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nature

A new look for *Nature*

The journal has been redesigned for clearer research communication in the digital age.

From today, *Nature* will look a little different. We are unveiling a redesign that will, we hope, help us fulfil our mission to serve researchers and disseminate scientific knowledge worldwide.

This design has been in development for well over a year, and is a much-needed update that helps us — in our 150th year — to communicate science with fresh clarity and style. We love it, and we hope that you, our readers, do, too.

Nature has had a number of design transformations over its history — but they were all based on one assumption: that our content would be accessed through the medium of static ink printed on a physical page. Not any more. That's why we have developed a design that is suited to digital platforms — where the vast majority of readers now find us — while at the same time producing a clear and engaging printed edition.

In surveys and interviews, readers told us that our text can be hard to read; and that research articles increasingly need to do justice to complex data sets. We knew that it would be challenging to come up with a compelling design that meets these needs and also works across formats, but working with renowned editorial designer Mark Porter, we listened, we experimented and we have now acted.

One of the first things you might notice is that the *Nature* logo has changed — this will be the 11th iteration. It's a fresh take on the nature-with-a-small-n that we've used for the past half-century. But it's not just the logo that is new — all our text is now in a custom typeface called Harding, named in memory of Anita Harding, an inspirational professor at London's Institute of Neurology who made important contributions to neurogenetics before her death at the age of just 42.

Working with designers and typographers at Commercial Type, we spent months crafting the typeface to integrate it into *Nature*'s overall design language, inspired by the mid-century Swiss modernist school of rational design. This design school — sometimes called the internationalist school — emerged in response to nationalist design trends before and during the Second World War. It promoted the idea that graphic design should be based on a mathematical grid, allowing designers to arrange type and images with a semblance of order, as *Nature*'s creative director Kelly Krause explains in this issue (see page 476).

The result is a printed journal with text that should be easier to read. We have also adjusted some of the organization and labelling to help readers navigate between sections. From now on, all our research content will also be published in the 'Article' format; the shorter, 'Letter' format has been retired. This will give all the research we publish equal prominence and adds to the extended-data section we created in 2013 to integrate supporting data sets into online papers.

> **"All our text is now in a custom typeface called Harding."**

We have also introduced a new back-page article, called 'Where I work', which profiles researchers, and those connected to research, in the places where they study, work and think. Through a combination of striking photography and first-person narrative, our goal is to provide a glimpse into the lives of people of all ages from around the world. Fans of our Futures articles should not mourn: the journal's science-fiction series continues online.

The redesign process is not over, and you can expect to see more digital changes over the coming year, along with new print and digital design principles for all Nature-branded journals.

Nothing is more important to *Nature* than communicating science with authenticity, accuracy and clarity. We hope the new design does this with a dash of style and with imagination, too. Please tell us what you think. As always, we would welcome your ideas and suggestions for further improvements.

Precarious supremacy

Quantum computing will suffer if claims of supremacy are overhyped.

Researchers led by Google's AI Quantum team have demonstrated 'quantum supremacy' by creating a chip that performed a computational task faster than a classical computer. As we report on page 461, an achievement that the researchers say would have taken the world's fastest supercomputer 10,000 years was completed in under 3 minutes (F. Arute *et al. Nature* **574**, 505–510; 2019).

As the world digests this achievement — including the claim that some quantum computational tasks are beyond supercomputers — it is too early to say whether supremacy represents a new dawn for information technology. It could be that we are looking at quantum computing's Kitty Hawk moment — a reference to the many decades between the Wright brothers' first flight at Kitty Hawk in North Carolina, in 1903 and the advent of the jet age (page 487). At the very least, quantum computers as a routine part of life are likely to be decades or more into the future.

Still, this achievement in science and engineering should certainly not be underestimated. Research teams around the world have been working intensely to unleash the processing power of quantum phenomena: these include superposition, in which particles seem to have multiple states until they are observed; and entanglement, which

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describes how the properties of quantum systems can be tied together. If these behaviours can be more precisely controlled, they would generate exponential gains in processing power for certain tasks compared with today's supercomputers. And that is what the team at Google has achieved.

