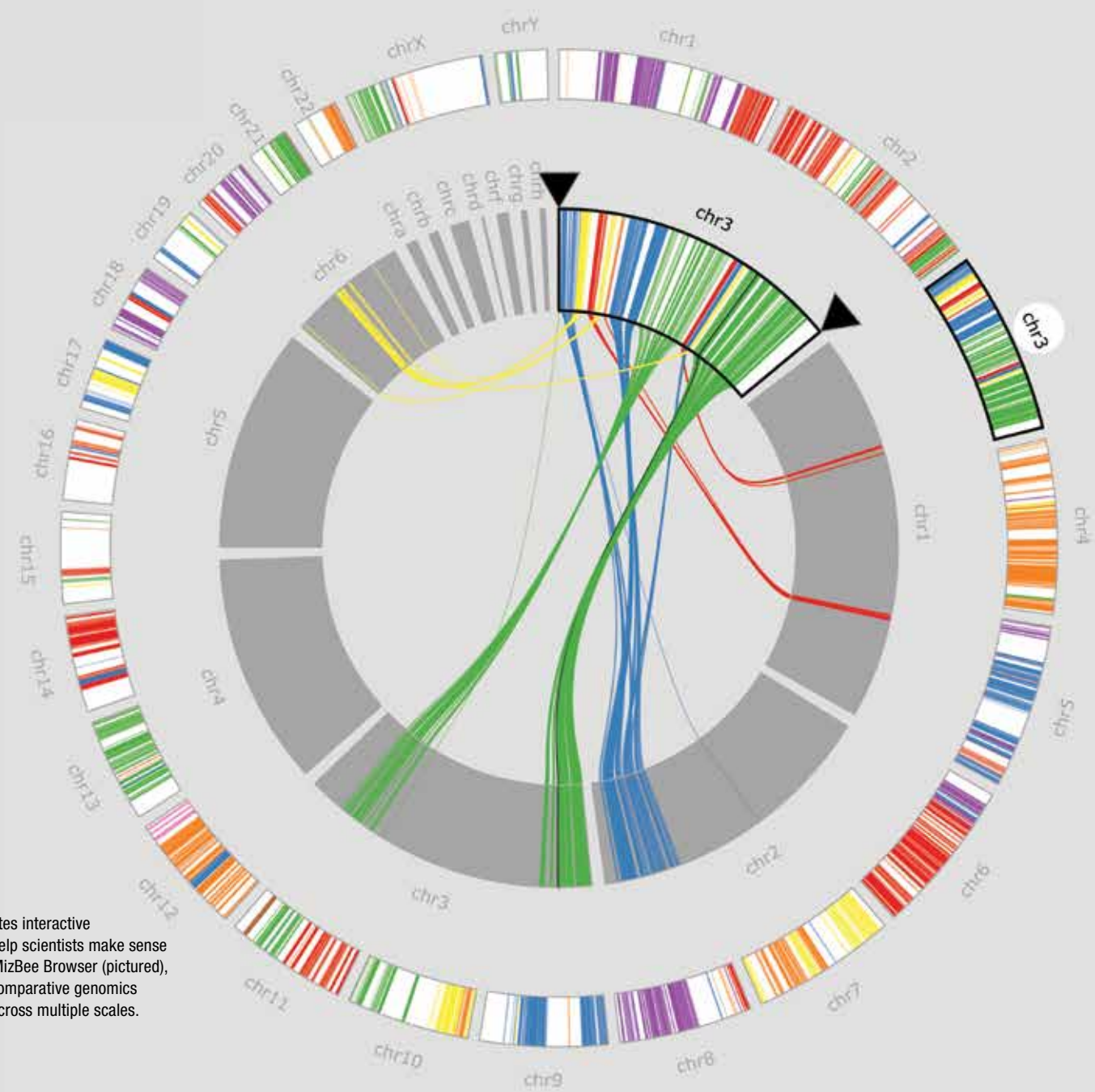


Costa Rican filmmaker Erika Bagnarello is the director of a number of documentaries and films, including *Primero de Enero* (pictured here), in which a 12-year-old boy sets out across the Dominican Republic in search of his father's stolen piano.



