with Sharif University of Technology in Tehran. More perniciously, international tensions have often driven a wedge between foreign and Iranian researchers, he says: "When I described my visit to Iran, some colleagues would seem to roll their eyes in a 'why would you go there?' fashion."

He adds: "Introducing a large country of 75 million people back into the international community would be a great breakthrough."

Eased sanctions would free up Iran's existing collaborations, too. "Life is not easy for our Iranian friends," says Fassnacht. CERN itself has had to be careful not to inadvertently contravene sanctions when dealing with Iran, he says, such as working with people blacklisted for their links to the country's nuclear programme. Swiss banks have also been reluctant to accept Iran's payment of dues to CERN, although CERN finally found a bank willing to do so, he adds.

The SESAME synchrotron being built near Amman, Jordan, with a goal of promoting peace between Middle Eastern nations, as well as particle physics, has faced similar bank problems, says Christopher Llewellyn-Smith, director of energy research at the University of Oxford, UK, and president of the SESAME council. "It will be a real shot in the arm for SESAME, as it will allow Iran to start paying again and pay debts which have accumulated since sanctions began," he says.

Even more broadly, the negotiations signal a readiness for dialogue. "It's immensely important," says Mansouri, "that Iran, the US and other countries have learnt to talk with each other with rationality." ■ SEE EDITORIAL P.263

Additional reporting by Davide Castelvecchi

NUCLEAR SCIENCE

Challenges to a formal deal

US and Soviet leaders relied on physicists to work out nuclear-weapons reductions and verification procedures during the cold war. Similarly, negotiators now working on a formal deal on Iran's nuclear programme are looking to scientists to provide confidence in its technical underpinnings. Here are three nuclear capabilities that a final agreement will need to address.

BREAKOUT Central to the deal is the concern that Iran could quickly divert its nuclear programme — which it claims is for peaceful purposes — to produce the highly enriched uranium or weapons-grade plutonium needed to build a bomb, an event known as 'breakout'. The preliminary deal requires that Iran reduce the number of operating centrifuges from 19,000 to 5,060 and its stockpile of low-enriched uranium from 10,000 kilograms to 300 kg. Under this scenario, it would take at least a year after a breakout to produce the uranium needed for a bomb, enough time for intervention. The framework agreement also stipulates that the core of a heavy-water nuclear reactor at Arak be replaced with one that generates less plutonium in its spent fuel — and that all spent fuel be sent out of the country.

SNEAK-OUT Under the framework agreement, for the next 25 years the International Atomic Energy Agency (IAEA), headquartered in Vienna, would be given unprecedented powers to inspect any part of Iran's nuclear-fuel cycle. It would also have the right to investigate the possibility of 'sneak-out' — undeclared sites carrying out uranium enrichment or other activities that could result in nuclear weapons. The agency's inspections would use satellite imagery, searches for equipment and environmental sampling to check whether highly enriched uranium has been used at a site. But the agreement is currently much less detailed when it comes to sneak-out than for breakout, and Iran has in the past hidden enrichment plants from the IAEA.

WEAPONS RESEARCH Perhaps the thorniest issue is military nuclear research. If inspectors had access to the nation's Parchin military site, where work on the development of nuclear weapons is alleged to have taken place, they could look for evidence of the testing of nuclear-weapons components. But the deal as laid out does not touch on what powers the IAEA would have to inspect military sites, and, unsurprisingly, Iran has in the past refused the IAEA access to Parchin. Satellite images suggest that Iran has tried to conceal previous nuclear-weapons research at the site from any future IAEA inspection. **D.B.**

GENDER

Leading scientists favour women in tenure-track hiring test

US science and engineering professors preferred female job candidates by two to one.

BY BOER DENG

Universities in the United States employ many more male scientists than female ones. Men are paid more, and in fields such as mathematics, engineering and economics, they hold the majority of top-level jobs.

