# NATURE'S

**TEN PEOPLE WHO MATTERED THIS YEAR**

FENG ZHANG

TÁNIA SIMONCELLI

DEBORAH PERSAUD

MICHEL MAYOR

NADEREV SAÑO

VIKTOR GROKHOVSKY

HUALAN CHEN

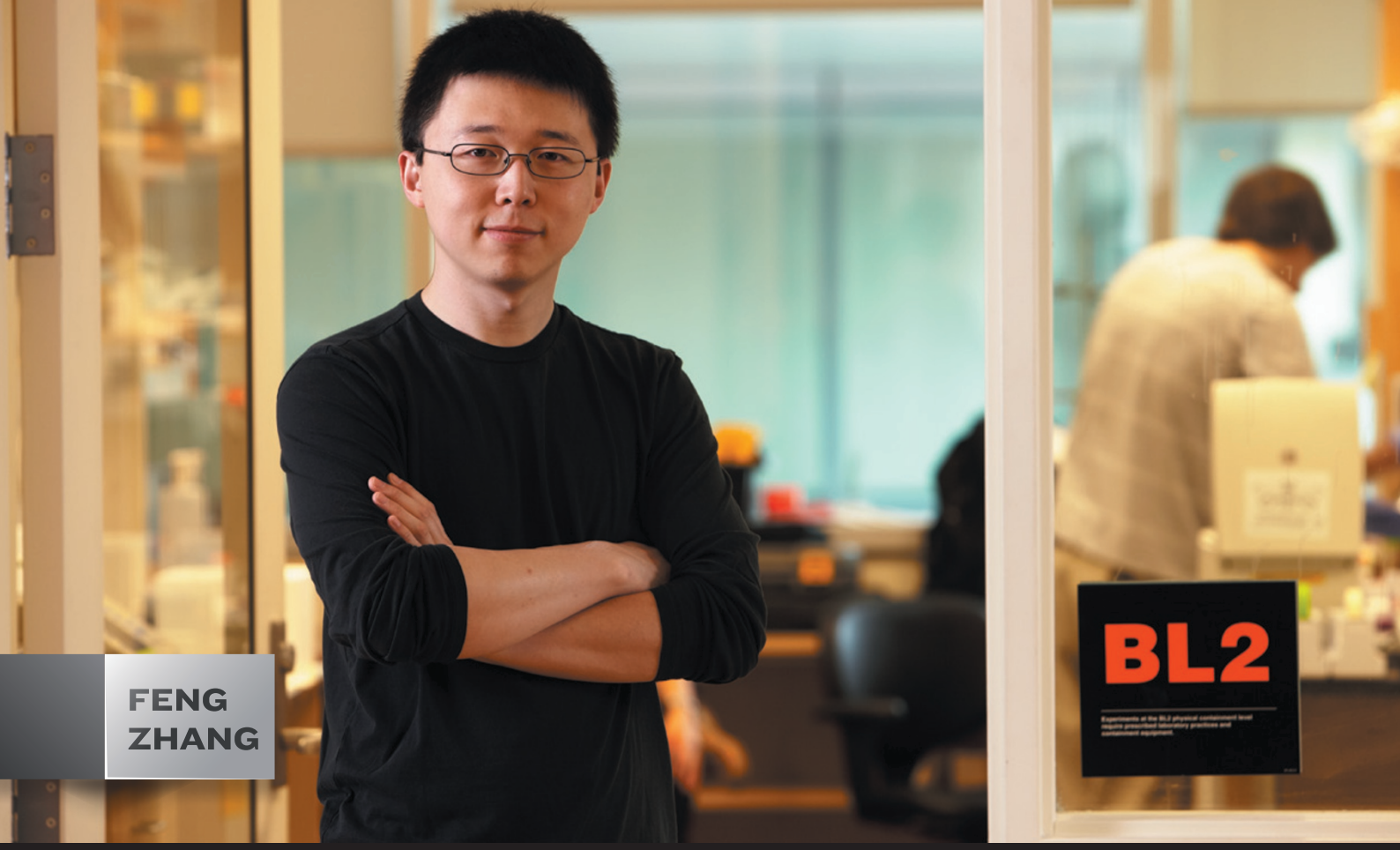
SHOUKHRAT MITALIPOV

KATHRYN CLANCY

HENRY SNAITH

**365 DAYS:** *the year in science*

ILLUSTRATION BY BRYAN CHRISTIE DESIGN




# DNA'S MASTER EDITOR

*Borrowing from bacteria, a biologist helps to create a powerful tool for customizing DNA.*

**BY DANIEL CRESSEY**

With a nip here and a tuck there, a DNA-cutting mechanism that bacteria use to protect themselves from viruses became one of the hottest topics in biomedical research in 2013. And a young neuroscientist with a penchant for developing tools helped to make it happen.

Thirty-two-year-old Feng Zhang of the Massachusetts Institute of Technology in Cambridge is among those leading the charge in using a system called CRISPR/Cas to edit genomes cheaply, easily and precisely. In January, his group showed that the system works in eukaryotic cells — ones with membrane-bound nuclei, including those of all animals and plants. This confirmed its potential for tweaking the genomes of mice, rats and even primates to aid research, improve human-disease modelling and develop treatments (L. Cong *et al. Science* **339,** 819–823; 2013).