Its chip, known as Sycamore, comprises just 53 individually controllable superconducting quantum bits (qubits), the basic building blocks of quantum computers. The team chose to calculate the outputs of a random quantum circuit — rather like a quantum random number generator. This is not an easy problem, and the Summit supercomputer at Oak Ridge National Laboratory in Tennessee, the world's most powerful machine in its class, would have taken 10 millennia to complete it, the researchers say. Sycamore needed only 200 seconds.

Summit can call on more than 9,000 of the most powerful central processing units (8 billion transistors in each) and nearly 28,000 graphics processors (21 billion transistors each). With such raw computing power outgunned by just 53 qubits, it's understandable that quantum computers are generating such excitement and optimism.

But this demonstration of quantum supremacy is extremely limited. There's a vast gap to be bridged before quantum computers can do more meaningful things — such as simulating the properties of materials or chemical reactions, or accelerating drug discovery.

For one thing, quantum computers are highly sensitive to environmental noise — including everyday phenomena such as temperature changes and electromagnetic fields. And researchers are a long way from being able to design out these and other obstacles.

Instead of proceeding with caution, a quantum gold rush is under way, with investors joining governments and companies to pour large sums of money into developing quantum technologies. Unrealistic expectations are being fuelled that powerful general-purpose quantum computers could soon be on the horizon. Such misguided optimism could be dangerous for the future of this still-fledgling field.

Such a landscape has created a flourishing network of quantum technologists, but those providing the funding will eventually seek a return on investment. There are already concerns that some firms are over-promising, which is why over-hyping this landmark demonstration could raise expectations further. Researchers fear that, if quantum computers fail to deliver anything useful soon, a 'quantum winter' could descend in which research progress slows, investment stalls and disillusion sets in.

The powerful processors that underpin today's devices such as smartphones were developed from decades of sustained investment — often public investment — in research. Quantum processors will similarly require what innovation economists call 'patient capital'.

Too often in the history of science and technology, expectations are raised, only for reality to get in the way. Quantum computers are still near the start of a long and unpredictable journey. As they encounter challenges and costs start to mount, researchers must know that they can reach their destination.

"Too often in the history of science, expectations are raised, only for reality to get in the way."

Young universities show leadership

Thriving new institutions can share lessons in building research and publishing capacity.

This week, an analysis from Nature Research's Nature Index team (see supplement, page S53) looks at the contribution of 'young' universities to research publishing in the natural sciences. Young universities — those aged 50 years or less — are quickly establishing a reputation in teaching and research. However, in Africa, more needs to be done to build their capacity.

The analysis looked at the contributions of authors from 100 young universities in 2018 to 82 journals in the natural sciences. The journals were chosen by an independent panel of researchers, and span the life sciences, physical sciences, chemistry, and Earth and environmental sciences. Author contribution was recorded in several ways, including the total number of articles published by an institution's affiliated researchers, as well as the share of each institution's contribution to those articles.

In most assessments of research-intensive universities, those in the United States and Europe tend to dominate. But among the leading 100 younger universities, there is much more of an east–west mix, spread across China (11 universities), Germany (11), India (10), Australia (9), South Korea (8) and the United States (8).

Authors from the University of the Chinese Academy of Sciences in Beijing are by far the most prolific, contributing 1,816 articles to the listed journals. That is on a par with the number of articles from older institutions in the United States, Europe and Japan, and substantially ahead of second-placed Nanyang Technological University in Singapore (569 articles).

The absence of institutions from Africa in the analysis is partly because many authors there publish in journals that the index does not capture, including in fields such as agriculture, water resources, primary health care and education. But a comparative lack of financial resources for researchers in the natural sciences is also a factor.

In the spirit of south–south collaboration, universities recognized for their publishing in the natural sciences have an opportunity to support those in need of a boost. Many of the young universities assessed in the index are in countries that, even one generation ago, were at an earlier stage of development. They will have valuable lessons to pass on in building research and publishing capacity.

China's fast-expanding universities are already doing this through the Belt and Road Initiative. Rising institutions in other countries, too, will find mutual benefits by sharing experiences and working with research partners in Africa and elsewhere in the global south.