

human sequences, says Labbé, but the pair hope to develop it to check sequences from other species, such as mice. The program also struggles to pick up misidentified sequences if the description is unclear in the original paper. This can cause it to miss some mistakes and to flag papers that have no errors, so all papers put through the software should also be checked manually, he says.

The pair say that they used Seek & Blastn to detect mismatched sequences in another 60 papers. Many of these manuscripts have other problems, such as poor-quality images, graphs and large chunks of overlapping text, all of which make some of the papers “strikingly similar” to each other, says Byrne. With the help of colleagues, they are now manually checking the papers.

Although some errors are minor or accidental, Byrne says, the majority of the mismatches they have detected in papers may invalidate the results and conclusions. When you see these incorrectly identified sequences, she says, “you do get concerned about how the results were produced and whether the results in the paper actually reflect the experiments that were done”.

In a study in *Scientometrics*, Byrne and Labbé reported 48 problematic papers, including the 30 papers that had incorrectly identified nucleotide fragments (J. A. Byrne and C. Labbé *Scientometrics* **110**, 1471–1493; 2017). These were all written by authors from China. The duo did not publicly identify the papers, apart from the five papers from 2015, but privately contacted journal editors, Byrne says. Many of the editors have not responded, she says. But three more papers have been retracted. In total, the pair have identified incorrect sequences in more than 90 papers.

Automated tools such as Seek & Blastn are most valuable if they are used to promote good scientific practice and encourage scientists to avoid errors in the first place, rather than just catch people out, says statistician David Allison at Indiana University Bloomington, who has spotted many papers with substantial errors.

Such tools could also help to quantify error rates in particular journals and fields, he says.

Matt Hodgkinson, head of research integrity for open-access publisher Hindawi in London, which retracted two of the papers from its journal *BioMed Research International*, says that he could see publishers using Seek & Blastn as part of the article-screening process.

“It would depend on the cost and ease of use, whether it can be used and interpreted at scale,” says Hodgkinson. Staff or academic editors would also need to check the output, given the risk of false positives, he says. ■



South Africa is building its part of the Square Kilometre Array radio telescope in Northern Cape province.

RADIO ASTRONOMY

Telescope will hit phone signals

Side effect of South African radio array riles residents.

BY SARAH WILD

A map showing how mobile-phone use might be restricted because of a giant radio telescope in South Africa has angered people who will live near the instrument — deepening a rift between the local farming community and those backing the project.

The row has arisen over the South African portion of the Square Kilometre Array (SKA), which will eventually consist of thousands of radio dishes in Africa and up to one million antennas in Australia. The array, which begins construction in 2019 for completion in the 2030s, will have a total signal-collecting area of more than 1 square kilometre, making it the world’s largest radio telescope. The telescope’s first phase in South Africa involves 194 radio dishes, to be laid out like a galaxy with three arms spiralling out from a core cluster.

Local residents in the Northern Cape province, where the government has acquired nearly 1,400 square kilometres of land for the initial phase, have already expressed concerns about the telescope. Some are angry that the SKA won’t boost the region’s economy as much as expected; others fear that the land acquisition will damage local agricultural activity — in particular, sheep farming.

But the map of projected mobile-phone

coverage around the project, uploaded to Facebook on 2 November, has brought to light another problem facing the local community. It shows the area around the SKA’s radio dishes where the use of electronic devices will eventually be restricted, because their signals would interfere with the relatively weak radio signals that the dishes will try to pick up from the distant Universe.

COMMUNICATIONS PROBLEM

Nearby residents had been aware that mobile-reception ‘dead zones’ could be a side effect of the SKA. But Eric Torr, a light-aircraft-business owner who uploaded the map, says it shows that the area affected is “larger than we were led to believe”. The map suggests that six towns fall into the dead zone, he says, and this could have serious implications for their farming economies.

The map was produced by the South African Radio Astronomy Observatory (SARAO), which is leading the SKA project in South Africa. Lorenzo Raynard, head of communications at the SARAO, says it shows areas where mobile-phone coverage could be reduced by 20% or more. The chart was part of a presentation calling on businesses to submit alternative communications solutions for affected areas, he says.