But as hot as the story has been this year, "the CRISPR craze is likely just starting", says Rodolphe Barrangou, a microbiologist at North Carolina State University in Raleigh.

CRISPRs (clustered regularly interspaced palindromic repeats) are DNA sequences that many bacteria and archaea use to defend themselves. They encode RNAs that can specifically recognize a target sequence in a viral genome. The RNAs work in complex with a CRISPR-associated protein, or Cas, which snips the DNA of the invader.

In 2012, Jennifer Doudna of the University of California, Berkeley, Emmanuelle Charpentier, now at the Helmholtz Centre for Infection Research in Braunschweig, Germany, and colleagues showed that they could reprogram a CRISPR system to cut apart potentially any specific DNA target (M. Jinek *et al. Science* **337,** 816–821; 2012). By controlling how the break is repaired, they can edit a gene — adding, switching or removing parts to change the protein it encodes or disable it altogether.

CRISPR is similar to two earlier genome-editing methods: the zinc-finger nuclease (ZFN) and transcription activator-like effector nuclease (TALEN) systems. But both of those locate target sequences using proteins that are often difficult and costly to produce. CRISPRs use RNA, making them easier to design. Zhang says he feels limited only "by what I can imagine is possible".

Although Charpentier and Doudna are generally credited with kick-starting the growth of CRISPR editing, Zhang demonstrated its vast potential by showing that it works in eukaryotes, a finding independently confirmed by George Church at Harvard Medical School in Boston, Massachusetts (P. Mali *et al. Science* **339,** 823–826; 2013). Zhang says that he had a head start on many of the teams who jumped in: he had been investigating the technique before it was widely reported, and because his lab had previously fine-tuned ZFNs and TALENs to edit DNA, it had procedures in place for perfecting CRISPRs.

Zhang now says that he feels challenged to be creative with other applications. One particularly ambitious project on his slate is to build a library of CRISPRs that can delete any sequence in an organism's entire genome in 100–200 base-pair increments. This could make it easier to investigate the function of non-coding DNA.

But he is most interested in using CRISPR to treat neuropsychiatric conditions such as Huntington's disease and schizophrenia by repairing genes in human tissues. To pursue therapeutic use of the technology, he and other CRISPR pioneers last month launched a company called Editas Medicine, based in Cambridge, that is backed by US$43 million in venture-capital funding. CRISPR "allows us to start to make corrections in the genome", says Zhang. "Because it's easy to program, it will open up the door to addressing mutations that affect few people but are very devastating." ■

KENT DAYTON

# GENE PATENT FOE

*A US science-policy expert fought to keep genes open to all.*

**BY HEIDI LEDFORD**

In 2005, Tania Simoncelli managed to shock the senior lawyer at the American Civil Liberties Union (ACLU). Simoncelli, the organization's first science adviser, informed him that companies were snatching up patents on many human genes. "That's ridiculous!" exclaimed the counsel, Chris Hansen. "Who can we sue?"

It would not be that easy. Although the ACLU, a non-profit organization based in New York City, has spent nearly a century suing state and federal agencies for infringing civil rights, it had never challenged a patent. And the prospect seemed daunting in this case: the US Patent and Trademark Office had been issuing patents on human genes for nearly 30 years. But Simoncelli saw the practice as a threat to the right of individuals to access their own medical information, as well as to scientists' ability to do research on the genes.

Over the next four years, Simoncelli helped ACLU's lawyers to pull together a case and identify a suitable target for a suit — Myriad Genetics, a firm based in Salt Lake City, Utah, that had been particularly aggressive in defending its patents on two genes that have been linked to breast cancer. And she rallied a consortium of scientists, patients and physicians to support the suit.

"She's so persuasive," says Hansen. "She's persistent in a way that you don't notice, until suddenly you've agreed with her." Ultimately, the ACLU pursued the lawsuit to the US Supreme Court and, this June, won.

For Simoncelli, the experience offered the kind of inter-disciplinary work that she had dreamed of doing since her undergraduate days studying biology and society at Cornell University in Ithaca, New York. "I wanted to be the person who could help bridge the cultures of science and justice," she says.

After Cornell, Simoncelli earned a master's degree in energy and resources from the University of California, Berkeley, then went to work at the ACLU in 2003. Her intention was to stay only two years before leaving to get her PhD in science, technology and society. She stayed for nearly seven — sometimes returning even after she left for the US Food and Drug Administration (FDA) in 2010, using her holiday time to continue work on the lawsuit.