Korean-American composer and multi-instrumentalist Bora Yoon creates live immersive soundscapes using digital devices, voice and found objects as well as instruments from different cultures and centuries, telling stories through sound while harnessing music's unique power to transform and heal. Photo: Ryan Lash





Designer Miriah Meyer creates interactive visualization systems that help scientists make sense of complex data – like the MizBee Browser (pictured), which enables analysis of comparative genomics data through visualization across multiple scales.



In her film *Canary in a Coal Mine*, Jennifer Brea documents her struggle with myalgic encephalomyelitis – popularly known as chronic fatigue syndrome – in an effort to shine light on the often-overlooked illness.



Viraj Puri is the co-founder and CEO of Gotham Greens, a Brooklyn-based company that builds and operates commercial-scale greenhouse facilities in urban areas for fresh vegetable production, like here on this New York City rooftop. Photo: Mark Weinberg



Investigative journalist Will Potter focuses on the animal rights and environmental movements, as well as civil liberties post-9/11. He is currently examining how whistleblowers and nonviolent protesters investigating factory farms are being treated by the FBI and other federal agencies as terrorists.



This is the LifeTrac II, an open-source tractor and one of the 50 tools Marcin Jakubowski is designing as part of his Global Village Construction Set, which can be used to build a self-sustaining village or even recreate civilization after a global disaster. Photo: Flickr/Sean Church



Science historian, artist-collaborator and best-selling author of *Animal Madness* Laurel Braitman has written about mental health in the animal kingdom and what it means about us. She also organizes concerts for animals and is working on a memoir about medicine, family and how we die. Photo: Ryan Lash



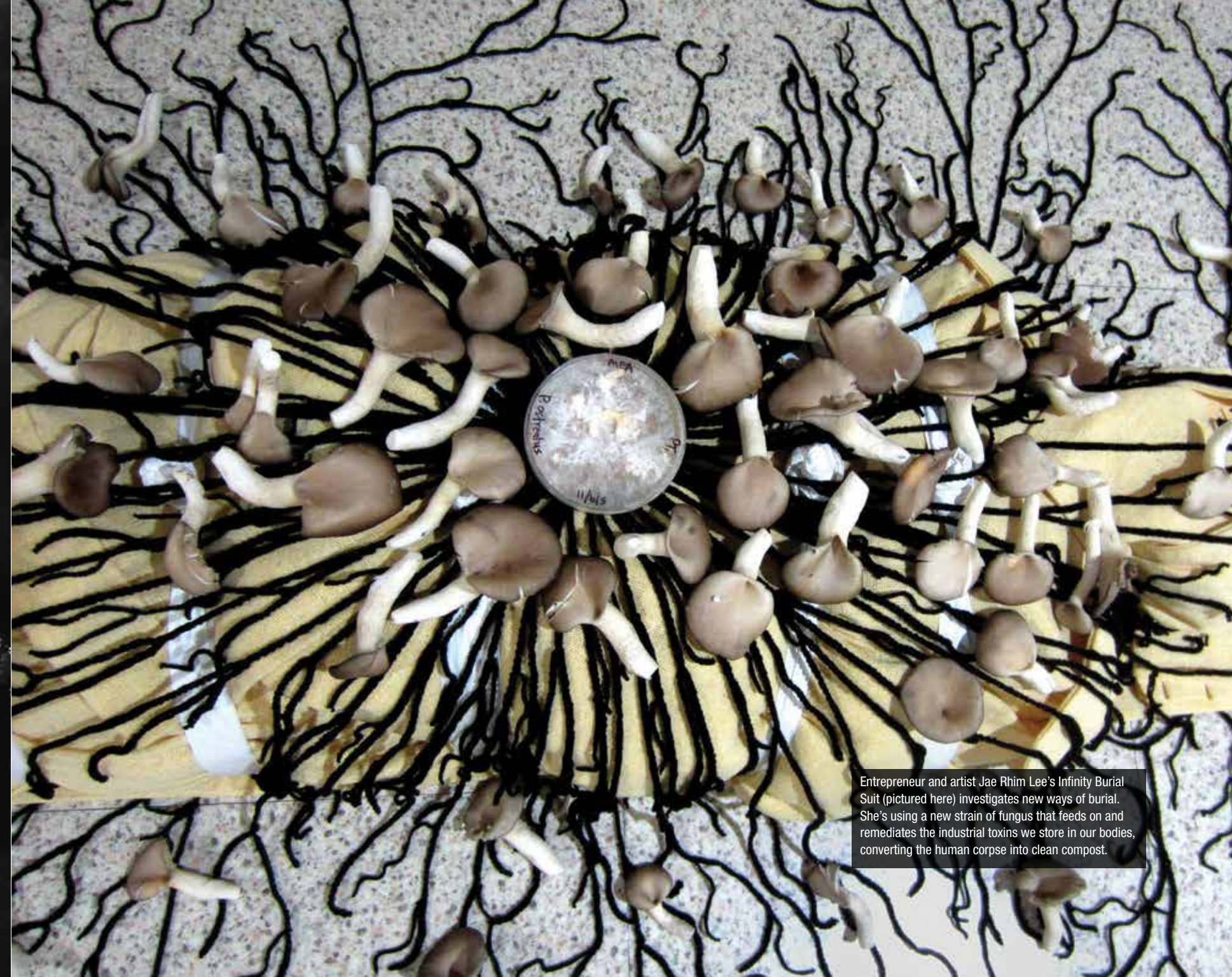
Interaction designer James Patten merges design and technology to create magical interactive experiences, such as this 100-foot video wall that captures live, 3D video of those in front of it, rendering generative figures in real time.