An informal collection of farming ▶

► organizations has already been working with the observatory to find alternative communications technologies, such as satellite phones, that can be used around the antennas, according to Henning Myburgh, a farmer in the area. “Adequate electronic communications, especially for children, are a basic human right,” he says. Myburgh says that the cooperative’s search has now moved to finding mobile-phone technologies that can coexist with the SKA and replicate the phone facilities the farmers currently have. “This is a major shift, and if possible will be a huge step forward,” he says.

Still, says Myburgh, there are farmers who are unhappy. “I don’t think that anybody will ever be happy with the situation, taking into account the massively intrusive nature of the project in the region,” he says.

Nicol Jacobs, who farms in the area of the spiral arms, says the SKA was originally going to affect only two farms. He says he found out about the full extent of the telescope when the government began buying more farms. “We’re going to be eaten piece by piece,” he says. Jacobs says he would like the government to return the bought farms to the agricultural community.

Despite residents’ annoyance, South African law says that the country’s science and technology minister can preserve the area of the SKA’s land for astronomy. The department of science and technology, which oversees astronomy in the country, is responsible for finalizing regulations about areas that will lose mobile-phone coverage, and for defining radio-wave frequencies that will be protected for astronomy. Asked when they would be finalized, the department’s astronomy-management authority declined to give a firm date.

Although resident’s complaints may not affect the SKA’s layout, an environmental assessment — due to be finalized next year — could change matters. Earlier this month, the SARAO tasked the South African Environmental Observation Network with implementing an environmental assessment of the telescope site, and made 3 million rand (US\$209,000) available for the work.

“The relative position of the dishes determines the quality of the telescope beam,” says Robert Braun, science director of SKA Organisation at Jodrell Bank, UK, which is designing the telescope. The organization has drawn up an ideal map of dish positions, says Braun. But it might have to shift them if the environmental assessment finds that local habitats or biomes are affected, says Casper Crous, an ecologist who is part of the assessment collaboration.

The overarching plan is to turn South Africa’s SKA site into a nature reserve and a site for long-term environmental research once the telescope is operational, says Crous. ■



People newly diagnosed with tuberculosis are treated here at a clinic in Jakarta, Indonesia.

INFECTIOUS DISEASE

TB diagnostic test fails to curb cases

Poor response to roll-out of automated test highlights need for better health-care infrastructure in many countries.

BY EWEN CALLAWAY

Seven years ago, the global community of researchers, health-care workers and activists battling tuberculosis was euphoric. A landmark 2010 trial showed that a new genetic test was highly effective at diagnosing TB, raising hopes that countries could soon finally control the disease, which killed 1.45 million that year. The World Health Organization (WHO) promptly endorsed the automated test, called GeneXpert, and promoted its roll-out around the globe to replace a microscope-based test that missed half of all cases.

But the high hopes have since been dashed, because rates of TB have not fallen dramatically (see “Tuberculosis trends”), and nations are now trying to address the problems that cause so many TB cases to be missed, as well as the difficulties of treating those who are diagnosed. Health ministers and officials from 100 countries met in Moscow on 16–17 November in an attempt to turn the tide. And a United Nations General Assembly devoted to TB is scheduled for September 2018. Experts say that the roll-out of GeneXpert offers a cautionary

lesson — although, in hindsight, an obvious one — in the battle against TB. The tale is a familiar one in global health care: a solution that seems extraordinarily promising in the lab or in clinical trials falters when deployed in the struggling health-care systems of developing and middle-income countries.

“What GeneXpert has taught us in TB is that inserting one new tool into a system that isn’t working overall is not going to by itself be a game changer. We need more investment in health systems,” says Erica Lessem, deputy executive director at the Treatment Action Group, an activist organization in New York City.

NO GAME CHANGER

Some 10.4 million people were infected with TB last year, according to a WHO report published on 30 October. More than half of the cases occurred in China, India, Indonesia, Pakistan and the Philippines. The infection, which causes coughing, weight loss and chest pain, often goes undiagnosed for months or years, spurring transmission. The US government and others spent more than US\$100 million developing GeneXpert. Yet despite the