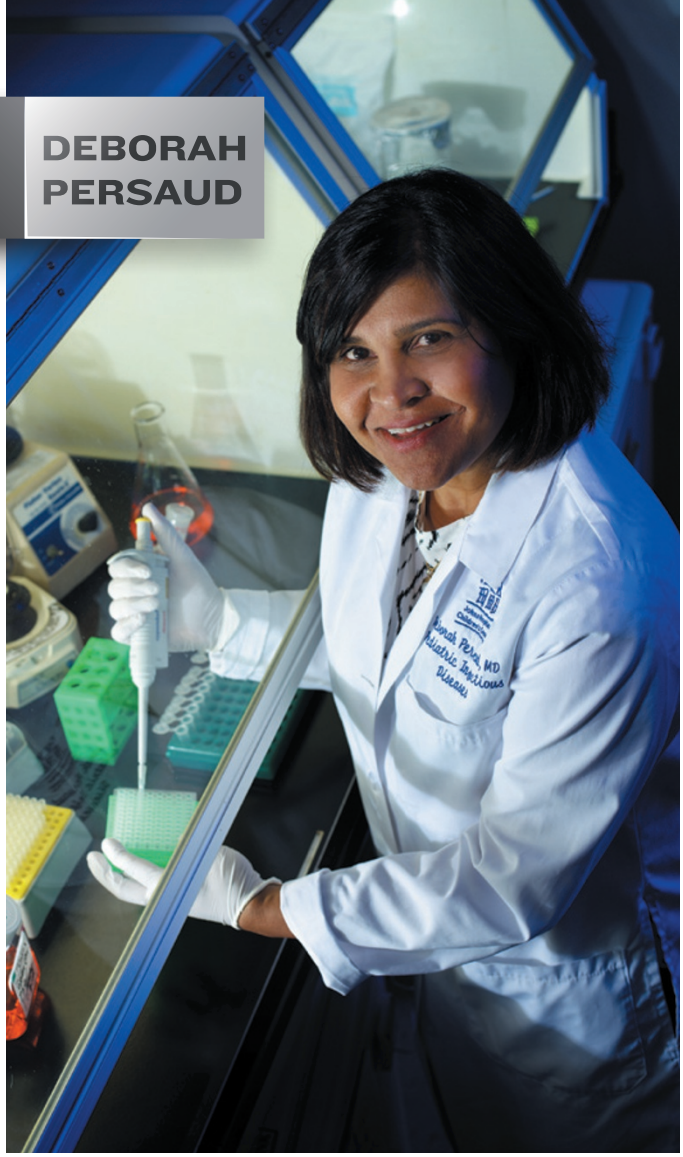
Skipping that PhD was a difficult decision, recalls Sheila Jasanoff, a specialist in science and technology studies at Harvard University in Cambridge, Massachusetts, who taught Simoncelli as an undergraduate and has mentored her ever since. She suspects that Simoncelli has lost out on jobs and at times struggled for respect because she lacks the degree. But at the ACLU she was given the freedom to make her mark. "It was a place where her passion and drive didn't get held back," says Jasanoff.

At the FDA, Simoncelli has focused on policy areas such as nutrition and personalized medicine. She is currently working at the White House Office of Science and Technology Policy on forensic science — a project that brings her back to the intersection of science and justice.

"I'm really looking forward to seeing what's next for Tania," says Jasanoff. "She always surpasses my imagination." ■

**TANIA SIMONCELLI**

EERO SIMONCELLI




JOHNS HOPKINS MEDICINE

# VIRAL VICTOR

*A virologist provides the strongest evidence yet that infants born with HIV can be cured.*

**BY SARA REARDON**

In March, Deborah Persaud was ready to share the news: a baby born with HIV in Mississippi seemed to be virus-free nearly a year after stopping treatment. Persaud, a serious, soft-spoken virologist at Johns Hopkins Children's Center in Baltimore, Maryland, says she knew that she had to tread delicately. More than 40 similar cases had previously been reported in the literature, and each had fallen apart on closer scrutiny. Genetic analysis revealed that most of the initial tests had generated false positives or had involved specimen mix-ups.

But Persaud and her collaborators, Hannah Gay at the University of Mississippi in Jackson and Katherine Luzuriaga of the University of Massachusetts in Worcester, had done the genetic tests on the Mississippi baby themselves and were ready for the critics. What they were not expecting was the media onslaught that followed their announcement. News outlets around the world jumped on the story, and after a month the three were listed among *Time* magazine's 100 most influential people in the world.

Persaud's role in the case started with a call in September 2012 from Gay, a paediatrician, who was treating a baby born to a woman with HIV. Because the mother had gone untreated for the duration of her pregnancy, Gay gave the baby high doses of three antiretroviral drugs — zidovudine, lamivudine and nevirapine — within hours of birth.

# IN SEARCH OF SISTER EARTHS

*An astronomer with a flair for technology extends his legacy of discovery.*

**BY ELIZABETH GIBNEY**

Michel Mayor and his team have found hundreds of exoplanets during the past two decades. But 2013 brought the 71-year-old planet-hunter a particularly gratifying discovery: his group determined that the planet Kepler-78b is of a density and size that make it the closest analogue of Earth identified so far.

It is far from an exact match — Kepler-78b orbits so close to its parent star that its surface is molten. But finding a true Earth twin is only a matter of time, says Mayor, an emeritus astronomer at the University of Geneva in Switzerland who is still active in research. Before he truly retires, he says, "I hope to have the possibility to celebrate this discovery."