Filmmaker Saeed Taji Farouky focuses on human rights in the Middle East and North Africa. His most recent film, *Tell Spring Not to Come This Year*, follows one unit of the Afghan National Army over the course of its first year of fighting without NATO support.



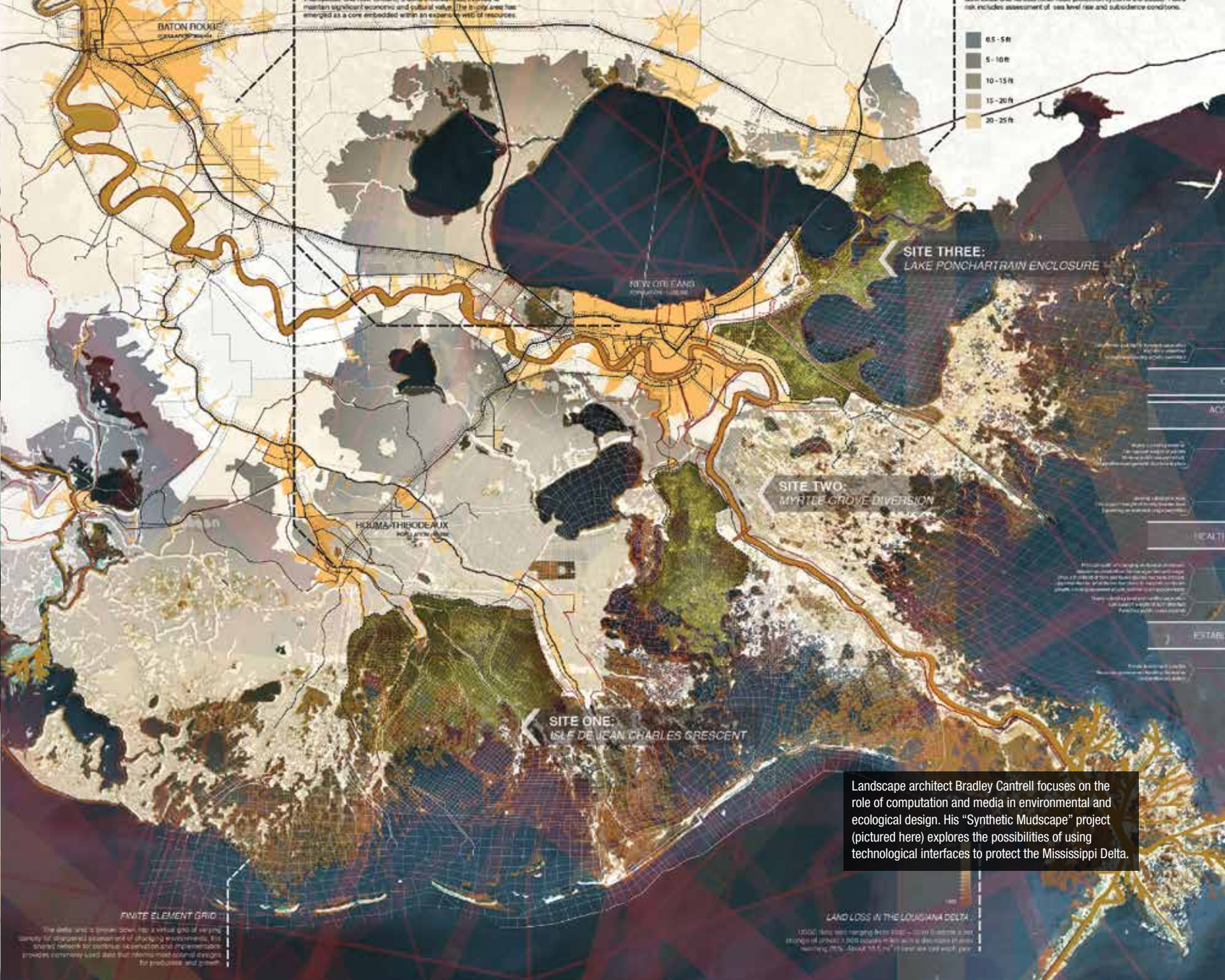
Kenyan producer, band leader, singer and DJ "Blinky" Bill Sellanga leads the musical collective Just A Band, which mixes genres like hip-hop, electronica and funk. Photo: Mutua Matheka



