

soil in Block 192 contains little oxygen. She says that this makes it difficult to use one of the cheapest, least invasive clean-up methods — introducing microorganisms that can break down oil and gas pollution.

Because of those conditions, along with the accumulation of metals from decades of polluted-water discharge, the UNDP study recommends a combination of measures. These include bioremediation with plants and microbes, removal and incineration of contaminants, stabilization or solidification of polluted areas, and thermal desorption, in which heat is used to separate individual contaminants from a mixture.

Many clean-up options put forth by the study would be difficult to use in Block 192, says Raúl Yusta García, a chemical engineer at the Monterrey Institute of Technology in Mexico. His research suggests that pollution levels in water discharged from oil operations have been underestimated.

Because Peruvian law lacks a clear definition of environmental remediation, government officials, company executives and local communities have different expectations about what a clean-up effort should entail. Although the “occidental, technified world” sees the goal of remediation as reducing health risks, Indigenous people think of it “more as restoration”, returning a site to its former state, says Fernando Morales, an environmental chemist at Simón Bolívar University in Caracas, who worked on the UNDP study.

Peru's environmental standards are inadequate for gauging risks to human health and the environment, especially the aquatic ecosystems on which people depend for food, says Diana Papoulias, an aquatic toxicologist retired from the US Geological Survey, who was also on the UNDP team.

The country has quality standards for water and soil, but not for sediments — where hydrocarbon residue and metals have probably settled, and which might be redistributed throughout the forest by floodwaters during the annual rainy season, she says. The standards that do exist were taken from nations such as the United States, Canada and the Netherlands, whose largely temperate ecosystems are very different from the Peruvian Amazon.

That very ecosystem might put local residents at further risk from pollution. Health exams have found cadmium and lead in Indigenous villagers' blood and urine. Núñez and her colleagues suspect that people might be more likely to absorb those elements in nutrient-poor environments that lack sufficient calcium and magnesium.

The UNDP team has recommended further study of the ecosystem, but that should not delay the clean-up, Núñez says. “Of course you'd do a better job of remediation if you had more knowledge, but I believe the remediation, as such, has to begin now.” ■

## EQUALITY

# Nobel committees to tackle gender skew

*Nominators will be asked to consider diversity in gender.*

BY ELIZABETH GIBNEY

When Donna Strickland won a Nobel Prize in Physics this week (see page 20), she was the first female winner in more than 50 years. Over that period, just one woman has won in chemistry (*Nature* went to press before this year's prize was announced).

This gender imbalance is the subject of increasing criticism, much of which is aimed at the Nobel committees that award the honours. In the awards' history, women have won only 3% of the science prizes (see ‘Nobel imbalance’), and the overwhelming majority of prizes have gone to scientists in Western nations. Some argue simply that the prizes tend to recognize work from an era when the representation of women and non-Western researchers in science was even lower than it is today. But studies repeatedly show that systemic biases remain in the sciences — and the slow pace of progress was especially evident in 2017, when there were no female laureates for the second year in a row.

Göran Hansson, secretary-general of the Royal Swedish Academy of Sciences, says that

even now, too few women might be nominated.

For the first time, the committees will explicitly call on nominators to consider diversity in gender, geography and topic for the 2019 prizes. The request will be included in invitation letters scheduled to go out this month to the thousands of scientists asked to nominate candidates for each prize. “We need the scientific community to see the women scientists, and to nominate those who have made outstanding contributions,” he says.

“The smallest possible nudge can make a difference, so I praise them for that,” says Curt Rice, president of Oslo Metropolitan University and head of Norway's Committee for Gender Balance and Diversity in Research. Other measures and suggestions are in the works to improve gender balance, including changes to nomination committees and nomination rules.

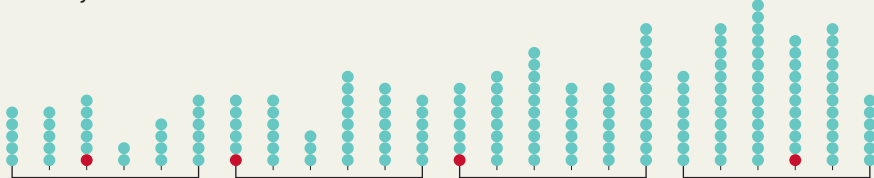
Hansson says that the diversity measures are not about improving the statistics, but about helping the best scientists to win by ensuring that outstanding women are not overlooked. “We are admittedly slow, but we are aware of the situation and we work on it,” he says. ■

## NOBEL IMBALANCE

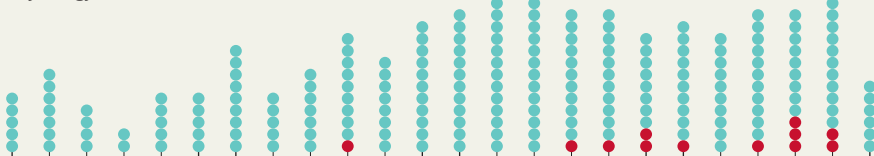
Of the 604 Nobel medals awarded in scientific disciplines, just 19 have gone to women.

### Chemistry

● Women ● Men



### Physiology or Medicine



### Physics



One stack represents 5 years, except for 2016–18 (2016–17 for chemistry).