Mayor has had plenty to celebrate already. In November 1995, he and his then-student Didier Queloz published the first evidence for an exoplanet orbiting a Sun-like star. The evidence was indirect: just a tiny wobble in the motion of the star 51 Pegasi, caused by the gravity of a world half the mass of Jupiter whipping around its orbit every 4.2 days. Since then, teams led by Mayor have discovered a substantial fraction of the 1,050-odd exoplanets known so far. That success is largely due to Mayor's talent for technology, says Geoff Marcy, a rival exoplanet hunter at the University of California, Berkeley. "Year after year, Michel has built an instrument a factor of ten better than the previous one," says Marcy. "Every time he does it, I'm amazed."

A prime example is the High Accuracy Radial Velocity Planet Searcher (HARPS), which Mayor and his team have been operating at the La Silla observatory in Chile since 2003. Able to detect stellar wobbles of less than 1 metre per second, HARPS is the most accurate spectrograph in the world, rivalled only by HARPS-North: a near-identical copy that has been operating on La Palma in the Canary Islands since 2012.

It was with HARPS-North that Mayor and his team determined the density of Kepler-78b, one of thousands of exoplanet candidates compiled by NASA's Kepler spacecraft between 2009 and 2013. Another group, of which Marcy was a member, independently measured Kepler-78b's size and density.

The next step — to find an Earth-like planet that is far enough from its star to harbour liquid water, and potentially life — remains a challenge. But with instruments improving all the time, Mayor predicts that it will happen within five years. He has every intention of remaining a part of that search. "When you are in the dome, looking at the sky with a new instrument for the first time and you start to see that it is working and better than expected," he says, "it is a huge pleasure." ■

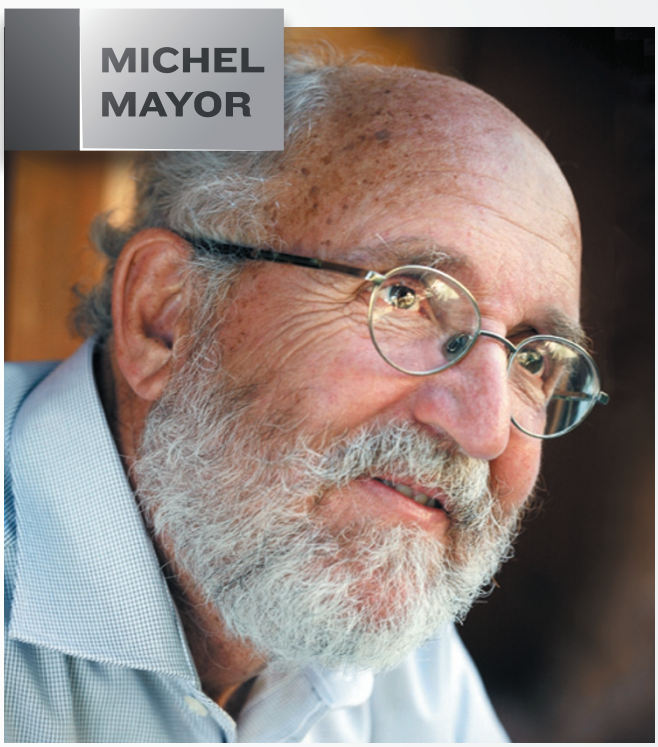
Tests conducted at the time showed that the baby had HIV, and the mother was told to continue the child on treatment. At one check-up, however, Gay found that the baby had not been getting her drugs for five months. Gay tested the child and found no sign of the virus.

To make sure that this was not another false signal, Gay called in Persaud and Luzuriaga. They matched the mother's DNA with the baby's to be sure that she had not been switched in the hospital. They took five separate blood samples for the HIV tests and personally checked each lab result. As they ruled out alternative explanations, it looked more and more likely that the initial blast of drugs had wiped out the virus. They published a paper describing the case in November (D. Persaud *et al. N. Engl. J. Med.* **369,** 1828–1835; 2013), and so far it seems to be standing up to scrutiny.

The media attention after the initial announcement had benefits: it made an ambitious clinical trial more feasible. The International Maternal Pediatric Adolescent AIDS Clinical Trials Group, for which Persaud is a scientific adviser, plans to test these early, heavy drug doses in high-risk infants. HIV transmission rates are low in the United States, so the researchers will need to enrol hundreds of women with the virus to find enough infected infants to make their case.

But many people do not want to wait for the results. Some patients who have been taking antiretrovirals since birth are now wondering whether they, too, can stop taking their drugs. "It comes up in every clinical visit," says Luzuriaga.