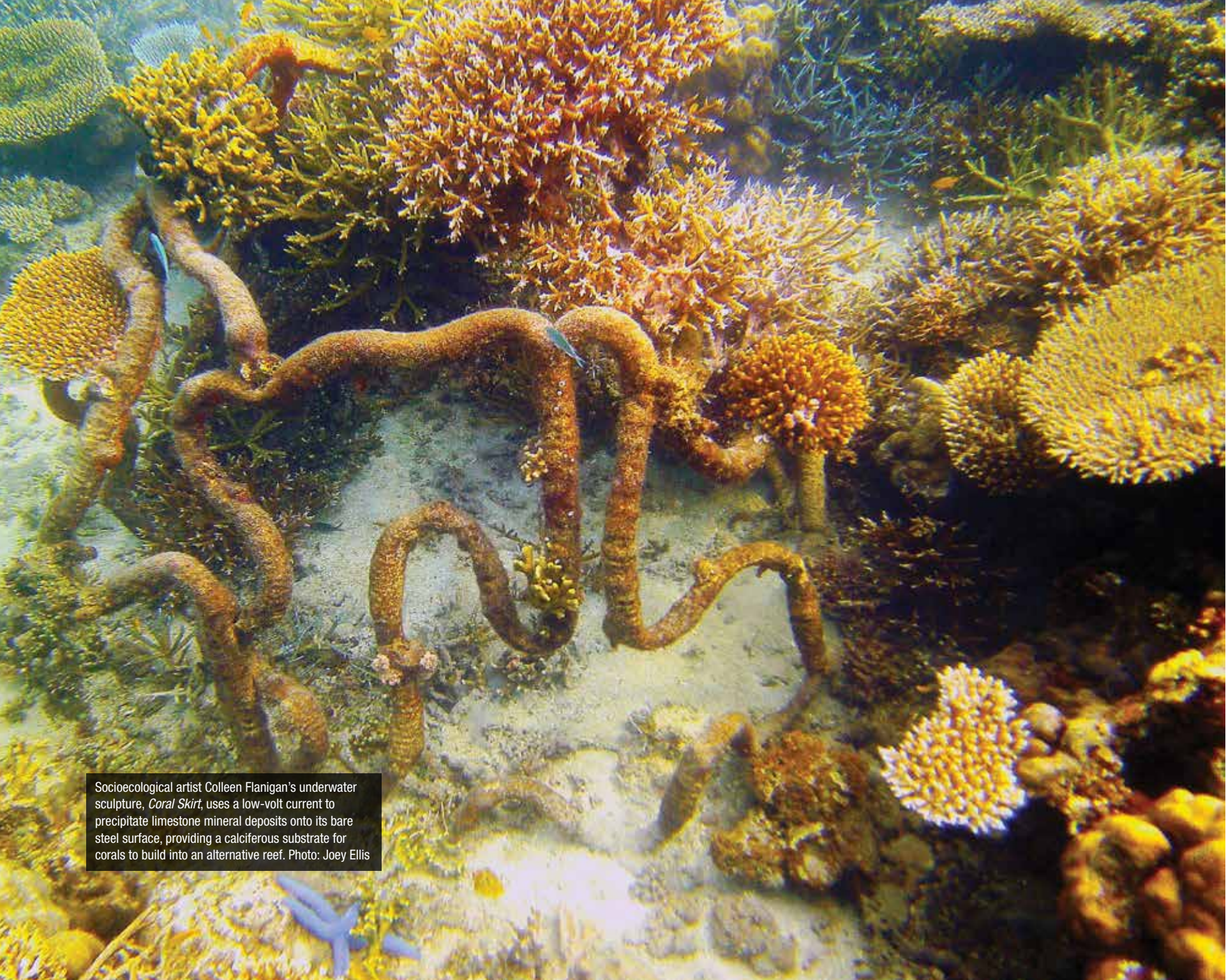
Entrepreneur and artist Jae Rhim Lee's Infinity Burial Suit (pictured here) investigates new ways of burial. She's using a new strain of fungus that feeds on and remediates the industrial toxins we store in our bodies, converting the human corpse into clean compost.



