

Correspondence

Sequencing risk to antibody patents

Patenting claims for genetic sequences of potential therapeutic interest could be called into question if they match those in natural DNA. Next-generation sequencing (NGS) combined with single-B-cell isolation technologies could reveal millions of new human antibody sequences (see S. Rajan *et al. Commun. Biol.* **1**, 5; 2018; B. Wang *et al. Nature Biotechnol.* **36**, 152–155; 2018).

NGS data are currently deposited at the Sequence Read Archive (see go.nature.com/2hhafpd). Although proper sequence annotations and analysis pipelines are still crucially needed (for searching the NGS data archive, for example), these data stand to reveal a wealth of information about human antibody repertoires and immunogenetics.

However, patent applications for huge numbers of such newly discovered antibodies could be doomed — given the 2013 US Supreme Court ruling that naturally occurring DNA segments are non-patentable. **Prabakaran Ponraj** *Intrexon Corporation, Germantown, Maryland, USA.* pponraj@intrexon.com P.P. declares competing financial interests: see go.nature.com/2kwzwxxt

Bitcoin mining built on shifting sands

I disagree with Stuart Wimbush's arguments on the wealth generated during cryptocurrency mining (*Nature* **555**, 443; 2018). Attributing value to the work itself rather than to its results works in a theoretical economics framework, but risks failing to capture the complexity of what wealth actually means.

Many would argue that wealth is defined by social stability and by access to food, education and health care, rather than just by

market values (see, for example, R. Costanza *Nature* **556**, 300–301; 2018). Living in an intact environment is also a form of wealth. The presupposition that cryptocurrency mining generates wealth, purely by converting vast amounts of energy into the results of otherwise purposeless algorithms, is in my view misguided — akin to claiming that multiplying the values of all state currencies by ten would make the world population ten times wealthier.

Wimbush's assertion that US\$275 billion in wealth was generated through Bitcoin and Ethereum currency mining throughout 2017 overlooks their continuing and substantial devaluation. Bitcoin dropped by 49% against the US dollar in the first quarter of this year alone. 'Wealth' is merely a fluctuating number, which can be wiped out in a matter of weeks. I perceive the environmental damage that remains (see S. Foteinis *Nature* **554**, 169; 2018) as a negative global-wealth coefficient. **Maciej Kawecki** *Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland.* maciej.kawecki@empa.ch

Secure energy, food and water in north

Permafrost thawing in the warming Arctic and sub-Arctic is likely to cause widespread land subsidence, damaging homes and infrastructure and disrupting energy, food and water supplies. It could be particularly hard for developed countries around the North Pole to ensure that remote communities have access to these essentials by 2030, in accordance with the United Nations sustainable development goals.

One way to help would be for governments to encourage adoption of renewable energy in the circumpolar north. This could power water-treatment facilities and greenhouses, thereby enhancing water and food

security, creating jobs and making communities self-sufficient.

Many in the far north of Alaska, Greenland and the Canadian and Russian Arctic are not connected to centralized grid systems (L. Mortensen *et al. Polar Geogr.* **40**, 163–185; 2017). Distribution of renewable energy would therefore depend on off-grid solutions such as community electricity generators, or on setting up and reconfiguring local microgrids.

As more financial and technological support is provided to build community-scale renewable-energy facilities, subsidies on fossil fuels in the circumpolar north could gradually be phased out.

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Kenya and Ghana's new science funding

Most African countries still do not prioritize research and development, despite its potential for resolving problems such as the continent's food security and its heavy disease burden. The governments of Kenya and Ghana aim to change this by setting up national funding programmes to achieve high-quality research output.

Kenya's government has committed 2% of the country's gross domestic product (GDP) to research. Its national research fund offers competitive grants to researchers in academia and the private sector. These financed 389 graduate-student fellowships in 2016 (see go.nature.com/2ji6lso) and 158 multidisciplinary or multi-institute research proposals (see go.nature.com/2rdduxv). In addition, 20 infrastructure development grants were awarded — to create centres for research into stem cells, cancer, fishing and food safety, for example.

Ghana's government also intends to start its own national

research fund, with a view to raising the money it spends on research to 1% of GDP. Last year it proposed investing the equivalent of US\$50 million, pending parliamentary approval (see go.nature.com/2w140tn). It also plans to set up a National Science, Technology and Innovation Fund that is accessible to researchers and all potential inventors and innovators (see go.nature.com/2w2jjgl).

Proper management will allow these initiatives to serve as a model for progress in other African countries. Government officials, grant managers and scientists must ensure, for example, that funding is awarded on merit and released on time.

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Fourier's Egyptian transformation

You mark the 250th anniversary of the birth of Joseph Fourier by exploring the past and present ramifications of his celebrated mathematical transform (*Nature* **555**, 413; 2018). Also noteworthy is his expertise in Egyptology.

As you mention, Fourier joined Napoleon Bonaparte's Egyptian expedition as an administrator in 1798. He quickly became an accomplished scholar of Egyptology. It is said that in 1802 he showed a copy of the Rosetta Stone inscription to the young Jean-François Champollion (1790–1832), declaring it impossible to decipher the hieroglyphs it bore. Twenty years later, Champollion announced his success in decoding some of these hieroglyphs (see also A. Robinson *Nature* **450**, 793–794; 2007).

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