For now, people are advised to continue to follow their prescriptions — missing even one daily pill can be hazardous. But if the results hold up, Luzuriaga says that some of the hundreds of children and teenagers treated at birth may one day be able to try ceasing their treatment. In the meantime, Persaud is looking for ways to test whether someone is in remission before such a step is taken. "It's a very high bar," she says, "but it could be the tipping point in HIV therapy for children." ■




RITA SCAGLIA


AP

# CLIMATE CONSCIENCE

*After Typhoon Haiyan ravaged the Philippines, a diplomat focused the world's attention — briefly — on global warming.*

**BY JEFF TOLLEFSON**

When Naderev Saño offered a tearful statement at the United Nations climate talks in Warsaw in November, he did not know the fate of some of his own relatives, or that of thousands of other fellow Filipinos. The head of the Philippines delegation knew only that his brother was alive and had joined emergency workers collecting dead bodies in the devastating wake of Typhoon Haiyan. He also knew that the colossal cyclone — one of the strongest on record — could be a harbinger of what coastal regions will face in the future.

"What my country is going through as a result of this extreme climate event is madness," Saño said. He pledged to fast during the talks, "until a meaningful outcome is in sight".

His plea for solidarity drew a standing ovation. And he kept his fast for 14 days, until delegates reached a last-minute deal to keep negotiations on track for the next major climate summit, in Paris in 2015.

The pace of international progress on global warming has been glacial. Despite more than two decades of negotiations, atmospheric carbon dioxide levels have continued to rise; in May, the daily average concentration topped 400 parts per million for the first time in Hawaii, where the longest-running record is kept. In September, the Intergovernmental Panel on Climate Change released its fifth assessment of the science underlying global warming, which warned of growing threats from climate-related problems such as sea-level rise, extreme weather and droughts.

Looking back, Saño is not sure what impact his speech had, but he argues that Typhoon Haiyan helped to put the international spotlight squarely on the climate issue. Having done graduate work on climate and disaster response himself, he knows that scientists shy away from attributing any single weather event to global warming. But there is general agreement that warming oceans will fuel more energetic storms, he says, and extreme storms resonate in a way that scientific charts cannot.

"I would hope that beyond the slow climate-change negotiations," he says, "our sacrifice and statement would translate into something more profound." ■

VIKTOR GROKHOVSKY

# METEORITE HUNTER

*A Russian researcher tracked the debris from the biggest object to hit our planet in a century.*

**BY QUIRIN SCHIERMEIER**

The event that made 2013 special for Viktor Grokhovsky came without any warning. The mighty meteor that fell to Earth on 15 February had approached our planet from a region of the sky that is inaccessible to ground-based telescopes, so it took astronomers by surprise.

Grokhovsky, a metallurgist at the Ural Federal University in Yekaterinburg, Russia, who has studied meteorites for more than 30 years, was too far away to watch the incoming object light up the morning sky. But when he learned about a powerful explosion that had knocked people off their feet and shattered thousands of windows in the city of Chelyabinsk, he realized that something substantial had hit the planet.

In the days after the impact, Grokhovsky worked feverishly to calculate the meteor's trajectory and predict where fragments might have landed. He supervised searches that unearthed more than 700 pieces of the meteor, weighing a total of 5.5 kilograms. "It was a great satisfaction when it turned out that our initial calculations had been correct," he says.

But his greatest catch came later in the year. Calculations of the meteor's trajectory and a large hole in the ice of a lake to the west of Chelyabinsk had convinced Grokhovsky that the biggest single chunk had landed there. When divers finally searched the lake's muddy bottom in October, they recovered a 570-kilogram boulder.

Thousands of fragments from the meteor are being analysed in labs around the world and they have already begun to reveal their secrets. "It is hard to overestimate the importance of the Chelyabinsk meteor," says Grokhovsky. Because of its size and the damage it caused, it has prompted scientists to increase the odds of similar meteors — or larger ones — striking our planet.

Grokhovsky says that it was a once-in-a-lifetime experience for him. "I was lucky enough to play a part in this exciting story about a space traveller's adventures on Earth." ■