Designer and filmmaker Anab Jain's studio Superflux creates powerful visions of near-future worlds. Her recent project Drone Aviary investigates the social, political and cultural potential for civil uses of drone technology. This Routehawk drone is designed to regulate traffic flow.



Landscape architect Bradley Cantrell focuses on the role of computation and media in environmental and ecological design. His "Synthetic Mudscape" project (pictured here) explores the possibilities of using technological interfaces to protect the Mississippi Delta.



Socioecological artist Colleen Flanigan's underwater sculpture, *Coral Skirt*, uses a low-volt current to precipitate limestone mineral deposits onto its bare steel surface, providing a calciferous substrate for corals to build into an alternative reef. Photo: Joey Ellis



Marc Fornes is a French computational architect and artist, focusing on the development of unique material systems for organic built spaces or environments. This piece, *Vaulted Willow*, is an ultra-thin, lightweight, self-supported shell made from structural shingles.

A member of Acumen's Global Advisory Council, energy investor Katie Hill led Apple's first renewable energy project in China, located in a remote region of the Tibetan Plateau (pictured).



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Sharon Lyle & Mark Mutschink

Jody & Tom Darden



Thank You

| | | | | | |
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Before I die I want to hug my boyfriend

Before I die I want to want a dog

Yes! MIM

Before I die I want to Be @peace

Go to Japan

Before I die I want to LIVE

Before I die I want to fall in

Before I die I want to have SEX at the

Be able to get married

Before I die I'm going to

see the world & try every food in the world

Before I die I want to LIVE

Before I die I want to fall in

Before I die I want to change someone's life

I want to

I want to live with

I #BIDSAV

I want to accept

Before I die I want to fall in

Want to live

Artist and entrepreneur Candy Chang makes cities more intimate and contemplative. Her public art project Before I Die... invites passers-by to share their deepest wishes and has been replicated in over 70 countries around the world in 35 languages. Photo: Kristina Kassem





About

The TED Fellows program is a global network of over 350 individuals – visionaries in their fields who collaborate across disciplines and make an impact around the world.

How it works

Every year, through a rigorous application process, TED selects a group of exceptional young leaders and trailblazers to be TED Fellows. Fellows are chosen based on the strength of their achievements, their work's potential for scale and positive impact, their vision and passion, and their personal character. They are invited to attend either the TED or TEDGlobal conference, where they participate in an exclusive pre-conference to meet, exchange ideas, engage in skills-building workshops and encounter a few surprises. TED Fellows also present their own TED Talk at the conference – an unprecedented opportunity to disseminate their groundbreaking ideas to the TED community.

