that could make more efficient use of that energy.

Mark Herrmann, Livermore's deputy director for fundamental weapons physics, says the lab got a lot of feedback from scientists involved in the programme. He emphasizes that the long-term goal is to achieve yields that are two orders of magnitude higher than those managed last August. "As long as we're doing good, careful, systematic scientific study, that's what's most important," he adds.

## A critical report

To some extent, the lab's failure to replicate the August experiment was to be expected, because the laser is now operating at the 'ignition cliff', says Riccardo Betti, who heads the laser-fusion centre at the University of Rochester in New York and provides independent assessments of experiments at the NIF. "If you are on one side of the cliff, you can get a lot of fusion output, and if you are on the other side of the cliff, you get very little," he says. The lab doesn't yet have the experimental accuracy to predict on which side a given experiment will land, he says.

Questions about fundamental science and predictive capacity were at the centre of a classified review of the NIF's scientific contributions to the US nuclear-weapons programme provided to the NNSA last year by JASON, an independent scientific panel that advises the US government. In an unclassified executive summary of the report, obtained by *Nature* under the US Freedom of Information Act, the panel acknowledged the NIF's abilities, but stated that the facility is unlikely to achieve "predictable, reproducible ignition" in the next several years.

**"We're still trying to pin down what exactly about these engineering aspects we need to control better."**

The JASON panellists advocated a fundamental rethinking of the programme, and that discussion has already begun in the broader laser-fusion community. Scientists at the NIF and elsewhere are examining ways to reconfigure the current laser, whereas others are pushing for entirely new designs.

For his part, Hurricane is in no hurry. He maintains that the device is now operating in a crucial fusion regime that will be useful for understanding and predicting the reliability of nuclear weapons. "Once we get more energy and more predictability, you have kind of skipped over the interesting physics," Hurricane says. "If understanding and being better scientists and stewards [of the nuclear stockpile] is your objective, this is the regime to work in."

Q&A

# Sri Lanka is in crisis — and so are its scientists

**Sri Lanka is in a state of crisis. With the country in vast debt and inflation sky-high, the government doesn't have enough money to import fuel, exacerbating food shortages. And after wave after wave of COVID-19, the country is now experiencing a massive outbreak of dengue fever. Neelika Malavige is an immunologist at the University of Sri Jayewardenepura in Colombo who has studied dengue for more than a decade. She spoke to *Nature* about the situation in Sri Lanka and how it is affecting her work.**

**What is life like in Sri Lanka at the moment?**
Sri Lanka does not have sufficient foreign reserves to import fuel, which has affected every sector. Schools are closed. The government has declared Fridays to be holidays for public institutions except those providing essential services. Patients can't get to hospitals and neither can doctors, nurses and other staff. On top of that, we are running out of essential medicines and have daily power outages of more than three hours.

There is also not enough food, partly because of the government's decision in May 2021 to impose a nationwide ban on chemical fertilizers, which cut agricultural production and drove up the price of staple foods such as rice and vegetables. Fishing boats don't have diesel or kerosene to catch fish. Inflation exceeds 50%. Many people can't afford to eat three meals a day.

We also have close to 46,000 confirmed cases of dengue this year, which exceeds the number we had in the whole of last year.

**How are you studying the dengue outbreak?**
Most people with dengue have mild disease, but some 15% of people who arrive at hospitals will develop dengue haemorrhagic fever, which can be fatal. There is no way to predict in the early stages of an infection whether someone will develop severe dengue, which means that people have to visit the hospital daily for blood tests to pick up the signs as early as possible.

We are trying to identify biomarkers that can help determine whether someone will go on to develop severe dengue. We are also trying to determine the immune response associated with protection from severe disease.

In addition, my lab is looking for drugs that can be repurposed to treat dengue — for which there is no safe and effective vaccine — and has completed several clinical trials.

**Has Sri Lanka's crisis affected your research?**
There are a lot of things we are not doing that we could have done last year. Recruiting participants and collecting samples from the hospital, which is 16 kilometres from our lab, is especially difficult right now because of the lack of fuel. A lot of people have started cycling, including myself, but cycling between 8 a.m. and 4 p.m. in temperatures above 33 °C, with 80–90% humidity, under the scorching Sun, is a nightmare.

The power cuts and lack of fuel for back-up electricity generators mean that we cannot use equipment such as our Illumina genomic-sequencing machine, which needs to run continuously for at least 24 hours. Instead, we rely on nanopore sequencing, which can run on a battery. Nanopore sequencing is easier and cheaper, but has slightly lower accuracy rates.

Owing to the foreign-reserve crisis, we cannot buy reagents for some of our dengue experiments, so we are freezing many samples for when we can get the reagents.

Some procedures, such as flow cytometry, have to be done on fresh samples, so we have to work around the planned power cuts. It's very challenging. I spend most of my time troubleshooting.

**Has inflation affected your work?**
It has driven up the price of many essential lab items. A bottle of the cell-culture medium we use was 4,000 Sri Lankan rupees (US$11 at current conversion rates) in 2021, and is now 36,000 rupees. I'm still just scratching my head trying to work out how to solve this problem. Can we get the medium at a cheaper rate from manufacturers in China?

Our staff are also severely affected by the rising food prices. An egg now costs 50 rupees, up from 17 in 2020. The price of rice, lentils and coconut oil has also shot up. My research assistants and PhD students are really struggling to make ends meet.

**Interview by Smriti Mallapaty**
This interview has been edited for length and clarity.