NATALIA NIKITINA

# FRONT-LINE FLU SLEUTH

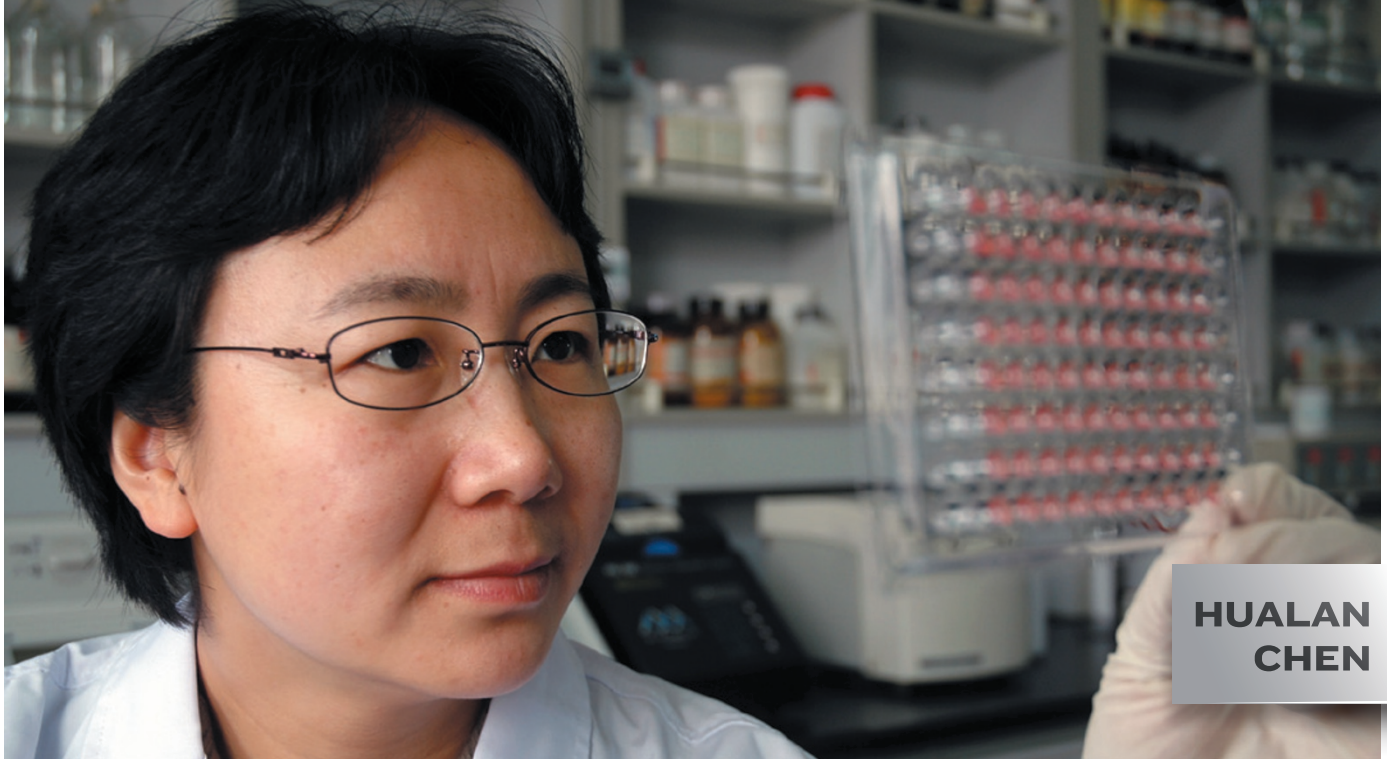
*A virologist helped China to quell an outbreak of H7N9 avian flu in humans.*

**BY DECLAN BUTLER**

In the early weeks of April, the world's virologists and public-health officials had their eyes fixed on China. An emerging avian influenza virus — H7N9 — was jumping to humans from infected poultry, causing severe disease and deaths, with new cases appearing in Shanghai and neighbouring provinces. Hualan Chen, head of China's National Avian Influenza Reference Laboratory in Harbin, found herself and her lab on the front line of efforts to contain the outbreaks. The scientists pushed all other research aside to focus on H7N9 and to find its route of transmission to humans from birds or other animals. They were so busy, Chen says, that "several lost four to five kilograms during the [first] six weeks".

Less than 48 hours after H7N9 cases were first confirmed (S. Jian-Zhong *et al. Chin. Sci. Bull.* **58,** 1857–1863; 2013), Chen's team, along with researchers at the Shanghai Animal Disease Control Center, collected about 1,000 samples from soil, water, poultry farms and live poultry markets in Shanghai and the neighbouring province of Anhui, where the first cases had occurred. Twenty came up positive for H7N9, all from live markets in Shanghai. Authorities quickly closed live markets in the cities where most cases had been reported, and the rate of new infections immediately plummeted. China's rapid and transparent response has been widely applauded.

SHOUKHRAT MITALIPOV




HARBIN VETERINARY RES. INST.

The low rate of new cases has continued, with only a handful reported from May through to the end of November, giving Chen and other researchers time to learn more about the virus. They know that H7N9 jumps more easily to humans from birds than does another deadly avian flu virus, H5N1. So far, H7N9 has shown no sign that it can pass from person to person, but Chen believes that it may have this potential.

Chen was so focused on dealing with the H7N9 outbreak that she paid little attention to a brouhaha that erupted in May over the publication of a study that she and Chinese colleagues had done describing the creation of hybrids of avian H5N1 and 2009 pandemic H1N1 flu that could spread easily between guinea pigs (Y. Zhang *et al. Science* **340,** 1459–1463; 2013). The work was reminiscent of controversial research published last year that involved the creation of forms of avian H5N1 that were transmissible between ferrets, prompting a moratorium on similar work that was ultimately lifted in January 2013 (see *Nature* **493,** 460; 2013). Critics argued that Chen's research, like the previous H5N1 studies, had few practical benefits and that the engineered hybrids might spark a pandemic should they escape from the lab.

Chen asserts that these experiments help to illustrate the threats posed by new flu strains; the H5N1 and H1N1 strains she used coexist in many countries, and she thinks that the reassortment carried out in the lab is likely to occur in nature. Similar experiments are needed for H7N9, she adds.

The lull in new H7N9 cases during the summer and autumn may be the result of the initial market closures, or the fact that avian flus typically spread less frequently during warmer months. Winter has now returned to China, and Chen's lab is on the look out for any resurgence. "Influenza virus surveillance is the top priority in our lab," she says. ■

# THE CLONING CHIEF

*After years of frustration, a biologist has finally developed a line of stem cells from a cloned human embryo.*

**BY ERIKA CHECK HAYDEN**

The hardest part of the cloning advance that Shoukhrat Mitalipov reported in May was not the experiment itself: it was the maze of red tape that came before it.