The program

Once selected, Fellows are given access to our suite of ongoing programming. Fellows participate in SupportTED – a professional coaching and mentoring program – at no charge. They work with a public relations expert dedicated to sharing their latest accomplishments with the world. TED Fellows also interact on our private online network, resulting in many cross-disciplinary collaborations. They organize regional meet-ups and retreats, building on the initial spark developed at TED conferences, and attend official TED Fellows Retreats, which gather all existing Fellows for a week of intensive conversation and collaboration. TED Fellows also have the opportunity to apply for a Senior Fellowship for an additional two years of engagement with the TED community.

The results

The TED Fellows experience helps these visionary individuals increase their clarity of mission, improve self-confidence and renew their sense of personal sustainability. As a result of the program, TED Fellows have received millions of dollars in funding, been awarded prestigious prizes, started speaking professionally and written books. Fellows become part of a dynamic and close-knit community for years after their initial selection. Most significantly, the program has helped the Fellows to expand and intensify the impact of their remarkable projects, benefitting thousands of lives around the world.

How you can get involved

The TED Fellows program is made possible by our supporters – extraordinary individuals and families who are passionate about the world-changing work the TED Fellows do every day. Our supporters play an active role at the TED conference and Fellows Retreats, mentor Fellows in their projects and careers and help the program grow in scope and ambition. You can contribute by:

- 1) donating to the program
- 2) sponsoring the program with corporate underwriting
- 3) mentoring a Fellow
- 4) teaching at a Fellows event
- 5) telling an excellent candidate about the TED Fellows program and
- 6) contributing in-kind goods and services.

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Shoham Arad, Deputy Director
Sam Kelly, Communications Manager
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Katrina Conanan, Executive Assistant

Contact the TED Fellows program at fellows@ted.com.

To learn more about the TED Fellows program, visit www.ted.com/fellows.

USING THE TERM LOOSELY

by Ben Burke

We're all just beams of light –
No wait – we're each a gem.
We were born a stone,
We got polished and cut
 And repolished and cut
Over and over again.

So now we're all multifaceted.
Now we each refract the light.
And the light is the light of just being alive.
Yes that's what it is,
That sounds right.

So all of life is a beam that is shot through us stones
And we pass it on
 After it's spent some time in our bones.
We accept it, deflect
 Remember, then forget it –
We absorb it and make it our home.

So then, what am I saying?
 Or more to the point –
What is there, truly, to be said?

We get here, go there
Build some stuff and write some things
 Maybe we sing a song
 And then we're dead.

*But maybe someone else will sing that song
 And someone will use all the
 things that we made.*

*Maybe we stopped something from
going wrong.*

*Maybe the next cut of some gem
will be finer, and better
Because we helped sharpen
the blade.*

No wait –
 Now I've got it:
 All of life is a sea.
 No, our brains are the sea
And they're pushing and pulling us.
 But consciousness lets us turn to face our brains
 Which are the sea,
Or more to the point –
 The tide.

Yes we have been built to swim against it
 To get over and under and around
 our own selves –
 Our minds longing to get to the other side

Of something.
Or other –
We can build our dreams and have our druthers
 Or hand them out and give them up.

We can see the water
Then be the water –
 We can make it full or break the cup.

So we're the water the light passes through.
 No wait –
 Again, I'm thinking, we're the light.
Sometimes you're a particle,
Sometimes you're a wave –
 You can be the days
 Or
 You can be the nights.

So we're a light that is bounced off the skin of the sea.
 Projecting on the future –
What is a thought for today, then
 Tomorrow, will be.

Of course I'm using my own unwieldy languages here
 To tell the world's most delicate story.
In a dimly lit room, describing the storm that's outside –

*Yes inside may be dark
 And at times,
 even boring –
But then we're floating in a cloud
of stars*

*So every moment then
is one of glory.*

And I guess we are each our own religion.
 Yes, I guess we have each found a way.
Or at least we are finding
 And our brains are always winding up
 In some new place to play.

And you can't ever have had
 More than you currently have, so –

(deep breath)

Never mind –
 I give up.
 Perhaps today it's enough
 To just be a thing that can cast its own shadow.

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