

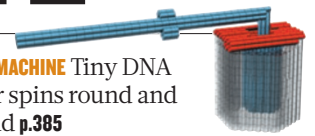
THIS WEEK

EDITORIALS

HOT SEATS All change at the top of the UN climate body **p.382**

WORLD VIEW We must remember that the future will forget **p.383**

NANOMACHINE Tiny DNA rotor spins round and round **p.385**



Safety first

It is worrying that US government departments are unable to divulge basic data on research projects involving human subjects. Such data should be publicly available to ensure volunteers' safety.

“Your safety is our priority.” It’s difficult to visit a sports stadium, travel on an aircraft or even head to the cinema these days without being told that someone, somewhere, is watching out for you. So why do some systems that are set up to protect the volunteers who participate in scientific research seem so inadequate?

It’s not as if we haven’t been warned about what can happen when supervision and scrutiny are lax. In 2010, the US Presidential Commission for the Study of Bioethical Issues was tasked with a sobering mission. A series of horrifying medical experiments on Guatemalan citizens — some intentionally infected with syphilis — in the 1940s had recently come to light. President Barack Obama asked the commission to determine whether such an atrocity could still happen today, and to evaluate the protections in place for all who participate in human-subject research funded by the US government.

The commission soon ran into a problem: a portrait of the current system was difficult to paint. Some government departments did not have ready access to essential data for identifying and tallying federally funded projects involving human subjects. More than six months after the commission asked for them, some departments were still unable to provide basic information, such as a list of all such projects, the number of participants involved and the location of the work.

When it reported its findings in 2011, the commission concluded that current regulations probably protect research participants from unethical treatment. But it could not say so with certainty: “Because of the currently limited ability of some governmental agencies to identify basic information about all of their human subjects research, the Commission cannot say that all federally funded research provides optimal protections,” the report concluded.

To improve the situation, and to help to secure the protection of all involved, the commission made a simple request. Any federal department or agency that supports human-subject research should make a core set of data publicly available, listing the research title, investigator, location and funding. The Department of Defense quickly complied, but some agencies still have not. That is not good enough. Although the bioethics commission cannot compel agencies to collate and gather this information, if these agencies are to preserve public trust and ensure future research, then they should all do so.

The system that oversees human-subject research in the United States is already secretive at too many levels. For example, the ethics committees that assess risk and approve projects — institutional review boards — deliberate in private. Although there are guidelines on the types of expert who should sit on the boards, the guidelines are toothless because there is no independent system to check that they are followed. In 2009, investigators from the Government Accountability Office reported that they had been able to register a bogus ethics committee with the Department of Health and Human Services.

It is true that many federally funded medical trials are logged on the ClinicalTrials.gov website. But sponsors are not forced to register early, phase I studies, and the database extends to non-medical projects.

Officials and government agencies are keen to talk up the benefits of gathering big data. Well, now they need to cough up some information themselves. And there is more to providing these details than mere box-ticking. A reliable map of where research is taking place and what projects are under way allows researchers — and members of the public — to identify gaps and redundancies. It could flag up populations of research participants who are being under- or over-sampled, and studies that are being conducted on populations that may not receive the benefit of the results.

Despite the struggle to obtain useful data, the bioethics commission’s report was able to estimate that the government funded more than 55,000 projects involving human subjects in fiscal year 2010. Most of those were medical studies.

It’s time for the system to give a little back to the many thousands of volunteers who help researchers to advance these studies, sometimes at risk to themselves — by lifting the veil of secrecy that limits oversight of such risks. Making the effort to fulfil the commission’s recommendation is a good way for those in charge to start. ■

“The system that oversees US research on human subjects is secretive at too many levels.”

Generation game

A Nature special issue takes on the world of tomorrow — and the decisions shaping it today.

How do we get to the future? As the old joke goes: well, I wouldn’t start from here. Perhaps the greatest trick that the film director George Lucas ever pulled was to set his Star Wars series not in the future, but a long time ago. Lucas’s emblematic take on once-upon-a-time introduced each film as entirely unconnected in space and time to the present day. Everybody on screen was long dead. Their lives and troubles and loves and hates were dust. The tales of heroism and noble deeds were essentially myths.

Much science fiction does the opposite. It takes what we have now and spins it forward. Or it picks a destination and charts a course. Occasionally, the two narrative devices collide awkwardly, and present-day humans discover some futuristic technology, which they use to change their own path. But most of the time, even tales of aliens and interplanetary travel are presented as a consequence

of a plausible series of likely events.

Technologists will tell you that the future is already here, it is just unevenly distributed. But there is one factor that defies such a simplistic vision: humans. One day, in the not too distant future, everybody alive today will be dead. The planet will be inherited by people who had zero input into how Earth — their only home — was farmed, fished, burned, polluted, shaped and exhausted. Perhaps some of them are reading this.