Since 2007, Mitalipov, a reproductive biologist at Oregon Health & Science University in Portland, had wanted to create cells with the potential to cure any number of diseases — patient-specific stem cells made from embryos cloned from a person's own skin cells. Beyond the technical difficulties, it was a tricky endeavour because it involves harvesting lots of human eggs and using them to create embryos that will then be destroyed. He had to gain approvals from an institutional review board and a stem-cell-research oversight committee. Ultimately, his university built him a new lab, because the cells could not, by law, be derived in his original, federally funded lab space.

Finally, last October, he got started; by Christmas, his lab had succeeded in cloning four cell lines by transferring nuclei into donor eggs. He says that he was able to accomplish the feat, which had long eluded the field, in part because he had spent years perfecting the procedure in monkeys. He had little competition, he says, because heavy regulation had deterred other researchers.

His rush to publish led to problems, notably some duplicated and mislabelled figures in his group's paper (M. Tachibana *et al. Cell* **153,** 1228–1238; 2013). Despite that, researchers such as Dieter Egli of the New York Stem Cell Foundation, who is trying to replicate the work, are optimistic. "My sense is that some of the major conclusions in Mitalipov's paper are likely to stand the test of time," says Egli.

Mitalipov is now seeking federal approval to begin clinical trials of a similar technique, mitochondrial transfer, in women who hope to have children free of mitochondrial diseases. He is also comparing stem cells derived from cloned embryos to those derived from reprogrammed adult cells. He is scrounging for funding and collaborators because federal funders will not pay for research with the cell lines, and the California Institute for Regenerative Medicine will not fund work on lines made the way his were, with eggs harvested from paid donors. And so the work proceeds slowly — just like before. "It feels like we're at the same point where we were a year ago," he says. ■

OREGON HEALTH & SCIENCE UNIV.


L. BRIAN STAUFFER

# AN EYE ON HARASSMENT

*An anthropologist unearths disturbing trends in sexual assaults at field sites — and suspects she's just scratching the surface.*

**BY ALEXANDRA WITZE**

Kathryn Clancy loved her doctoral fieldwork in rural Poland. After long days gathering biological specimens from women in a study of reproductive health, she and her fellow scientists — all women — spent their evenings playing board games and listening to pop music. It was "the most magical field experience", says Clancy, an anthropologist at the University of Illinois at Urbana-Champaign.

But years later, she learned that many anthropologists have very different memories of fieldwork. In a halting conversation over coffee, a friend revealed that she had been sexually assaulted by a colleague at a field site run by a university. Clancy decided to take action.

She began in January 2012, by posting stories from her friend and others, anonymized, on her *Scientific American* blog. But she soon realized that anecdotes weren't enough. So she joined forces with three colleagues — Katie Hinde of Harvard University in Cambridge, Massachusetts, Robin Nelson of Skidmore College in Saratoga Springs, New York, and Julienne Rutherford of the University of Illinois at Chicago — to put out a call for data. They asked biological anthropologists to share their stories of field experiences through a web-based survey.

In April this year, Clancy's team dropped a bombshell. During an ethics symposium at a meeting of the American Association of Physical Anthropologists in Knoxville, Tennessee, the team announced that 59% of the 124 survey participants reported experiencing

# SUN WORSHIPPER

*An energetic physicist pushes a promising solar-cell material into the spotlight.*

**BY MARK PEPLOW**

"I always wanted to be an inventor," says Henry Snaith happily. The 35-year-old physicist at the University of Oxford, UK, has fulfilled that childhood ambition in spectacular style.

This year, Snaith amazed materials researchers by massively boosting the efficiency of solar cells made with perovskite semiconductors (M. Liu *et al. Nature* **501,** 395–398; 2013). For a few years, other researchers have used these materials to make lower-efficiency, complex photovoltaic devices, but Snaith realized that they could be harnessed in a much purer and cheaper design. They are now on the brink of commercialization.

Most of the world's solar cells rely on silicon, and convert roughly 17–25% of the light that falls on them into electricity — almost 10 times better than the humble leaf does through photosynthesis. But their thick chunks of pure silicon make them expensive to build. Thin-film solar cells, containing leaner slivers of other semiconductors, are cheaper but generally less efficient; it has taken decades for their efficiencies to creep above 15%. Perovskite cells combine the best attributes of both.

Snaith's cell — made out of methylammonium lead iodide chloride — already has an efficiency of 15%. "The performance has very quickly got to a high level," says Richard Friend, an optoelectronics researcher at the University of Cambridge, UK, who was Snaith's PhD adviser. Through fine-tuning — changing the balance of chloride and iodide, for example — Snaith thinks that perovskite cells could rival the 29% achieved by crystalline gallium arsenide cells, which are used in many satellites but are much too expensive for widespread use.