But in a sign of progress, a 13 April study finds that faculty members prefer female candidates for tenure-track jobs in science and engineering — by a ratio of two to one. That result, based on experiments involving hypothetical job seekers, held true regardless of the hirer's gender, department, career status or university type, researchers report in the *Proceedings of the National Academy of Sciences*[1].

"We were shocked," says Wendy Williams, a psychologist at Cornell University in Ithaca, New York, and a co-author of the study. With fellow Cornell psychologist Stephen Ceci, she surveyed 873 tenure-track faculty members in biology, psychology, economics and engineering at 371 US universities. One experiment presented participants with three hypothetical job candidates, of which two were identical except for their gender. Another experiment added descriptions of marital and parental status, to test whether underlying assumptions about gender choices affected hiring. "You don't frequently see that level of attention and sophistication" in statistical analysis, says Robert Santos, vice-president of the American Statistical Association in Alexandria, Virginia.

Nothing seemed to sway study participants' preference for female job candidates. The authors say that this is interesting given their previous finding that a relatively low percentage of female PhDs in the social and biological sciences secure academic positions — in part ▶

because they are less likely than men to apply for these jobs. Other research suggests that in the physical sciences, women and men are just as likely to secure a tenure-track position within five years of earning a PhD.

There are more signs that science is inching towards gender equality. In February, a study[2] in the journal *Frontiers in Psychology* reported that US women and men with bachelor's degrees in science, engineering and mathematics go on to receive doctoral degrees at roughly the same rate.

Nancy Hopkins, a biologist at the Massachusetts Institute of Technology in Cambridge, argues that the news is not as good as it seems. Women in academic science still face gender-related obstacles before they reach the point of applying for tenure-track jobs, she says.

In the biological sciences, for example, most elite US labs are headed by men. These principal investigators hire more male postdoctoral researchers than female ones[3] — despite the fact that women receive the majority of biology doctorates. Postdocs from such elite labs also tend to be chosen for assistant-professor positions, perpetuating the cycle[3]. Other studies have found that individual faculty members of both genders view female students as less competent than their male counterparts when judging qualifications for junior positions in a lab[4].

Virginia Valian, a psychologist at Hunter College in New York who studies gender equity, says the study's main findings are not surprising. But, she says, "there is a valid concern that progress will be over-interpreted."

Asked about the doubt that has greeted the study, Williams argues that "people find it hard to accept when there's change, even for the better." But she does not dispute that bias may still undermine the prospects of women in science. She and Ceci are now examining women's chances of advancement at other points in their scientific careers, on the basis of data from other nationally representative surveys. ■

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USAF/GETTY

Computer systems have been prone to error since the early days.

REPRODUCIBILITY

Journal buoys code-review push

Nature Biotechnology *asks peer reviewers to check accessibility of software used in computational studies.*

BY ERIKA CHECK HAYDEN

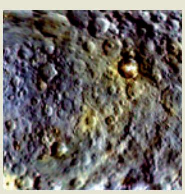
The finding seemed counterintuitive: warming in North America was driving plant species to lower elevations — not towards higher, cooler climes, as ecologists had long predicted. But the research published in *Global Change Biology* indeed turned out to be wrong. In February, the journal retracted the paper after its intriguing conclusion was found to be the result of errant software code[1].

Worried about a rising tide of results that fail to measure up, journals are starting to take action. In the latest such move, *Nature Biotechnology* announced on 7 April a plan to prevent such embarrassing episodes in its pages (*Nature Biotechnol.* **33,** 319; 2015). Its peer reviewers will now be asked to assess the availability of documentation and algorithms used in computational analyses, not just the description of the work. The journal is also exploring whether peer reviewers can test complex code using services such as Docker, a piece of software that allows study authors to create a shareable representation of their computing environment.

Researchers say that such measures are badly needed. They note that the increasing size of

MORE ONLINE

ASTEROID MISSION



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