If so, the people of the future — those born in the late twenty-first century and beyond — may well scan this special issue of *Nature* with bewilderment or mocking nostalgia. In a series of articles starting on page 397, we tackle the ethics and opportunities of early-twenty-first-century science and technology and its impact on our future generations (see nature.com/futuregenerations). Gene editing, nuclear waste, climate change, the march of computers and population growth — decisions and paths embarked on today will resonate well into the future.

Nature has long taken an interest in the fate of future generations and how science can improve — and endanger — them. Back in March 1870, an issue in the first volume of this journal carried a review of the book *Hereditary Genius* (Macmillan, 1869) by Francis Galton, who spawned the field of eugenics (see A. R. Wallace *Nature* 1, 501–503; 1870). His book introduced claimed scientific concepts into what had previously been an economic and social debate about the relationship between present and future people. In Britain, this

came during the era of friendly societies, groups of like-minded people who — before



Climate changes

The loss of three key facilitators must not impede progress on emissions mitigation.

Christiana Figueres has charmed the world. As executive secretary of the United Nations Framework Convention on Climate Change, she helped to lead a remarkable transition from nearly collapsed climate negotiations in Copenhagen in 2009, to an agreement between the world's governments in Paris last year. She transcended her once-thankless — and largely powerless — post as facilitator-in-chief to become a popular and influential advocate for action on global warming. Figueres has now announced that she will be stepping down in July. She will leave on a high note, but whoever fills her shoes will have to deal with significant head winds.

Figueres's departure, which became public knowledge on 19 February, is part of a larger shake-up in the UN climate shop. On the same day, HÉla Cheikhrouhou, executive director of the Green Climate Fund, which was created to help developing countries to reduce emissions and adapt to climate change, announced that she will leave her post at the end of her term in September. And on 15 February, former French foreign minister Laurent Fabius, who skilfully guided the negotiations to a smooth conclusion in December, announced that he is stepping down as president of the climate talks. French environment minister Ségolène Royal will take his place until November, when the leadership transitions to Morocco at the next major meeting, in Marrakesh.

In her letter to governments, Figueres lauded the Paris agreement as a historic achievement and said that the world is now transitioning into a phase of "urgent implementation". From a political perspective, it is certainly true that the Paris agreement was historic. After all, there was no guarantee going into the meeting that anything at all would come out of

welfare and insurance — would pay subscriptions while young, and (they hoped) receive benefits in old age, sickness and death. (In reality, and in a stark example of the pressures that still squeeze pension provision, many of these societies paid out more to older members than they could take from healthy young workers, and so went bust.)

The concept of intergenerational equity in popular debate has since focused on finance, with environmental stability and sustainability tacked onto discussions only in the past few decades. The younger generations might feel, quite legitimately, that they are getting a raw deal. Just as many of the people who paid into friendly societies never got a penny back, so the generation born around the turn of the millennium must look at the home-owning and financially secure baby-boomers and curse the timing of their births. Yet these are the young people who will, as they mature, be asked to make monumental decisions that affect not just one or two generations to come, but hundreds.

As tools emerge that could eradicate the genetic basis for ill health, should they be used? When do nations abandon the (already shaky) attempts at collective action on climate change and make explicit their pursuit of pure self-interest? Just how do we dispose of drums of toxic waste that could remain hazardous for a million years? If the future starts tomorrow, then how do we best serve tomorrow's people?

Perhaps there is a lesson in science fiction? Taking what we have and spinning it forward raises questions about the direction we head in — some of which are addressed in this special issue. And the best way to answer those questions is to work out, as best we can, where we, they — or if you are reading this in the future, you — want to end up. We start from here. ■

it, let alone the formal agreement that will be opened up for ratification on 22 April, Earth Day, this year.

Both Figueres and Fabius deserve credit for making that happen, but their successors have plenty of work ahead. It is no secret that the actions that governments have committed to thus far fall well short of those needed to limit warming to 2°C, let alone to 1.5°C, which is the stated goal of the agreement. Nor is it clear that the world is urgently moving forward.

The Green Climate Fund, which was created more than five years ago and has approved just eight projects, is still trying to collect the money promised by nations. The US Supreme Court has put US President Barack Obama's regulations for power-plant emissions on ice, pending a legal challenge. Policymakers in the United Kingdom are still debating how to proceed in the wake of a government decision last November — just before the climate talks got under way — to pull the plug on a programme supporting the development of carbon capture and sequestration technologies. And in another branch of the UN, the International Civil Aviation Organization has proposed a rule on aircraft emissions that is so weak as to be irrelevant.

Nor is the Paris agreement a done deal: crucial details about the framework for monitoring commitments must still be negotiated. For instance, countries have yet to agree on precisely what kind of information they should submit to the UN. To track progress, build confidence and hopefully pave the way for more ambitious policies, scientists, environmentalists and governments need these data to be solid. Given that this objective is the only thing resembling accountability in an otherwise voluntary agreement, negotiations on this point could determine whether the Paris agreement is indeed a success.

Figueres was optimistic about the work to come. "The journey that lies ahead will require continued determination, ingenuity and, above all, our collective sense of humanity and purpose," she wrote to government officials. "I know that together you will again rise to the task." Let us hope that she is right. ■

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