The perovskite cells are easy to make. Snaith uses simple techniques such as smearing the readily available ingredients across a coated glass plate (S. D. Stranks *et al. Science* **342,** 341–344; 2013). "I don't think there's a cheaper photovoltaic material," he says. "And the stuff is fundamentally stable. We can stick these devices under a tap and they still work." His team is now working on alternative perovskites that do not contain toxic lead and thus would be easier to dispose of.

Snaith chose solar cells as the focus for his research because they

## FIVE TO WATCH

# 2014

### MASAYO TAKAHASHI
**RIKEN CENTER FOR DEVELOPMENTAL BIOLOGY**
Induced pluripotent stem cells could get their first test in the clinic. Using cells derived from patients, Takahashi plans to create sheets of retinal cells to treat macular degeneration, a common cause of blindness.

### CHRIS FIELD
**INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE**
As co-chair of the upcoming report on the impacts of climate change, Field hopes to avoid the errors that undercut the Intergovernmental Panel on Climate Change's 2007 report on the same topic, an area that has taken on greater urgency in the intervening years.

### JEAN-PIERRE BOURGUIGNON
**INCOMING PRESIDENT, EUROPEAN RESEARCH COUNCIL**
When the French mathematician replaces Helga Nowotny, he will enjoy a bigger budget but must protect the grant-giving institution from political and bureaucratic pressures.

### KOPPILLIL RADHAKRISHNAN
**CHAIRMAN, INDIAN SPACE RESEARCH ORGANISATION**
India's Mars Orbiter Mission — the country's first attempt to visit that planet — is scheduled to reach orbit in September. All eyes will be on the spacecraft as it travels a route that has, more often than not, ended in failure.

### GORDON SANGHERA
**CHIEF EXECUTIVE, OXFORD NANOPORE**
In February, customers are expected to reveal the first data collected using the UK company's MinION genetic sequencer. If it lives up to its promise, the device could usher in a new era of dramatically faster, cheaper sequencing.

inappropriate sexual comments, and 18% reported physical harassment or assault in the field.

Abuse was systemic, the team found, and frequently played out along lines of power. Young female graduate students were usually the targets; older, more senior men were usually the perpetrators. And sexual harassment was mostly committed by university personnel: postdocs and professors, not local workers hired for the season. Many respondents suggested that work in the field — removed from the norms of family and friends — may be particularly likely to elicit unwanted behaviour. (When Clancy's team later expanded the survey to include 666 respondents in all fieldwork disciplines, from archaeologists to geologists to zoologists, the results were essentially the same.)

Clancy and her colleagues acknowledge that the survey may have drawn an unrepresentative number of people who have been harassed, but even so, the results shocked the anthropological community. A reaction came swiftly. Within days, the American Anthropological Association put out a statement asserting a zero-tolerance policy for sexual harassment. Other professional societies quickly followed suit with similar policies to cover additional venues, such as their professional conferences.

Through their surveys, Clancy and her colleagues learned that many victims didn't report the abuse to authorities, fearing that they would be cut off from data or from access to a field site they needed. Others filed formal complaints but were told to keep quiet or 'just deal with' the situation. Only on rare occasions were reports of abuse followed through to the victim's satisfaction.

The effects of the trauma lingered for many. "Every time you try to do your science, you're reminded of what happened," says Clancy. Some young researchers leave science because of their field experiences, she adds. "There's no doubt in my mind, we are losing very good people."

Clancy, Hinde, Nelson and Rutherford are putting the final touches to a manuscript detailing the field abuse, which Clancy believes is just part of a larger problem. She has been deluged with e-mails asking her to quantify what takes place in other university settings.

Meredith Hastings, a biogeochemist at Brown University in Providence, Rhode Island, and co-founder of the Earth Science Women's Network support group, says that such work is needed to shine a light on an oft-ignored problem in the research world. "You don't recognize how widespread these issues are," she says, "until somebody speaks up." ■

occupied a happy middle ground in clean energy: wind power, he reckoned, involved too much engineering, and nuclear fusion seemed too distant. Photovoltaic research was just right — plenty of room for improvement, with new discoveries delivering immediate, practical benefits.

He is not alone in his quest. Michael Grätzel at the Swiss Federal Institute of Technology in Lausanne pioneered dye-sensitized solar cells more than 20 years ago, and is now getting spectacular results using perovskites in them (J. Burschka *et al. Nature* **499,** 316–319; 2013). "The whole photovoltaic community is excited about it," says Grätzel. "The perovskites are kind of magic." Snaith did his postdoctoral research with Grätzel, and says that they are still very friendly "but there's certainly competition there".

Solar-cell manufacturers are starting to take an interest in perovskites, but Snaith hopes he has a jump on the competition. In 2010, he co-founded Oxford Photovoltaics, which aims to incorporate transparent perovskite cells into windows. By 2017, the company hopes to glaze large buildings for not much more than the price of conventional glass.

Snaith is also looking forward to his next invention. If photovoltaic power really takes off, he notes, we will need a better way to store solar power for a rainy day. "Once things calm down a bit," he says, "I'll be looking to adapt our work to make better battery electrodes." ■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